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**ESSAYS IN DEVELOPMENT ECONOMICS**

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## FOREWORD

The M.A. Economics programme at the Gokhale Institute of Politics and Economics enjoys an excellent reputation for its analytical rigour and emphasis on sound economic foundations. However, the programme provides training in more than this. An additional aim of the programme is to enable students to develop the ability to cogently analyse current policy issues of relevance in the Indian and international spheres.

This collection of essays by Gokhale Institute M.A. Economics students was undertaken as part of their coursework for the course on Economics of Development, during the 1999-2000 academic year. The collection has been edited and compiled by Miss Ira Athale, who is herself currently an M.A. Part II student, under the overall guidance of Professor Arindam Das-Gupta.

Given the diverse coverage of the essays undertaken, it was felt useful to collect around 10 of the essays with the most competent analysis in a volume. The volume provides testimony to the level of maturity of students and the quality of education they receive during their Master's degree. In addition, the essays also contain interesting and relevant discussions of a variety of current policy issues in the area of Development Economics, broadly defined.

We are publishing this collection of essays by the students under the Gokhale Institute Students' Publication Series, beginning with the publication of the present volume.

It is hoped that the essays are found to be of interest to readers while also providing an illustration of possible use in programme design to other M.A. Economics courses in the country.

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August 2000.

## EDITOR'S NOTE

These eight student essays are a selection of those written at the Gokhale Institute, Pune in January- April 2000 for the course on the Economics of Development, conducted by Prof. A. Das-Gupta, Dr. A. Dharmadhikari and Dr. J. Ghanekar.

Development Economics is a broad subject, dealing with diverse socio-economic, technological, ecological, ethical and financial issues of importance in understanding the process and goals of economic development. These papers cover a varied mix of development topics. Their largely common approach is to describe an aspect of development, study the problems associated with it and offer solutions. The papers have been grouped into the following categories:

- General issues in Development
- The Environment, Problems and Policy
- Trade and Infrastructure

The first section comprises three papers. "A Critical Review of Development as Defined by the World Bank", by Deepavali Kulkarni, takes a critical look at the key multilateral funding agency in international development. The author identifies weaknesses in the World Bank's definition of development. She then documents how implementation of World Bank policies is in direct contrast to its avowed aims.

"Judicial Reforms, Development and India" by Daya Murlidharan is an innovative study of the need for judicial reforms in India from the perspective of economic development, the factors that reduce the effectiveness of the Indian judicial system and corrective measures to improve its quality and efficiency.

Anjali Agate's careful paper on "Health Services for the Poor in Pune" not only details the existing health services provided for Pune's poor, but also evaluates the results of a field survey conducted by the author in a slum in Pune.

The next section deals with environmental damage, policy responses and the need for environmental costing. Nitu Singh's paper "Causes and sources of Global Warming" details the root and proximate causes of global warming, major countries responsible for it and suggests economic solutions.

A second, related, paper is "International Policy Responses to the Problem of Global Warming" by Lipi Parija. Reductions that may be possible in emission of greenhouse gases by imposing a carbon tax and trading in emission permits are described. An innovative but incomplete game theoretic analysis of the economics of damage costs and abatement has been carried out, and the resulting non-cooperative equilibrium has been discussed.

Ritwik Rai's essay on "Large Dams in India: Factors that Escape the Cost-Benefit Analysis" adds to the burning debate on the topic. Cost over-runs, overestimation of benefits and unforeseen destruction are incisively catalogued in this essay. Recommendations to ensure more meaningful economic evaluation of costs and benefits are then made.

The first paper in the Trade and Infrastructure section, "The Growing Importance of Electronic Commerce in Global Trade and the Role of the World Trade Organisation" by Queenie Rodrigues, describes the impact of the information revolution on trade practices and their regulation. The growth trends in e-commerce and the efforts of the WTO to encourage and regulate it are the main focus of the paper.

The final paper in this volume is "Financing Infrastructure" by Gita Mahapatra. This deals with the need for Government and private financing of infrastructure and the problems associated with it. Who should finance infrastructure and how, especially in the Indian situation are other topics covered by this essay.

I wish to thank the Director Prof. V.S. Chitre for giving me the opportunity to edit this volume. I also want to convey my gratitude to the Registrar Dr. K.G. Kshirsagar, the Institute Library and Computer Laboratory staff. This volume would not have been possible without Prof. Das-Gupta, who was the moving spirit and guiding force every step of the way.

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**SECTION I**  
**GENERAL ISSUES IN DEVELOPMENT**

# A CRITICAL REVIEW OF ECONOMIC DEVELOPMENT AS DEFINED BY THE WORLD BANK

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M. A. Part II

## Abstract

The World Bank is a major player in development. Therefore its views and definition of development demand rigorous analysis. The World Bank has designed the Comprehensive Development Framework (CDF) on the basis of four principles to enable countries to overcome bottlenecks and meet development goals. Areas of development that the World Bank is concerned with include structural elements, human, physical and sectoral development, macro stability and poverty, information, population and gender issues. Some of these areas cannot be measured. Other areas require more comprehensive indicators than those in use by the World Bank.

The World Bank does not provide a clear guideline to developing countries as to the aim of development and the path to take them there. Prioritisation by the World Bank would help developing countries with inadequate information and expertise to optimally allocate resources. Furthermore, World Bank aid is going to countries not in dire need while other less developed nations do without, as seen in health, irrigation, education and productivity fields. Finally, loans in priority areas such as female primary education can be most effective. Despite this, the World Bank has concentrated on secondary and higher education.

By framing better indicators, providing a clearer development path and allocating money where urgently required, the World Bank will be better able to fulfill its development goals.

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## I Introduction

The subject matter of this paper is the definition of economic development according to the World Bank.

The World Bank, or the International Bank for Reconstruction and Development, as the name suggests, is mainly involved in assisting countries develop by giving them Structural Adjustment Loans. The World Bank is a large international organisation with sanctioned loans of US \$ 28,994 million in (fiscal) 1999. When an organisation controls such vast resources for development, it becomes essential to look into what it means by economic development.

This paper has four more sections. Section II deals with the definition of economic development, according to the World Bank. Section III examines the gap between definition and measures of development employed by the Bank. Section IV

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\* The author wishes to thank Prof. Arindam DasGupta for his inputs and help.

examines the variance between its definition and actual World Bank assistance. Section V presents some conclusions.

## II The definition of economic development according to the World Bank

The World Bank has a holistic approach to development and hence created the Comprehensive Development Framework (CDF). This has been designed to overcome bottlenecks and meet development goals.

CDF is based on the following principles (4):

- (i) The ownership of the development strategy with the country.
- (ii) Partnership of the government with the private sector, NGOs etc. to define development needs and implement programmes.
- (iii) A long-term collective vision of needs and solutions that will draw sustained national support.
- (iv) Structural, social, macroeconomic and financial concerns should be treated equally.

Development has the following six areas:

### a. *Structural elements:*

- (i) Honest and competent government committed to the fight against corruption.
- (ii) Strong property and personal right laws supported by an efficient and honest legal and judicial system.
- (iii) A well-supervised financial system that promotes transparency and strong social safety net.

### b. *Human Development:*

- (i) Universal primary education and strong secondary and tertiary educational systems.
- (ii) A health system that focuses on family planning and child care.

### c. *Physical :-*

- (i) Efficient provision of water and sewerage systems.
- (ii) Expanded access to reliable electric power.
- (iii) Access to road, rail and air transportation and telecommunication.
- (iv) Preservation of the physical environment
- (v) A commitment to processing cultural and historical sites.

### d. *Sectoral :-*

- (i) Integrated rural development strategy.
- (ii) A strong urban management approach.
- (iii) An enabling environment to the private sector.

### e. *Macro-economic stability.*

f. *Poverty, gender inequality, knowledge and information gaps and over population.*



### III The gap between definition and measures of development employed by the Bank

The World Bank's definition of economic development is totally different from what is meant by development in the usual sense. The World Bank is not defining economic development, it is specifying areas of development.

An illustration- a (i). Corruption impedes long term foreign and domestic investment, misallocates talent to rent-seeking activities and distorts sector priorities and technical choices. E.g. - Creating incentives to contract for large defence projects rather than rural health clinics. Thus curbing corruption is of utmost importance in the development process.

However, providing theoretical explanations is not enough. Although in actual practice, the World Bank is involved in the anti-corruption movement, it does nothing to measure and rank countries accordingly. Ranking of countries, as done by Transparency International, is needed to know what measures are needed. Hence only setting up criteria and not evolving indicators to measure those criteria is not enough.

The same is the case of a (ii). What is the measure of a strong legal and judicial system? The number of judges cannot be, since a large number of judges does not ensure an effective legal system. The World Bank though, only gives information on the number of judges and nothing else. In that case, how does one measure a (ii)?

Again, a problem lies in a (iii). Financial transparency refers to the extent to which people know about actual government business – such as how funds are actually allocated. However, the World Bank has not stated any indicator to measure financial transparency. A strong social safety net demonstrates how secure people feel about their future. This feeling of security is generated by the provision of pensions, insurance etc. and also the guarantee of employment upto retirement age. How are these to be measured? The World Bank provides no such measure. Thus structural elements defined by World Bank appear to be somewhat vague, and need to be further elaborated. The other areas of development are easier to measure.

While stating areas of development, no prioritization is done by the World Bank. According to it, every country has its own priorities, depending on its own social and economic needs. Every country must have priorities of development, since resources available with it are limited. However, each country with its limited knowledge, may not be able to fix priorities that will produce the best results. Hence expertise is necessary, which can be easily provided by the World Bank, e.g.- before opening up of capital markets, there should be a strong financial control system. Therefore, the World Bank should prioritize the areas of development (3).

In addition, the World Bank does not have any goal, aim or good to be reached by every country, i.e. it does not display any country as a model developed country, with other countries striving to reach that level. It only publishes data on what all countries have done so far. The country must decide for itself where it wants to reach. This should not be the case. The World Bank should provide countries with the standard that they should reach within a specified time period. The process through which such standard will be reached is also important.

A case in point is women's education. It has the highest social gains; so investing in primary education for women is the most beneficial. It will reduce the Infant Mortality Rate (IMR), incidence of child diseases and will improve child health. So directly investing in an IMR reduction programme would be beneficial, but investing in primary education would comparatively be more effective.

The process through which the problem is attacked is also important and the World Bank should emphasise it.

#### IV The variance between the World Bank's definition and its actual assistance

It can be seen that there is a total difference in policy and actions of the World Bank. The World Bank was meant for development of those areas, which find themselves unable to develop on their own. Instead, it appears to be helping those who are already better off. This can be seen at the aggregate as well as at disaggregate level :-

Table 1: Regional Socio-Economic Characteristics and World Bank Lending

Region	IBRD & IDA Lending (%)	PCI in PPP (US\$)	IMR Per 1000 live births	% Irrigated land	% Adult illiteracy rate
1. East Asia and Pacific	34	3400	37	35.5	22
2. Europe and Central Asia	18	4240	23	9.9	6
3. Latin America and Caribbean Countries	27	6780	32	13.3	14
4. Middle East and North Africa	5	4220	49	35.0	50
5. South Asia	9 %	1610	77	38.9	63
6. Sub-Saharan Africa	7 %	1430	91	4.3	50

Source: (5)

From the two indicators, i.e. IMR and Adult illiteracy rate, the regions that most need assistance appear to be the last three. The assistance they are getting from World Bank and IDA however, is comparatively low. Regions 5. and 6. with low levels of PCI in PPP terms are also small receivers of loans from the World Bank. Thus, this policy of the World Bank is contradictory. It is helping those who don't really need it, at the expense of those who really do.

At micro level (i.e. at each country level), this superfluity becomes clearer.

Table 2: World Bank Loans Needed and Actually Given

Table 2.1: Irrigation System

Most needed in *	% of irrigated land
Botswana	0.3
Burkina Faso	0.7
Chad	0.4
Congo	0.1
Croatia	0.2
Ghana	0.1
Uganda	0.1

\* Most needed – those countries that most need assistance.  
Source: (5)

Loans actually given to	% of irrigated land
Albania	48.4
Egypt	100
Krygyz Republic	76.8

Source: (5)

Table 2.2 Agricultural Productivity

Most needed in	Agricultural Value added (V.A.) per agri worker (\$)
Angola	117
Burundi	139
Malawi	122
Mozambique	76

Source: (4)

Loans actually given to	Agri V.A. (\$)
Brazil	3931
Bulgaria	4351

Source: (5)

Table 2.3 Education

Most needed in	Percentage of relevant age group	
	Primary	Secondary
Burkina Fasso	31	-
Niger	25	6

Source: (4)

Loans given to*	Primary	Secondary
Brazil	90	20
Chile	88	58
China	102	-
Egypt	93	68

\*These loans are mainly for secondary and higher education.

Source: (5)

## Table 2.4 Health

### 2.4.1: Mortality

Most needed in	Mortality per 1000 under 5 years of age	Life Expectancy at birth	
		M	F
Angola	209	45	43
Burundi	200	41	44
Malawi	224	43	43
Mozambique	201	44	47

Source: (4)

Loans given to	Mort. Per 1000 < 5 years	Female Life Expectancy at birth
Argentina	24	77
China	39	71
Indonesia	60	67
Jordan	35	73

Source: (5)

### 2.4.2: Access to safe drinking water and sanitation

Most needed in	% of population with access to safe drinking water	% of population with access to sanitation
Angola	32	15
Cambodia	13	-
Eritrea	7	-
Mozambique	24	23
Congo	-	9
Ethiopia	-	8

Source: (4)

Loans given to	% Popn. with access to clean drinking water	% Popn with access to sanitation
Argentina	65	75
China	63	-
Jordan	63	98
Philippines	63	77

Source: (5)

From all these selected indicators for a few countries it becomes clear that those in utmost need of getting assistance from the World Bank are not getting it, while those who really don't need it, are getting it. This is not how development policy should be.

Another anomaly is the World Bank funding of secondary and higher education, when studies have shown that the rate of return on primary education, particularly female education is higher.

Table 3: Relationship between Female Primary Education and Health Indicators

	Illiterate	Primary	Middle	Higher
TFR	4.03	3.01	2.44	2.15
IMR per 1000	100.6	62.5	56.1	9.72
Maternal Deaths per 1000	48.8	19.9	9.8	4.2
Child Immunization (%)	24	46.9	60.3	70.0
TFR- Total fertility rate				

Source: (2)

*Effect of education on non-market behaviour in India*

The table clearly shows that today's burning social issues like TFR and IMR can be tackled by universal primary education. This should be adopted by the World Bank in its policy, but is not actually being done.

A study examined eight East Asian export-led economies (World Bank 1993). Its results show that increasing enrollment in primary education and later secondary education has been significant in explaining these economically sustained high levels of growth. Since the 1960s, these economics have grown twice as fast as the rest of East Asia, three times as fast as Latin America and faster than the industrial economics. Primary education has also led to a decline in poverty. Primary education was the largest predicted contributor to economic growth rates over the past three decades in these economics, accounting for 58% in Japan and 87% in Thailand.

Table 4: Private Role of Return on Education (Maharashtra 1988)

	Rural		Urban	
	M	F	M	F
Primary	5.5	4.5	8.0	6.3
Middle	3.5	4.5	5.9	7.0

Source: (2)

The World Bank should place greater emphasis on primary education.

## V Conclusion

As pointed out in Section II, for measurement of structural development, i.e. for a (i), a (ii) and a (iii), the indicators given by World Bank are not enough, and still have to be evolved.

The indicators for other criteria, i.e. human development, physical development are satisfactory in themselves, but the World Bank's actions are contradictory. It is not giving loans to those, who really want or need them.

Regarding sectarian development, the World Bank is emphasising integrated rural development. However, the World Bank indicators for rural development are only % of people having access to safe drinking water and the % of people living below the poverty line. These two indicators can not be enough for IRD, some other indicators such as employment guarantees should be included.

For urban management – the indicators given are satisfactory.

With regard to an enabling environment to the private sector – the indicators given by private sector finance and information on corporate tax rate appear comprehensive.

Regarding macro-economic stability, data on deficits or surpluses and the GNP deflator is published. For poverty, the only indicator is the % of the population below the poverty line.

Gender inequality can be seen in the difference between male and female literacy, life expectancy and other socio-economic indicators.

The CDF developed by the World Bank is really very comprehensive and reflects economic development. However, it is stated in vague terms. More elaboration and more indicators are necessary for each criterion stated. Only then can countries know where they stand. If the criteria are non-measurable, then they will be of no use to them. So still better framed indicators of development are needed.

Some goal or standard of development should be stated by World Bank that every country should reach. While achieving it, the new priorities to be set should also be stated by World Bank.

And most important of all, lending activity of the World Bank should be targeted at those who are most in need of it.

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# JUDICIAL REFORMS, DEVELOPMENT AND INDIA

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M. A. Part II

## Abstract

Establishing the rule of law is the core goal of any state. Judicial institutions to protect property rights and enforce contracts lead to efficient allocation of resources and lower transaction costs. Access, timeliness, fairness, public trust and judicial independence measure the efficiency and quality of justice.

The Indian judicial situation is characterised by an excessive number of laws, cumbersome procedures and slow and expensive litigation. Though the need for reform has been recognised, there are vested interests strongly opposed to them. There is limited judicial accountability and no mandatory judicial code of conduct in India. There is a steady increase in the backlog of pending cases along with a shortfall in the required number of judges. This is aggravated by the presence of systemic corruption. On the positive side, public perception of judicial quality, efficiency and integrity is good.

Reforms to solve these problems include simplification and compilation of existing laws, consultations with representatives of the legal profession, procedural checks in the appointment of judges to ensure quality, and internal dispute resolution channels for the largest litigator—the Government.

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## I Introduction

The rule of law is placed as the second most significant indicator of development, next only to investment, by empirical evidence (13). Establishing a strong foundation of law is one of the core goals of any state.

Institutions are devised so as to create order and reduce uncertainty in exchange (15). Institutions that enforce the rule of law play a very important part in the development of an economy as they enable the formation of a stable and predictable system. Protection of property rights and contract enforcement encourage efficient allocation of resources, rational assessment of risks and lower transaction costs. The main aim of such institutions is to minimise the deadweight loss caused by transaction costs, e.g. enforcement costs and information costs (21).

An independent and well functioning judiciary is thus an important prerequisite for an economy to develop. This however, is not present in many countries (19). It has therefore become important to find reforms that can be applied to the judicial system to make it more effective in order that it may provide an environment conducive to development.

The objective of the paper is to discuss judicial system reforms in the context of India. Section II discusses the ways in which the effectiveness and quality justice can be measured. Section III deals with the Indian situation and the problems faced.

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\* The author would like to thank Prof. Arindam Das-Gupta for his help and guidance.



Section IV lists some solutions that have been proposed. In conclusion, possible reasons for non-implementation of reforms are given.

## II Measurement of the Efficiency and Quality of Justice

Three elements have to be considered in the measurement of the efficiency and quality of justice – substantive law, judicial decision making and judicial administration (5).

Substantive law refers to the legal norms expected to be enforced. It is important that the legal system has a single well-defined objective. This allows for the making of clear laws (8).

*Ignorantia juris non excusa* is the diction in most legal systems (12). It is thus important to keep laws simple and clear and also ensure that there is effective communication of laws and regulations to society (21).

Judicial decision making is the manner in which courts find facts and apply substantive law to those facts. This is hampered if there are too many conflicting laws. A single well-defined objective in the legal system rules out subjectivity in decision making. The idea of judicial accountability is also important to ensure that there is no abuse of power (10).

Judicial administration consists of the process and procedures by which courts take cognizance of disputes and present them to judicial decision-making for disposition (5). This is measured by the concepts of efficiency, access, fairness, public trust and judicial independence. Lack of efficiency leads to a reduction in access, fairness and public trust. Efficiency can be measured in terms of timeliness and quality.

Timeliness can be measured using the number of cases filed per year, cases disposed per year, cases pending at year-end, the clearance rate (ratio of cases disposed to cases filed), the congestion rate (the ratio of pending and filed cases to resolved cases) and the average duration of a case. Quality can be measured using the number of judges per million population and by public perception.

## III The Situation in India

The Indian judicial system is generally trusted by business and ranks above the 50th percentile in a recent international cross sectional ranking. However, 64% of the domestic firms find the court system expensive and 88% find it slow (20).

Furthermore, there are too many laws in India. New laws are made without repealing old ones. There is no system by which laws die a natural death. There is also no proper compilation and presentation of these laws. Court procedures are cumbersome and there are procedural avenues to delay court decisions. The law is often written in incomprehensible language and contains conflicting definitions (20, 7).

The system of laws has generated strong vested interest groups, which block any attempt to change them. The judges, the Bar, and judicial support personnel benefit from an inefficient court system and oppose any changes that make it more efficient (14). For example, an attempt has been made to amend the Civil Procedure Code

(CPC) to reduce procedural delays and curb frivolous litigation. The amendment was drafted in 1996 and passed in 1999. When it was finally to become operative, some groups of lawyers blocked it (16). One of the main reasons for this is that the lawyers' incentive structure depends on the hours spent in court preparation and court appearances, rather than on results achieved (20).

A second aspect to consider is the quality of the judiciary. Judges should be competent, qualified, independent and incorruptible. This can be ensured with formal rules, voice and contestability. In India however, there is no system of judicial accountability to the community. There is no punitive measure below that of impeachment (10). The Judicial Code of Conduct in India, which is a little more than four years old, has been recycled recently (1). Its effectiveness, however, is still in question.

Using measures of efficiency discussed in the previous section, India's performance in the years 1968-70, 1982-84 and 1987-89 is examined in Table 1. From the table we can see that the problem is not just an increase in the backlog of cases, but also one of increasing inefficiency in the settlement of new cases. Thus, the growth rate of pending cases is largely determined by the clearance rate. The number of pending cases per judge is strongly associated with the time taken to fully resolve a case. Note that, in Table 1, cases filed per judge are based on the number of sanctioned judges. In India however, as documented in Table 2, the number of actual judges is less than that sanctioned, due primarily to delayed appointments thus increasing the number of cases filed per judge and reducing the clearance rate below the rates in Table 1.

Table 1: Measures of Efficiency of the Judicial System

Years	No. of cases filed per judge* (approx)	No. of cases disposed per judge	Clearance rate** (in %)	Cases pending at year end
1968-70	547	650	119%	3,24,188
1982-84	1606	1498	93.28%	12,51,945
1987-89	1059	1032	97.49%	14,21,589

Notes: \* No. of cases filed per judge -  $\frac{\text{No. of cases filed in that period}}{\text{No. of sanctioned judges}}$

\*\* Clearance rate =  $\frac{\text{Cases disposed}}{\text{Cases filed}}$

Source: (6)

From Table 2, we can also observe that the shortfall in the required number of judges has been increasing over the years. One reason for this could be that the President of India determines the judicial strength and need not consult even the Chief Justice while doing so. India has only 10 judges per million persons. As compared to between 41 and 107 judges per million in Australia, Britain, Canada and the U.S., this is grossly inadequate (7).

At present, there are 28 million cases pending and mounting arrears with the courts in India. Consequently, it can take up to 20 years before a court decision is obtained and enforced. Arrears are estimated to be growing at the rate of 8% per

annum. This means an annual increase of more than 2 million cases per year. At present rates of disposal, it will take 324 years to clear the backlog. The problem is allegedly aggravated by the presence of corruption in the system.

Table 2: Judge Strength in Indian High Courts

Judge strength	1968-70	1982-84	1987-89
<b>Sanctioned judge strength in High Courts</b>			
• Permanent	233	393	422
• Additional	71	31	39
• Total	304	424	461
<b>Actual judge strength in High Courts</b>			
• Permanent	224	358	354
• Additional	54	13	20
• Total	278	371	374
<b>Estimates of required judge strength (Malimath Committee)</b>			
• Required for new cases	225	454	473
• Required for old cases	100	167	276
• Total required	325	621	749
• Shortfall	47	250	375

Source: (7)

Table 3: Quality, Integrity and Efficiency of Judiciary

Percentage of respondents rating services under different categories:					
Very good	Good	Slightly good	Slightly bad	Bad	Very bad
8%	39%	25%	9%	16%	3%

Source: (7)

On the positive side, we can see from Table 3 that the public perceives the judiciary to be good in terms of quality, efficiency and integrity.

#### IV Discussion of Some Solutions Offered

The idea of judicial reforms is not new to India. Law Commissions have been appointed to find solutions to the problems of congestion, access and delay since 1925. A few solutions and steps taken to implement them are discussed here.

First, the compilation of the various laws and regulations is an urgent need in India. Laws must be simplified or scrapped if found to be unnecessary (7).

Second, the problems arising out of the amendment of the CPC discussed earlier, show the importance of extensive consultation with committees representing judges, the Bar, legislators and other affected groups while making any reforms (13). This will assist in the quality, acceptance, implementation and long run sustainability of legal reforms (21).

Third, the quality of judges can be enhanced through judges training programmes (21). Proper procedural checks in the appointment of judges can be

introduced to ensure that the judges are competent and qualified. It is also suggested that the working hours and working days of judges be increased (6).

Fourth, inadequacy of judges can be targeted, by ensuring that decisions on judicial strength are made in consultation with the Chief Justice. Also, the procedure of using sitting judges to participate in Commissions should be discouraged. Instead, retired judges can be used for this purpose (11). There is also need for modernisation of the system of courtroom administration, to reduce arbitrary selection of cases to be heard and corruption, so as to increase the efficiency of the system (17).

Fifth, the government is a major litigator. It is plaintiff, defendant, appellant or respondent in 60% of all suits filed. In the government decision making system, a decision to appeal is taken at the lowest level and that not to appeal at the highest level. This needs to be reversed (6). Also, alternative channels for the Government to resolve its disputes out of court if the disputes are within various Government departments must be set up.

Sixth, the working of Lok Adalats and Tribunals, made with the intention of reducing the caseload on the court system, should be reexamined. The increase in the supply of dispute resolution channels has been offset to some extent by the change in demand. Thus, there has not been a significant fall in the caseload. However, with reform, this is a promising avenue to reduce congestion. For example, The Brazilian judicial system has a complex appeals procedure, which slows down the legal process. However, problems associated with the legal system are given a low ranking by businesses. This is because the judiciary is considered reasonably fair and predictable. Also, private institutions (like well-informed credit systems) have evolved to restrain opportunism in business dealings. These judicial mechanisms allow for the usual proceedings to be bypassed in many cases (19).

Seventh, court fees vary from state to state and also depend on the value of a suit. An increase in these fees will deny legal access to the economically backward. But low court fees encourage frivolous litigation. This increases congestion and causes delays in dispute resolution, making the system anti-poor anyway (7). A solution to this could be to use the English Rule that the losers pay the winners legal fees upto a reasonable limit (9).

## V Conclusion

Many good solutions have been offered to improve the legal system in India. These suggestions have been in existence for a very long time. The problem is with the implementation of these reforms, since the Government is preoccupied with economic and other issues. Those who recognise the need for legal reform (private agents in need of legal protection and independent arbitration) are unable to convince decision-makers to allocate funds or borrow for such purposes (19). The need and relevance of judicial reforms is not well understood. Reforms cannot be started unless there is a consensus among concerned parties with regard to the reforms. There is, therefore, the requirement to educate Government decision-makers on the need for a strong judicial system. The provision of more funds can help build a strong judiciary. If the link between the judicial system and development is understood better, progress may be made towards the implementation of judicial reforms.

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# HEALTH SERVICES FOR THE POOR IN PUNE

ANJALI AGATE  
M.A. Part II

## Abstract

The Pune Municipal Corporation is a large public sector provider of health services in the city, targeted mainly at the poor. It has set up general and special hospitals, maternity homes and dispensaries, providing health care at nominal rates. The private sector in Pune has numerous registered medical practitioners, dispensaries and hospitals, which do not provide health services at subsidised rates.

The pattern of utilisation of medical services by the poor was studied by questioning the residents of the Lakshminagar slum. They were found to use the municipal dispensary for treatment of acute illnesses, mainly because its health services are provided free. Common complaints included the rude behaviour of the staff and inconvenient timings, leading to a loss of daily wages. For minor and chronic illnesses, the poor prefer private practitioners.

Other major health concerns faced by the poor are lack of sanitation and inadequate supply of clean drinking water. Recommendations for improvement include the provision of decentralised medical services, heightened public awareness on health and hygiene and initiatives from business houses.

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## I Introduction

Health Services are services provided for the prevention and treatment of diseases and the promotion of health. This also includes environmental sanitation, immunisation and any other services provided under the Model Public Health Act, as well as the establishment and maintenance of any institution for the purpose of any such services (2).

Given their socio-economic conditions, the poor take rational decisions to utilise not only the public sector medical services, but also other medical care resources available. This paper attempts to shed some light on the medical facilities available for the poor in Pune. It attempts to look at the pattern of utilisation of the existing private and public sector medical services.

The second section of the paper examines the existing medical facilities in Pune, both public and private. The nature and quality of services provided are described in this section. The third section discusses the pattern of utilisation of medical services by the poor. The next section identifies reasons for utilisation or non-utilisation of Municipal medical services. Finally, other health-related problems faced by the poor in Pune, which need to be studied in further detail, are described.

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\* The author wishes to thank the following PMC officials- Dr. Rawatekar, Dr. Satarkar, Dr. Bhagwat, Dr. Thakur and Dr. Chandakkar.

## II Existing Medical Facilities in Pune

### *Public Sector*

The Pune Municipal Corporation is the major public sector medical services provider in Pune. It has a wide network of medical establishments, including 14 general and special hospitals, maternity homes and 38 dispensaries in Pune. These establishments are mainly intended to serve the poor. The Corporation has made provision for the following services:

- i) Maternity Welfare including school health and family welfare services
- ii) Immunisation services
- iii) Health education
- iv) Public health Laboratory services
- v) Hospitals / Dispensaries
- vi) Ambulance Service facilities.

The average population covered by a municipal dispensary is approximately 50,000. There is one Central Government hospital – Sassoon Hospital, with a bed strength of 700. In all these hospitals a nominal fee of Rs. 2 is charged as case paper charges per patient. The bed charge is Rs. 5 per patient per bed. Medicines are available free of charge in all these hospitals and dispensaries and tests are conducted at subsidised rates. However if the patient cannot afford to pay even these charges then it is left to the discretion of the Superintendent or the Doctor to give free service. The patient may also avail of free service (if his economic condition is really bad) on the recommendation of the Corporator of the area or the Health Officer.

The State government has a scheme called the Employees State Insurance Scheme under which the low-income workers can get free medical service in local government hospitals. One percent of their annual salary is deducted for the purpose of this scheme.

The Central government has a scheme called the Central Government Health Scheme, under which Central government employees can get discounts on medical service. This Scheme is applicable in all hospitals, unlike the Employees State Insurance Scheme, which is only available in local Government hospitals. According to the 1998–1999 Budget of Pune Municipal Corporation, the expenditure on medicines provided to its hospitals and dispensaries has been estimated at Rs. 11,20,80,000. Staffing in Government Hospitals and dispensaries is according to Government norms. All the hospitals and dispensaries in the public sector work on a no profit no loss basis.

A questionnaire used to gather information from government hospitals is included in the Appendix.

### *Private Sector*

The private medical sector in Pune has 466 private hospitals and around 1,400 registered medical practitioners. The number of private dispensaries is difficult to estimate, as the setting up of a private dispensary by a registered medical practitioner does not require a licence or permission from the Corporation. As regards the case paper charges and the cost of beds in private hospitals, these differ from hospital to hospital. It is left to the discretion of the management of the hospital to decide these charges. The lowest charge is at the Sanjeevan Hospital (Rs. 75 for a bed in the General ward and no deposit). Private hospitals charge higher



rates for special rooms, VIP rooms and deluxe rooms. They do not offer concessional rates to the poor. Medicines are available within the hospital premises. However these are not free, nor at subsidies rates. Tests conducted in these hospitals are expensive and unaffordable for the poor. The network of private dispensaries is widespread in Pune.

### III Pattern of Utilisation of Existing Medical Services by the Poor in Pune

To study this, a small survey was conducted in the 'Lakshminagar' slum area in Kothrud, Pune. It is a highly congested slum, with the area not developed for human living. Basic amenities like water supply and sanitation facilities are in short supply. In terms of medical services, it is situated in an area where almost all medical facilities are located, including private dispensaries, hospitals, maternity homes, a municipal dispensary, pathological laboratories and so on.

In the absence of any reliable database to select a sample, every alternate household was selected starting from the western corner of the slum. If a house was closed or did not respond, the next was chosen. The respondents included both men and women, with female respondents being in the majority. Both members were found to be daily wage earners in most households.

The interview schedule (in the Appendix) focused mainly on the utilisation of medical facilities. It was divided into sections on utilisation of medical services for minor illnesses, acute illnesses and chronic illnesses, as well as maternal and child health services and family planning services. Also, the extent of utilisation of medical facilities provided by the Municipal Corporation as well as reasons for their utilisation or non-utilisation was asked. Different recall periods were used for different illnesses. For minor illnesses, recall period was one year. Only current chronic illnesses were considered. Acute illnesses were defined as those which required hospitalisation, excluding hospitalisation for child delivery. Family planning utilisation data was collected for married persons in the reproductive age group of 14 - 44 years. In all, 200 persons were interviewed.

#### Findings

The various sources of medical services utilised are summarised in Table 1 for different kinds of illnesses.

Table 1: Health Demands and Sources of Health Services Utilised (per cent)

Health needs	Type of facility		
	Public	Private	Other
1. Minor illness	22.00	67.00	11.00
2. Acute illness	90.00	08.00	02.00
3. Chronic illness	40.00	60.00	--
4. Antenatal care	80.00	20.00	--
5. Delivery	70.00	20.00	10.00
6. Post natal care	75.00	21.00	04.00
7. Immunisation	65.00	10.00	25.00
8. Family planning (Sterilisation)	85.00	13.00	02.00

Source: Primary Data Collection in Lakshmi Nagar Slum Area.

The study found that, for minor illnesses, a majority of households used private medical services. As regards chronic illness, a large number went to private sector for treatment. However for acute illnesses most of the people went to

municipal hospitals or the Sassoon Hospital. Most pregnant women went to municipal hospitals for maternal care. As for immunisation and family planning programmes, most people went to municipal dispensaries.

*Medical Expenditure during one year*

Table 2 documents medical expenditure incurred by families during one year.

**Table 2: Medical Expenditure During One Year**

Medical expenditure (in Rs.)	% households
Less than 100	5
100 - 299	25
300 - 499	40
500 - 999	20
1000 and above	10
<b>Total</b>	<b>100</b>

Source Primary Data Collection in Lakshminagar Slum Area.

The study revealed that the people use private sector medical facilities extensively due to which their medical expenditure was quite high. Though more free or nominally-priced Municipal medical facilities were available, the people preferred private sector medical facilities.

**IV Reasons for Utilisation or Non-Utilisation of Municipal Medical Services**

The findings of the study as regards the reasons for utilisation or non-utilisation of municipal medical services are summarised in Tables 3 and 4.

**Table 3: Reasons for Utilising Municipal Medical Services**

Reasons	% households
1. Nominal charges	80
2. Good treatment	12
3. Qualified doctors & other staff	4
4. Proximity to home	2
5. Other	2
<b>Total</b>	<b>100</b>

Source : Primary Data Collection in Lakshminagar Slum Area.

**Table 4: Reasons for Not Utilising Municipal Medical Facilities**

Reasons	% households
1. Inconvenient	75
2. Rude behaviour of staff	15
3. Distance from home	12
4. Ineffective medicines	4
5. Doctors not good	2
6. Medical benefits available elsewhere	2
<b>Total</b>	<b>100</b>

Source : Primary Data Collection from Lakshminagar Slum Area.

The main reason for the use of Municipal Medical services is the free or nominal cost of medical services in Government hospitals and dispensaries. Other

reasons include good treatment, qualified doctors and other staff and proximity to home. Also, people utilised municipal hospitals more than dispensaries.

Reasons for not utilising municipal medical services were given as rude behaviour of staff, doctors not good, inconvenient timings and medical benefits available elsewhere as main reasons.

The people's perception of quality medical services offered was excellent for the private sector and fair for public sector. Inconvenient timing of Municipal medical services leads to loss of daily wages, hence people preferred to pay higher charges to private practitioners, rather than lose out on their daily wages. Indicators of good quality medical services were mainly early cure, good and regular supply of medicines, good behaviour of doctors and staff and personalised care. Thus different factors influenced the use of medical facilities for different categories of illnesses.

#### *Summary of findings of the study*

The small survey showed that the poor preferred private medical services as against public medical services. However they made use of Municipal medical facilities as they are either free or at absolutely nominal charges. Quality of medical services provided was perceived to be better in case of the private sector as against the public sector. The poor were not confident about the quality of services of public sector. This was mainly due to the way in which medical services are delivered in Municipal hospitals and dispensaries.

#### **V Other Health Problems Faced by the Poor**

Apart from the problems in municipal medical care facilities for the poor in Pune, there are other health care problems, which need to be addressed in greater detail. In this paper we will just take a look at those problems.

The survey conducted above revealed other problems faced by the poor, mainly in the areas of sanitation and water supply. Due to rapid urbanisation and industrialisation, the challenge of providing basic amenities is mounting. With the population of Pune growing at an increasing rate, there is an increasing burden on the Pune Municipal Corporation to keep the city clean and provide regular and clean drinking water.

According to the Model Public Health Act:

"Every local authority shall provide and maintain in proper and convenient places a sufficient number of sanitary conveniences for the use of public and cause all such places to be kept in proper order so as not to be a nuisance or injurious to health.

...Every owner of the ground on which a group of six or more huts stand, shall provide such latrine accommodation, in such positions, and within such time as the Health Officer may, by notice, require for the use of the inhabitants of such group of huts" (2).

The poor in Pune complain of a lack of proper sanitation facilities. The living conditions of the poor, especially in slums is very unhygienic. There is no closed drainage system, which leads to breeding of insects and germs. The *kutchas* houses are located close to each other, with the drainage flowing from the side of the house. This leads to an increase in stomach ailments, as the food the people eat is unhygienic. Toilet facilities are restricted to the bare minimum, with just one toilet constructed per slum area. With the growing population in these areas,

facilities will have to be improved.

In the Lakshminagar slum area where the survey was conducted, there is no toilet facility. When the PMC authorities were questioned about this, they complained of lack of funds. Generally, there was a lack of enthusiasm observed among the authorities in this regard. The PMC needs to improve the situation, by constructing more public toilets and more importantly maintaining them clean. Also, there needs to be more public awareness in this regard. People need awareness about keeping their surroundings and their city clean.

Clean and regular water supply is another problem faced by the poor. In the Lakshminagar slum area, there are only 2 taps provided by the PMC. However people complained that water supply was irregular and that they had to fetch water from Karvenagar, about 2-3 kms away. This leads to lack of sleep as they have to fetch water at 2 am in the morning, to tension and minor illnesses. According to Dr Moghe, a private practitioner who frequently visits this area, most of the ailments of the poor are related to the unhygienic living conditions and lack clean drinking water. According to him, 60% of the diseases can be eradicated if only these basic amenities are provided to the people.

#### **VI Lessons to be Learned**

The quality of medical facilities provided by the Pune Municipal Corporation is perceived to be low. Steps will have to be taken to improve this. In a large set up like Municipal Corporation there is a need for decentralised planning at the Municipal Ward level. More public awareness needs to be developed regarding public health care. One way of doing this is by graphically putting across the message to children in Municipality schools. In addition, business houses can take the initiative to adopt schools, instead of traffic islands. (1)

The Municipal Corporation medical care facilities are effective only at higher levels i.e. hospitals and there is need for developing the lower level medical facilities. Also, local authorities should take steps to raise general awareness about health care.

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## Appendix: QUESTIONNAIRE

### I FOR BENEFICIARIES

#### A. LOCATION:

What is the distance of

- i) Municipal dispensary
  - ii) Municipal hospital
  - iii) Private dispensary
  - iv) Private hospital
- from your house ?

#### B. EQUIPMENT:

1. Do you feel that the services and facilities available in public dispensary / hospital are satisfactory ?
2. Do you find dearth of medicines in the public dispensary / hospital ?

#### C. SERVICES AND STAFF:

1. Are all services mentioned below available in municipal hospital / dispensary and have the services rendered been satisfactory ?
  - i) Medical relief
  - ii) Control of Communicable diseases
  - iii) Environmental sanitation
  - iv) Maternal and Child Health Services
  - v) Family planning
  - vi) School health
  - vii) Health education
2. Have you been getting good treatment from municipal hospital / dispensary staff during your visit there as a patient ?
3. Have any of the government hospital / dispensary staff visited your house on request? If not, What were the reasons ?

D. Suggestions with regard to working of municipal hospital / dispensary and treatment given by it.

E. Medical Expenditure during one year

F. Reasons for utilising municipal medical services

G. Reason for not utilising municipal medical services

H. Health demand and sources of medical facility utilised

I. Any other problems.

## II FOR GOVERNMENT HOSPITALS

### A. LOCATION:

1. Is the hospital / dispensary ideally situated? Do you suggest a change in its location?
2. Are there any private hospitals / dispensaries in the proximity of government hospital / dispensary and have they reduced your importance ?

### B. EQUIPMENT:

1. Maintenance - Is it satisfactory or not? What improvements are needed?
2. How do you obtain medicines and equipment, are present arrangements satisfactory ?
3. Are the supplies on indents placed by you being received (delivered) on time ? Difficulties and suggestions for improvement.
4. No. of beds  
Cost of bed (per patient).

### C. STAFF:

1. Whether trained or not
2. Do you have any emergency calls and how do you respond to them?

### D. SERVICES:

What are the services provided by government dispensary / hospital ?

**SECTION II**  
**THE ENVIRONMENT, PROBLEMS AND POLICY**

# CAUSES AND SOURCES OF GLOBAL WARMING

NITU SINCH  
M.A. Part II

## Abstract

Market failure and policy failure lead to a divergence of public and private interests, resulting in various forms of environmental degradation, such as global warming. In the absence of secure property rights, externalities and the problem of the commons arise. International coordination failure and the application of high discount rates to the future are other underlying causes of global warming. Allied to these are inappropriate pricing of resources, inadequate enforcement of standards and a lack of complete information.

To solve the problem, application of standards, the Polluter Pays Principle and Carbon Taxes are viable command and control measures. The establishment of tradable permits in emissions, under the aegis of an international environmental bank is a market-based solution. At the global level, international agreements can be made and jointly implemented. These and other policy measures need to be taken to appropriately change institutions, modes of production and human behaviour, to ensure a sustainable future.

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## I Introduction

Environmental degradation, whether tropical deforestation or global warming, occurs when those who make decisions about using these resources ignore or underestimate the costs of environmental damage to society. The reasons for this divergence in interests fall into two main categories:

### a) *Market Failure*

Markets frequently do not accurately reflect the social value of the environment, for several reasons: (8)

- (i) No market exists because it is difficult to demarcate or enforce the rights to own or use the environment as with air quality.
- (ii) Some uses for a resource are marketed but others are not. The non-marketed benefits are frequently ignored, while other uses of the resources are overexploited.
- (iii) Open access to resources allows them to be exploited by all. The results are deforestation and global warming.
- (iv) Individuals and societies lack information about environmental impacts and low-cost ways to avoid damage.

### b) *Policy failure*

Sometimes government actions encourage inefficiencies that in turn cause environmental damage. Examples include non-accountability of public sector polluters, provision of water and sanitation at subsidized prices. These failures of



government policy may aggravate the environmental damage caused by market failures, as has happened in the past few decades in the form of global warming (8).

Global warming is one of the most widely discussed environmental challenges of the day. It means a gradual increase in world temperatures. This is caused mainly by the emissions of greenhouse gases (GHGs) and the accumulation of GHGs in the atmosphere is due to inadvertent human intervention (5). The major GHGs are listed below.

Table 1: Greenhouse Gases: Sources and Estimated Relative Contributions to Global Warming

Gas	Major Sources	Percentage Contribution
1. CO <sub>2</sub>	Fossil fuels, deforestation	50
2. Chlorofluoro carbons, other halo carbons	Refrigeration, Solvents, insulation, foams, aerosol propellants, other industrial and commercial uses	20
3. Methane (CH <sub>4</sub> )	Rice paddies, swamps, bags, cattle and other livestock, termites, fossil fuels, wood burning, landfill.	16
4. Tropospheric ozone	Fossil fuels	8
5. Nitrogen Oxides	Fossil fuels fertilizers, soils, burning of wood & crop residues	6

Source: (5)

This note is divided into five sections. The following section deals with the root and proximate causes of global warming. Section III details the major countries responsible for it and IV provides economic solutions to the problem, followed by the conclusion.

## II Root and Proximate Causes of Global Warming

The root causes of global warming are:

### 1. *Property rights*

A property right relates to the right to use a resource. The environment is a resource and hence property. Rights can be private and common (6).

Private property rights exist virtually everywhere. However, the characteristics of the rights differ, depending on the good or resource in question and the jurisdiction, institutions and culture in which they are applied. For instance, despite the widespread use of private property rights, they have not often been used for common pool resources. One explanation for this rests on the fact that to have a private property right of value, we must be able to exclude at least to some extent others from using it. The inability to exclude or alienate makes it difficult to assign private rights to common pool resources. The problem of the misuse of many environmental assets comes about because of imperfectly specified property rights in those assets and this is the main cause why areas which are treated as free to all are poorly managed and degraded (1). The major reasons for poorly defined

property rights according to Schleifer (1995) are inefficient control structures of physical rights and unenforceable contracts (6).

## 2. Problem of the commons

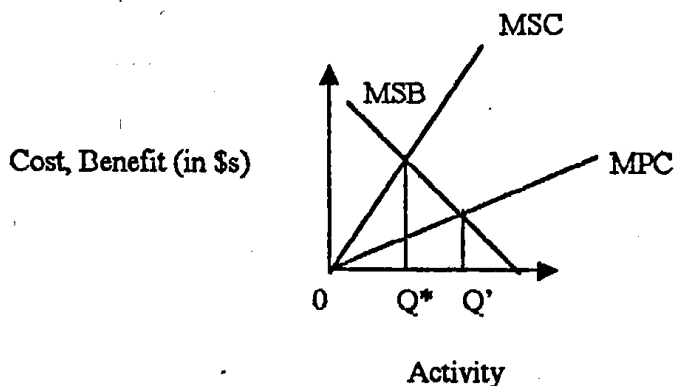
The arrangement that can lead to more externalities in common pool resources than any other is open or free access. Open access describes a situation where no controls are placed on how much firms or individuals can consume or produce. No restrictions exist on the number of firms or individuals. Essentially it is where no property rights exist over the resource in question. Therefore, it leads to the over-exploitation of natural resources, a case where "everybody's access is nobody's property". This is often described as the "Tragedy of the Commons". Many of the world's global environmental problems arise from open access. No one owns the atmosphere so it is often used as a repository for wastes and pollution.

## 3. Externalities

The problems of the distortion of the ozone layer or global warming are called externalities. They arise wherever individuals or firms act without considering their impact on others (1).

In the case of global warming, billions of people contribute to the release of GHGs. Most only consider the private cost of their actions and not the social ones imposed on others in terms of increased GHGs in the atmosphere. This externality or divergence between private and social cost leads to an inappropriate amount of consumption or production of goods and resources (1).

Figure 1. Desirable Level of an Activity



Source: (1)

This is illustrated in Figure 1, where:

Marginal Social Benefit (MSB) shows the benefit derived by society from the consumption of an extra unit.

Marginal Private Cost (MPC) shows the cost of production of an extra unit.

Marginal Social cost (MSC) equals  $MPC + MEC$  (Marginal External Cost).

$Q'$  is the desirable activity from the viewpoint of the individual, whereas  $Q^*$  is the desirable activity.  $Q'$  is not the desirable output from the perspective of society, because the firm imposes an external cost on others which it does not consider. The desirable social output is at  $Q^*$ , where the  $MSB = MSC$  (1).

#### 4. International Coordination Failure

The costs and benefits of measures to mitigate the greenhouse effect may be spread very unevenly across countries. As result, the negotiations on global warming will be difficult and lengthy. The main reasons are: (8)

- (i) Climate change will differ across countries.
- (ii) The damage will differ across countries because of differences in ecology, economic activity or the values placed on natural Habitats and other environmental resources.
- (iii) Countries are responsible for different amounts of GHGs emissions.

Besides this, there are two difficulties to formulate an appropriate response to global warming: (1)

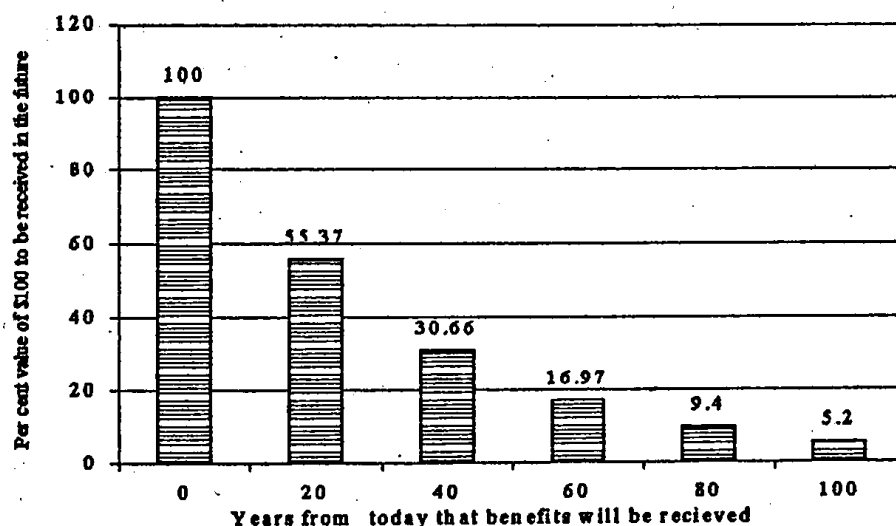
- (a) The lags between action and effect will inevitably be long.
- (b) There is great uncertainty about the links between atmosphere concentrations of the gases and climate change and about the economic and social consequences of global warming.

#### 5. High discount rates

Discounting is a way of aggregating a series of future net benefits into an estimate of present value. A high rate implies that a dollar in the near term is much more valuable than one later on. Thus, the higher the discount rate, the more we would be encouraged to put resources into programmes that have relatively high payoffs in the short run (2).

Figure 2. shows how much the present value of \$ 100 of benefits, discounted at 3 percent diminishes as the time it will be received recedes into the future.

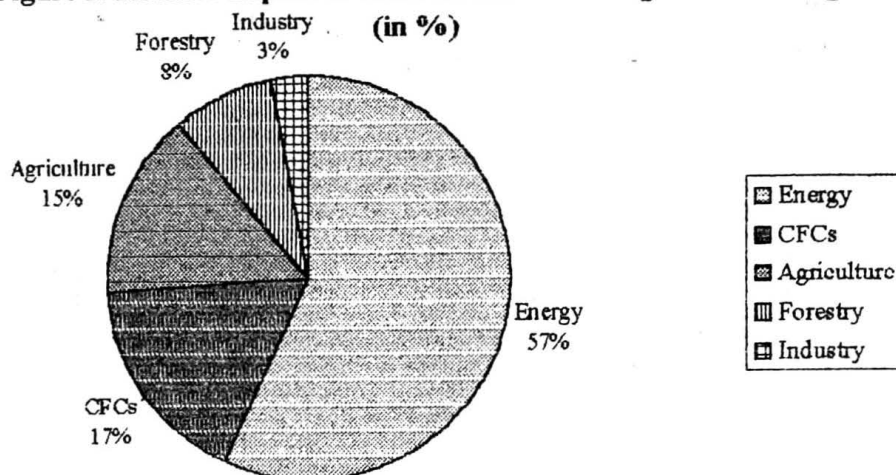
Figure 2. Discounted present value of future benefits



However, there are some significant environmental issues, such as global warming, where substantial impacts are expected to occur in the distant future and

in this case discounting tends to reduce substantially the importance of programmes addressing this problem (2) .

**Figure 3. Relative impact of different activities on global warming**



The Proximate Causes of Global Warming include:

1. *Underpriced resources*

Air pollution and hazardous wastes arise mainly from the use of energy and from industrial production. Energy accounts for 57 percent of global warming. The main cause of increasing consumption of energy is underpricing. At presently underpricing of electricity is the rule, not the exception, in most developing countries. Other sources of energy are coal and petroleum products, which are available at subsidized prices. Due to underpricing of these resources, there is excessive consumption of these resources which is the main cause of pollution. If the prices were to be determined by market forces, demand would be lower (8).

2. *Inadequate enforcement*

It is often assumed implicitly that the penalties written into the pollution control law will be sufficient to produce complete compliance. However, pollution control laws, like any others, require enforcement and this takes resources. Public enforcement agencies always work under limited budgets, hence it is not possible for them to enforce acceptable levels of compliance. On the other hand, at local level, there can be a great deal of informal give and take between the authorised and local plant managers, with participation by local environmental groups as well (2).

At the global level, the standards imposed by industrial countries may set reasonable long-term goals, but developing countries rarely have the means or the need to adopt them immediately. Instead, each country must determine its own priorities (8).

3. *Lack of information*

In determining the acceptable amount of pollution to generate, it is necessary to calculate the costs associated with the externality. However, this is an extremely

difficult task for various reasons. The ability of the regulator to promote the “appropriate” amount of the externality hinges on having enough information to determine this acceptable level. The informational requirements underlying this process are immense. Determining the impact of something such as carbon dioxide (CO<sub>2</sub>) emission is extremely complex because

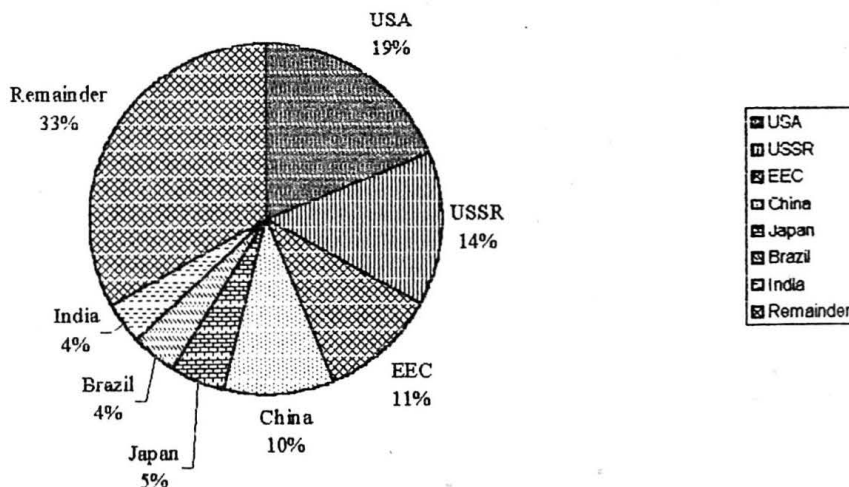
- (i) One has to identify all of the effects of this emission on air quality, health and so on.
- (ii) The costs associated with each effect have to then be determined. For instance- the cost to society of poor air quality alone. It will depend upon the geographical characteristics of the affected area.

Due to the above reasons it is difficult to evaluate the full costs and benefits associated with economic activities for environmental assessments (1).

### III Major Countries Responsible for Global Warming

Figure 2 shows the GIIGs contribution of different countries of different regions. This is calculated as the sum of the national emission estimates of each GHG weighted by a Global Warming Potential (GWP) according to the Intergovernmental Programme on Climate Change (IPCC). The GWP accounts for the impact of each gas based on its atmospheric lifetime and its potency for absorbing heat (4).

Figure 4. Major Countries responsible for Global Warming in 1991



Source: (4)

### IV Solutions

Solving environmental problems like global warming require us to encourage individuals, owners of firms or our national government to take account of the costs that their actions impose on others (1).

Important solutions offered are :-

### 1. Negotiate and assign property rights

Property rights are an effective way of controlling pollution to the socially acceptable level. The property rights solution encourages firms to seek ways of reducing pollution in the least cost way and it forces polluters to face all the costs of their actions. Thus, firms are forced to conform to the internationally accepted Polluter Pays Principle.

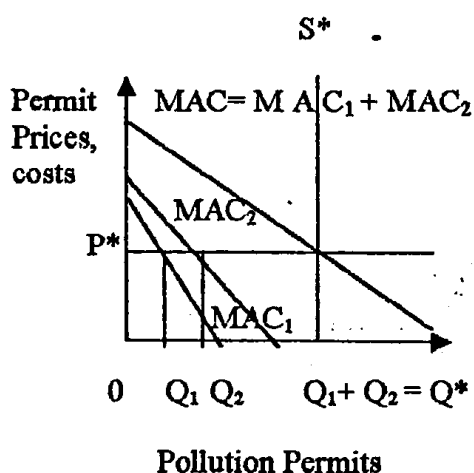
### 2. Standards

This is the traditional approach to pollution control. Standards are frequently referred to as a Command and Control (CAC) policy because they often dictate particular terms to the polluting industry or firm. They could dictate, for instance, that the firm must not pollute more than some given quantity, or that the firm must employ some given production technology. Their effectiveness in terms of pollution reduction depends critically on how the standards are set and enforced (1).

### 3. Tradable Permits

A popular suggestion is to establish tradable permits for emissions so that countries can buy or sell the right to emit CO<sub>2</sub>. This market solution is certainly more flexible than command and control methods and gives incentives to develop cleaner technologies (7).

Figure 5. Cost Minimisation with Marketable Permits



Source: (6)

Figure 6 shows the overall marginal Abatement Cost (MAC) curve as being the sum of the two individual polluters MAC curves ( $MAC_1 + MAC_2$ ). The MAC curve is in fact the demand curve for permits. Polluter 1 buys  $OQ_1$  permits and polluter 2 buys  $OQ_2$  permits at price  $P^*$ . The higher cost polluter 2 buys more permits. This gives us a clue to the cost-effectiveness of permits. Polluters with low costs of abatement will find it relatively easier to abate pollution rather than buy permits. Polluters with higher costs of abatement will have a greater preference for buying permits than for abating pollution. Since polluters have different costs of abatement there is an automotive market – low cost polluters selling permits and high cost polluters buying them. By giving the polluters a chance to trade, the total cost of

pollution abatement is minimized compared to the more direct regulatory approach of selling standards.

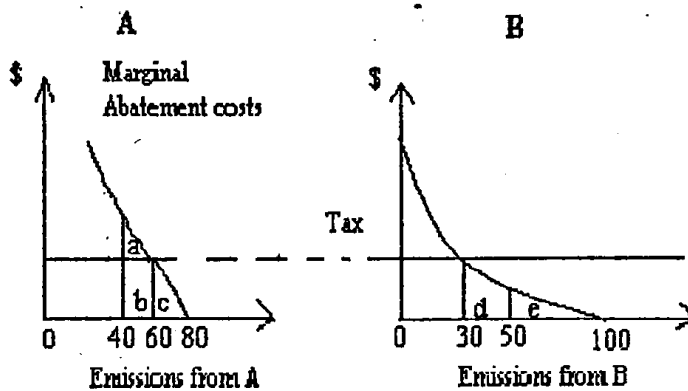
#### 4. Taxes or charges

One way to discourage the burning of fossil fuels is to impose a "Carbon tax" on their consumption. A carbon tax is levied in particular on the amount of carbon emitted during combustion of a particular fossil fuel. Accordingly, coal would generally be taxed at a higher rate than natural gas. Such a tax would encourage more efficient energy use and the development of non-carbon emitting energy technologies (5). Taxes or charges are convenient in the sense that they can be applied uniformly across all firms (1).

#### 5. International agreements

Although difficult to enforce in any court of law, these agreements have been used with increasing frequency over the past decade. The reason for this is their cost effectiveness. In Figure 7, two countries A and B. Both would benefit the same amount from cutbacks in emissions, but have different marginal abatement cost functions. Current emissions are 80 from A and 100 from B. An agreement requiring a uniform 50% reduction would put A at 40 and B at 50. However, the costs of achieving this would be much higher for A (a+b+c) than for B (d+e). Country A might very well fail to agree with uniform reduction when there would be such a large discrepancy in total abatement costs (2).

Figure 6. Cost-effectiveness in International Agreements



Source: (2)

The international community brings pressure to bear on the signatories of the agreement, to "encourage" them to honour their commitments. In addition, international agreements tend to command a great deal of media attention. Consequently, pressures from within the signatory countries themselves may also encourage them to meet the various commitments. The Convention on Climate Change, which came into force in March 1994, commits developed countries to control GHGs emission, so as to reduce the chances of global warming (1).

#### 6. *Joint implementation*

One proposal is for "joint implementation", whereby countries can achieve reductions either within their own borders, or pay for the same reduction to be made in another country (7).

#### 7. *An environmental bank*

To make the tradable permit effective, one proposal is to create an international Bank for environmental settlements. The bank would act as a clearing house for the global environmental market, matching parties in environmental trade, mediating borrowing and lending and ensuring the integrity of market transactions and their settlement (7).

#### 8. *Total ban*

There should be a total ban on activities causing global warming. This does not imply that all human made GHGs emissions should be prohibited because this is technically infeasible and socially undesirable. The economic cost of such ban will be very high. Therefore, it is not a good solution (1).

### V Conclusion

Whether the problem is deforestation or global warming, humanity has had an important and negative impact on many ecosystems. There is a need to have an effective environmental policy, which is sensitive to the economic circumstances of the population, because poorest people are expected to be hit hardest by the failing harvests, growing water shortages and rising seas that accompany global warming. At the same time, we do need to adjust our behaviour, production and consumption so that future generations have the potential to enjoy a quality of life as least as good as our own.

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# INTERNATIONAL POLICY RESPONSES TO THE PROBLEM OF GLOBAL WARMING

LIPI PARIJA  
M.A. Part II

## Abstract

International negotiations to reduce global warming, caused by the accumulation of greenhouse gases (GHG), recently culminated in the Kyoto Protocol, which lays down maximum GHG emission levels for developed countries, to be attained within a specified time-frame. A market based policy instrument, emissions trading, can also be used to target the source of GHG accumulation and redistribute costs more effectively among developed nations. Additionally, developed countries can meet their emission requirements by investing in "clean" technology in developing nations. Experts have also proposed a carbon tax to curb CO<sub>2</sub> emissions. However, this tax will impose real costs, causing a decline in GDP.

Game theoretic analysis of the responses of countries indicates that, if there are no negotiations, emissions will be greater than at optimum levels in the ensuing non-cooperative equilibrium. Therefore, there is no clear case for implementing emission quotas as recommended by the Kyoto Protocol. The desired level of abatement may be achievable by including developing countries into the negotiation framework.

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## I Introduction

Setting policy in response to accumulating greenhouse gases (GHGs) is a difficult task for two reasons. First, the concept of global warming itself is a complex one and little is known with certainty. Second, both the source of the problem and the predicted effects are global in scope. Therefore any effective policy solutions must rely on some measure of international agreement. (2) The objective of this essay is to examine whether emissions quotas as a policy solution by Kyoto Protocol lead to optimal emissions or not. Therefore, the political history of major policy formulation is first analysed (starting with Rio, Berlin and Kyoto). The second section will deal with the estimation of costs and benefits of GHG abatement via a discussion of the effect of carbon taxes. Then the economics of the issue of damage costs and abatement are examined using a game theoretic model. The final section makes concluding remarks.

## II The International Response

At the 1992 Rio Summit, global climate change was an important agenda item. Among the major agreements at the summit was the UN Framework Convention on Climate Change. This deals directly with global warming and other air quality issues. Its major provisions are as follows (2):

- (a) Countries must implement national strategies to limit GHG emissions with the objective of reducing emissions to their 1990 levels by the year 2000.

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\* The author wishes to thank Dr. Madheswaran and Dr. Vijay for their valuable inputs.

- (b) Different emission targets and timetables for only one GHG are specified, to accommodate differences in political and economic conditions among nations.
- (c) Signatories are encouraged to recognize climate change in the formulation of economic, social and environmental policies.
- (d) Industrialized nations will assist developing countries in obtaining data and in limiting emissions.

However, the Rio Summit did not commit any signatories to meeting specific targets and timetables. (1) In the first conference of the parties to the Framework convention, held in Berlin in 1995, industrialized countries agreed to negotiate emission limits within specified time frames such as 2005 or 2010 or 2020. Importantly, developing countries were not expected to limit their emissions. It was this differential treatment of developing and industrial countries in the Berlin Mandate that the US Senate objected to (1).

The Kyoto Protocol specifies maximum emission levels for “Annex I” (i.e. industrialized) countries and also the dates by which these ceilings must be met. However, the Clinton administration estimated the marginal cost of meeting Kyoto targets to range from \$14 to \$23 per tonne of gas provided participation in the agreement is full and implementation is cost-effective. Furthermore, the greater are the differences in marginal costs among countries, the higher the costs and the lower the benefits (1). Another problem in the Kyoto Protocol is compliance enforcement and free rider deterrence. In the Kyoto Protocol only Annex I countries were set targets to reduce their GHG emissions.

A strategic response to global warming is to formulate market-based policy instruments aimed at the cause of the problem – the accumulation of GHGs, primarily CO<sub>2</sub>. To correct the problem, policy instruments must aim to make market participant internalize what are currently external costs. One type of market based instrument proposed is “a tradable permit system”. Here each permit allows the release of some amount of CO<sub>2</sub> into the atmosphere by the holder (2).

Emission trading among Annex I countries is the most important flexible mechanism in the Kyoto agreement. Trading will lower costs for all the Annex I countries for two reasons – first, by redistributing abatement among them so that marginal abatement costs are equal everywhere and second, by relaxing the total constraint on Annex I emissions (1).

Other provisions of the Kyoto Protocol are as follows (1):

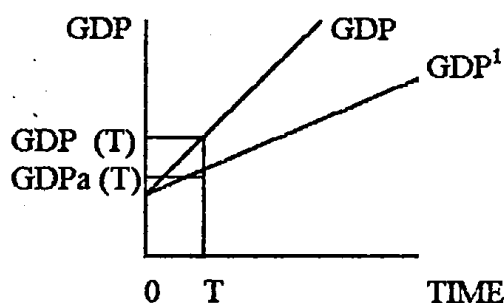
1. *Joint Implementation*: Joint implementation trades are bilateral and project based rather than market based trades, in which one country receives “emission reduction units” for undertaking projects in another country that reduces net emissions.
2. *Clean Development Mechanism (CDM)*: The joint implementation concept is extended to included non Annex I countries through the CDM. This allows Annex I countries to meet their emission ceilings by undertaking projects in developing countries that provide additional and certified emission reductions. The CDM is potentially of huge significance, for it provides the only means within the Kyoto framework of shifting abatement towards non Annex I countries.

### III Pros and Cons of a Carbon Tax

GHG includes not only carbon dioxide, but also methane, nitrous oxide, fluorocarbons (including hydrofluorocarbons and perfluorocarbons) tropospheric ozone and sulphur hexafluoride. However, carbon dioxide accounts for the bulk of aggregate warming potential. Mainly for this reason, policy debate has focussed on the extent to which emissions of this gas should be limited (1).

A carbon tax is a widely discussed policy to curb CO<sub>2</sub> emissions. To get some insight into the size of tax needed and its GDP cost, the findings of Manne and Richels and Nordhaus attempt to compare the potential level of growth with and without abatement policies.

Figure 1. Time Path of GDP with and without GHG Abatement policies



In the absence of abatement policies, GDP is predicted to grow along the path labeled GDP in Figure 1. If abatement policies are introduced, GDP is predicted to grow more slowly along the path GDP<sup>1</sup>. The difference in any year T, GDP(T) – GDP<sup>1</sup>(T) is the net reduction in GDP. To achieve required levels of carbon emission reduction, the model requires a carbon tax that gradually increases to \$250 per tonne of carbon, roughly equivalent to \$30 per barrel of oil (5).

Nordhaus also estimates a sequence of optimal carbon taxes under uncertainty. He first examines a scenario labelled 'learn, then act' in which there is perfect information. Here the optimal rate of carbon emissions rises from about 9 percent in 1995 to just over 12 percent in 2045. The optimal carbon tax rises from \$5.24 per tonne in 1995, to \$13.40 per tonne in 2045. Nordhaus then examines a more realistic case, which he terms "act then learn". This case reflects the need to undertake policies before knowing the state of the world. His results indicate that the optimal carbon tax rises to about \$12 per tonne in 1995 and to around \$26 per tonne in 2020 (5).

These and other studies (Table 1) strongly suggest that GHG abatement through a carbon tax will impose real costs. However, these costs should be studied in the light of benefits from GHG abatement and the losses that would accrue in the absence of mitigation.

Table 1: Alternative Cost Estimates for Reduction in Carbon Emissions

Study	Year		
	1990	2025	2050
<i>Manne and Richels (USA)</i>			
Reduction in emission (%)	0	52	63
Associated Carbon Tax (\$ / tonne)	0	375	250
GDP loss (%)	0	3.2	3.3
<i>Nordhaus (World)</i>			
Reduction in emission (%)	0	18	41
Associated Carbon Tax (\$ / ton)	0	33	113
GDP loss (%)	0	NA	NA
<i>Jorgenson &amp; Wilcoxon (US)</i>			
Reduction in emission (%)	0	31	36
Associated Carbon Tax (\$ / ton)	0	43	42
GDP loss (%)	0	1.1	1.1
<i>Whalley &amp; Wigle (World)</i>			
Reduction in emission (%)	0	50 <sup>a</sup>	NA
Associated Carbon Tax (\$ / ton)	0	445 <sup>a</sup>	NA
GDP loss (%)	0	21.4	NA
<i>OECD (World)</i>			
Reduction in emission (%)	0	-43 <sup>b</sup>	NA
Associated Carbon Tax (\$ / ton)	0	215 <sup>b</sup>	NA
GDP loss (%)	0	2.2 <sup>b, c</sup>	NA
<i>Edmonds and Barnes</i>			
Reduction in emission (%)	0	-31	-50
Associated Carbon Tax (\$ / ton)	0	100	280
GDP loss (%)	0	0.2	0.9

Notes : N.A. = not available; a: 1900 - 2030; estimate centered in 2010. b: in 2020.  
c: loss in household real income.

Source : (5)

#### IV The Economics Of Damage Costs And Abatement

Consider 'n' countries (subscripted i) and 'n' commodities (subscripted j). Each country enjoys an aggregate consumption level  $X_i$ , equal to its aggregate production,  $Y_i$  minus the value of damage  $D_i$ , or the lost production from global pollution. Each country's productive activity generates some emissions  $E_i$  such that  $Y_i = G_i(E_i)$ . Damages in each country are generated by the total of such emissions such that the damage cost function is

$$D_i = d_i \left( \sum_{j=1}^n E_j \right)$$

which we assume to be linear. Then each country's consumption possibilities are given by the expression:

$$X = G_i(E_i) - d_i \sum_{j=1}^n E_j \quad (1)$$

Where  $d_i > 0$  is the damage per unit of emission.

World consumption optimality can then be represented by the consumption levels that maximize  $\Sigma X_i$  with respect to the variables  $E_1, E_2, \dots, E_n$ .

Let  $(E_1^*, E_2^*, \dots, E_n^*)$  be the vector of emission levels in the  $n$  countries that achieves such a world optimum. Then the first order conditions for a maximum are given by the system of equations:

$$\frac{dG_i(E_i^*)}{dE_i^*} - \sum_{j=1}^n d_j = 0 \quad \text{for } i = 1, \dots, n \quad (2)$$

We assume that climate change negotiations aim at achieving such a world optimum. Attaining it requires coordination among countries so that each country takes into account the effect of its emissions on other countries as reflected by their damage cost functions.

### *Non Cooperative equilibrium*

In the absence of coordination, countries choose emission policies that best suit their own interests. A non-cooperative equilibrium can be assumed to prevail if there is no negotiations between countries.

Classical economic reasoning suggests that a rational domestic optimum for each country would be one that best balances the production function and damage cost function  $D_i$ . This is achieved by choosing  $E_i$  to maximize its own consumption level  $X_i$  as defined in equation (1), taking all  $E_j$  with  $i \neq j$  as given. If all countries adopt such behaviour, a non-cooperative game takes place. The Nash equilibrium of the game

between countries prevails, represented by the vector of emissions  $(\bar{E}_1, \bar{E}_2, \dots, \bar{E}_n)$ .

For each country, the first order condition of its maximizing behaviour is given by the equation:

$$\frac{dG_i(\bar{E}_i)}{d\bar{E}_i} - d_i = 0 \quad \text{for } i = 1, 2, \dots, n. \quad (3)$$

While its achievable consumption level is

$$\bar{X}_i = G_i(\bar{E}_i) - d_i \sum_{j=1}^n \bar{E}_j \quad \text{for } i = 1, 2, \dots, n \quad (4)$$

Two characteristics of non cooperative equilibrium are as follows:

- (i) The equilibrium emissions  $(E_1, E_2, \dots, E_n)$  are clearly not optimal, as can be seen by comparing equations (2) and (3). That is why negotiations are necessary.
- (ii)  $\bar{E}_i > E_i^*$  for all  $i, i=1, \dots, n$ , which means world optimal emissions are lower than those prevailing in the non cooperative equilibrium.

### *Coalitional Stability for the Treaty*

The basic reason for the non-optimality of the Nash equilibrium is because each country decides its emission level without concern for the effect on other countries. It equates its marginal abatement cost  $dG_i/dE_i$  to its marginal damage cost  $d_i$ , whereas a world optimum requires each country to equate its marginal abatement cost to the aggregate world marginal cost  $D_i$ . Furthermore, a world optimum may require from the

various countries different levels of abatement  $E_i - E_i^*$ , entailing costs and benefits that are not identical across countries. Some may have high abatement cost while having only small damage costs to avoid, whereas other countries may have low abatement costs while facing high damage costs. To have the world optimum voluntarily agreed to by all countries requires that, for each country and each group of countries, the benefits exceed the cost of abatement.

For this, we can develop a game [6] wherein there are countries A and B that are taxed if their emissions exceed a certain level, say  $E$ , and the tax  $E - E_i$  is imposed if  $X > E$  and  $Y > E$ . This is shown schematically in Table 2.

Table 2

B \ A	X=E	X>E
Y=E	Situation 1	Situation 2
Y>E	Situation 3	Situation 4

The four situations in Table 2 are as follows:

*Situation 1:* Each country emits as much as it likes. There is no restriction on the amount of emission. No one bears the tax as in the non-cooperative situation.

*Situation 2:* Country A pays a high tax by reducing output following emission norms if it exceeds  $E$ . But B does not pay a tax because, say, its government has not put restrictions, country B has a revenue surplus.

*Situation 3:* Country B follows  $E_B$ , paying a tax by reducing output while A does not follow.

*Situation 4:* Both A and B pay taxes if they cross their respective levels of emission.

Although Situations 2 and 3 can be equilibrium situations, they are unstable equilibrium or interior solutions. This is because for situation 2, B pollutes as much as possible at lower damage cost, while A pays taxes for B's pollution. A similar explanation holds for situation 3.

Therefore Situations 1 and 4 are the stable equilibrium situations, no country pays a tax or both pay it. But which equilibrium will be chosen depends on the cost factor.

## V Conclusion

Although Kyoto chooses emission quotas, there is no firm basis to assert that it corresponds to optimal emissions. While the Kyoto Protocol is a step in the right directions in terms of actual emissions, it should reach an agreement on appropriate reference emissions levels  $(E_1, \dots, E_n)$  at some future round of negotiations. Once an agreement is reached regarding reference emissions, an agreement would need to be reached regarding the target emission quotas  $(E_1^*, \dots, E_n^*)$  and competitive emissions trading which leads to optimum emissions (3).

One reason why the currently prevailing reference level may be considered unfair is because it does not take into consideration non Annex I (developing) countries (3). Therefore we can conclude that the level of abatement desired can be achieved cost effectively only by including non Annex 1 countries in the Kyoto Protocol.

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# LARGE DAMS IN INDIA: FACTORS THAT ESCAPE THE COST-BENEFIT ANALYSIS

RITWIK RAI  
M. A. Part I

## Abstract

1,137 large dams have been built in India. Their poor performance over the years has raised questions about their utility. Massive cost overruns and long delays in completion of the project postpone and reduce the benefits accruing to people from the dams. Additionally, benefits are inflated and costs underestimated. Transmission losses of water and siltation occur on a large scale, reducing the effectiveness, longevity and safety of the reservoirs.

Traditional cost-benefit analyses do not take into account the enormous financial and emotional costs of displacement and rehabilitation of the project affected people. Ecological damage caused by large dams may only partly be known at the time and hence may not be measurable. Dam-induced seismicity and the collapse of dams are some of the technical failures resulting from inadequate geological and hydrological understanding.

Supplements to traditional cost-benefit analyses include retrospective study of previous projects and class benefit analyses to check the equity of distribution of benefits. Better implementation of plans, more realistic costing including the risks of collapse and more transparency are needed to make such analyses more meaningful.

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## I Introduction: What are Large Dams?

The International Commission on Large Dams (ICOLD) defines large dams as dams measuring 15 metres or more from foundation to crest. Dams of 10-15 metres may also be defined as large dams if they meet the following requirements : crest length 500 metres or more; reservoir capacity at least 1 million cubic metres; maximum flood discharge of at least 2,000 cubic metres per second (1).

As per this definition, India has built 1,137 large dams (1) and is the fifth largest producer of large dams in the world. Large dams were supposed to bring prosperity and strength, but recent anti-dam movements seem to suggest otherwise. This paper attempts to capture some of the factors that are responsible for the poor performance of these projects and also to compare, by whatever incomplete parameters are available, their performance relative to the original estimates.

Section II deals with the inadequacies of traditional cost-benefit analyses of large dams. Section III discusses important cost factors that are ignored by traditional evaluation methods. Section IV provides recommendations to make the present cost-benefit analysis more meaningful.



## II Inadequacies Of Traditional Cost-Benefit Analyses Of Large Dams

The task of evaluation of large dams has been fraught with uncertainties. Traditionally, cost-benefit analysis (financial and economic) was carried out to evaluate the costs and benefits accruing from these projects. The planning commission has declared that only those projects shall be considered for approval, that have a cost-benefit ratio not less than 1:15 (2).

However, this method of evaluation has lately lost credibility and there has been an increased demand to evaluate the social and environmental impact of these projects as well, as also their effect on the lives of people who have been displaced. The cost-benefit analysis of large dams is now being questioned mainly on these grounds.

A scrutiny of past projects on certain grounds gives clear indications that all costs that are easily quantifiable and therefore easily anticipated have often been wrongly estimated. The Public Accounts Committee has stated that in a scrutiny of 32 large dams, a cost overrun of 500% or more has been observed. The cost overruns in some of the major projects are in Table 1.

Table 1: Cost Overruns for Major Projects

Project	Estimate Cost (year)	Actual Cost (year)	Cost overrun (%)
Bargi	Rs. 640m (1968)	Rs. 5.7 bn (1991)	784
Nagaujeensagar	Rs. 910m (1954)	Rs. 6.8 bn (1989)	652
Sardar Sarovar	Rs. 42 b (1983)	Rs. 342 bn (1994)	714
Selaulim	Rs. 96 m (1972)	Rs. 730 m (1985)	660
Sriramasagar	Rs. 640 m (1964)	Rs. 5 bn (1987)	694
Srisaillam	Rs. 385m (1963)	Rs. 2.6 bn (1979)	575
Tchri	Rs. 2 bn (1969)	Rs. 60 bn (1994)	2900

Note: The Cost Overrun (%) is Adjusted for Inflation.

Source: (4)

India has acquired the dubious distinction of not having a single project completed within the initial estimated costs. Nor has any project been completed in the initially stipulated time-frame. Time overruns do not only imply cost overruns but also delay the benefits from these projects. For example, a sensitivity analysis conducted by the World Bank of a particular project (3), showed that a 22% delay in the implementation would reduce its present value to zero.

The Public Accounts Committee (2) has observed two facts about the state of large dams (irrigation projects):

- a. Of 205 major projects taken up since independence, only 33 have been completed till 1989-90.

b. Not a single project has been completed within the stipulated date targets.

*Overestimation of benefits*

An analysis of irrigational benefits from large dams is given below.

Table 2: Irrigational Benefits from Large Dams

Project	Area under irrigation (planned)	Area under irrigation (actual)	% achievement over plan
Bhakra Nangal	1381.5	1421.1	102.86 %
Chambal	556.8	299.3	53.69 %
Sardar Canal System	1100.2	848.2	77.13 %
Kosi eastern main canal & Rajpur branch canal	1636.4	802.7	49.05 %
Nagarjunsagar	831.6	322.6	38.8 %
Total	5506.5	3693.9	67.08 %

Note: Data has been aggregated over various sub-groups to obtain these figures.

Source: (4)

We can see that there is an overestimation of benefits in case of irrigation projects. We consider only irrigation projects here, since about 56% of projects in India are developed with the purpose of irrigation (1). However, it may be mentioned here that dams built with the purpose of generating electricity are not faring too well either. The same PAC report, points out that among 12 dams considered, only 2 had reached their planned production.

*Underestimation of Costs*

Transmission Loss of Water: Another parameter crucial in evaluating benefits is the transmission loss of water. The figures of CAG 1975-76 show that the difference between actual and projected losses has been between 150 and 300 percent (Table 3).

Table 3: Projected and Actual Transmission Losses

Canal	Losses Projected (a)	Losses Observed (b)	Diff between (a) & (b)	(a) as a percentage of b
Chambal Right Main Canal	8	15	7	187.5
Jawa	8	22.8	14.8	285.0
Mahanadi Canal System	8	39.7	31.7	496.2
Periyar Main Canal	2	3.5	1.5	175.0
Periyar Branch Canal	2	3.25	1.25	162.5
Periyar Branch Canal	2	3.26	1.26	163.0
Girna / Jamda LBC	8	11.0	3.0	137.5
Mula-Sonai Distributary	8	9.19	1.11	112.5
				237.5

Source: (4)

### *Siltation*

Siltation of the reservoir greatly reduces its life and sometimes its safety. Many estimates show that the siltation rates observed in most reservoirs are higher than anticipated.

Table 4: Assumed and Observed Siltation Rates

Reservoir	Annual Rate of siltation (acre feet)		Percentage difference between observed and assumed siltation rates
	Assumed	Observed	
Bhakra	23,000	33,745	146.7
Maithon	684	5,980	874.2
Panchet	1982	9533	480.9
Ramganga	1089	4366	400.9
Tungbhadra	9796	41,058	419.1
Mayurakshi	538	2,000	371.7
Nizam Sagar	530	8,725	1646.2
Ukai	7,448	21,758	292.1

Source: (4)

### III Cost Factors Ignored by Traditional Evaluation Methods

Some cost factors that are ignored in cost-benefit analysis, but which have significant costs and require thought on the part of planners of large dams in the process of evaluation. These are examined under the following broad heads:

- a. Displacement and consequent human suffering
- b. Environmental loss
- c. Technical lapses.

#### *Displacement*

Displacement and subsequent rehabilitation of people is an area vastly ignored during the cost-benefit analysis of large dams. The table given below gives an idea of the extent of displacement.

Table 5: Extent of Displacement Caused by Large Dams

Project	River	No, displaced
Bargi	Narmada	1,13,600
Bhakra	Sutlej	36,000
Hirakud	Mahanadi	1,10,000
Uben	Uben	1,400
Thuj	Kaveri	1,100
Amla	Ver	2,300
Sukhi	Sukhi	11,200
Tankhan	Tankhari	2,900
Pong	Beas	1,50,000
Machhanala	Machhan	2,100
Sukhabhadra	Sukhbhadra	2,400

Source : (1)

From a total of 35 large dams studied (partly reported on in Table 5), a total of 13,81,900 people were displaced, resulting in an average of 39,482 people displaced per large dam. This average, multiplied by the total number of large dams in India, i.e. 1,101, gives rise to 44.89 million people. Other estimates also put the total number of displaced people in the 30-50 million range.

Custees of these projects have to undergo severe changes in their socio-economic life pattern and this must be considered somewhere, if not evaluated. However, planning authorities have scarcely paid any attention to the displacement problem. There is in fact a consistent underestimation of the number of displaced people, as shown in table 6.

Table 6: Original and Revised Estimates of Number Displaced

Project	Original estimate (a)	Revised estimate (b)	% change over (a)
Andhra Pradesh Irr. II	63,000	1,50,000	238
Gujarat medium irrigation II	63,600	1,40,570	220
Karnataka Irrigation II	20,000	2,40,000	120
Sardar Sarovar	33,000	3,20,000	969

Source: (2)

#### *Environmental Costs of Large Dams*

The environmental impact of dams can be broken up into two parts, viz.

- a. Impacts due to existence of dam and reservoir
- b. Impacts due to pattern of dam operation.

Environmental impacts seen are usually in the form of flooding of forests, wetlands, and inundation of wildlife. A number of fish have become extinct due to salination observed in rivers following the building and operation of dams. Apart from this, there is siltage of very high order. Although no one has yet managed to assess with accuracy the global extent of fragmentation of river ecosystems, two Swedish scientists have estimated the degree of ecological damage in U.S.A., Canada, and Europe. They have concluded that many riverine species have become extinct due to the environmental impact of large dams (1).

Huge as the environmental costs of dams may be, these costs can hardly be measured, since many adverse consequences will not even be known for hundreds of years after building of the dams (1).

#### *Technical Lapses / Inadequate geological surveys*

Every dam site has unique geological characteristics. Gaining a thorough understanding of these is expensive and time consuming. It is therefore normal for dams to be designed with only a partial knowledge of the local site conditions. A study by the World Bank in 1990 concluded that for hydro dams "the absence of geological problems should be treated as the exception rather than the norm."

There are also serious lacunae with hydrological data, for much the same reasons. Thus, there are actually cases where the water in the reservoir is not enough to run turbines, which defeats the purpose of the dam and sharply reduces project benefits.

There are studies now that link big dams to earthquakes. Reservoirs are believed to have induced five out of the nine earthquakes strong enough to cause damage in peninsular India in the 1980's. All the same, it must be said that the actual mechanism of reservoir induced seismic activity is not yet fully understood and it is impossible to predict which dam will induce earthquakes and how strong the tremors are likely to be.

Dam collapses are another notable technical failure that has been observed. The tables below provide data on some prominent dam collapses that have been witnessed in India.

Table 7: Prominent Dam Collapses in India

Dam	Height	Year Completed	Year Failed	People killed
Tigra	24	1917	1917	>1000
Panshet	54	1879	1961	>1000
Nanaksagar	16	1962	1967	100
Machhu II	26	1972	1979	>2000
Gopinathan	-	1980	1981	47

Source: (4)

#### IV Recommendations and Conclusion

Based on the facts stated already, this paper makes the following recommendations:

- a. *Planning process*: It has often been seen that work commences on a project even before the project is duly cleared by the Planning Commission (The Kosi, Tama and Malaprabha dams are cases in point) This kind of behaviour makes the 'cost-benefit ratio constraint' of 1:1.5 redundant. This tendency should immediately be capped by means of law.
- b. A *retrospective cost-benefit analysis* (comprehensive) should be carried out, at least for a sample of our projects, in order to assess how beneficial they have been to the country.
- c. Initiatives should be taken to establish an *international study group* (in order to reduce the costs involved) to study the ecological problems that arise due to large dams. An estimate of ecological costs should be made available wherever possible.
- d. It has been seen that vital data on certain projects is concealed from public view and representatives of the people (e.g. Commissioner of Scheduled Castes and Scheduled Tribes) have been denied access to the data as well as the site. Attempts must be made henceforth to make the process as transparent as possible.
- e. Since neither geological nor hydrological surveys are adequately done before building a dam, we must distribute the losses caused due to wreckage of dams and the like, over all projects. In other words a 'chances of failure cost' must be taken into account.

It is important that these recommendations be looked into and necessary steps taken, else we as a nation shall not be able to best distribute our resources among the

populace. Cost-benefit analyses of the type presently carried out are not meaningful without considering the factors discussed above.

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**SECTION III**  
**TRADE AND INFRASTRUCTURE**

# THE GROWING IMPORTANCE OF E-COMMERCE AND THE ROLE OF THE WTO

QUEENIE RODRIGUES  
(M.A. Part I)

## Abstract

E-commerce is emerging as a major component of world trade. Due to the opportunities it provides, a wide variety of businesses are taking advantage of it. E-commerce has grown rapidly in most regions of the world. Its importance is set to increase in the areas of advertising, health and education. Developing countries have been slow to join the Information Technology revolution, hampered mainly by inadequate infrastructure, lack of education, high prices and poor quality of services provided. The World Trade Organization (WTO) sees this as an opportunity to generate new employment opportunities, increase output and productivity and better integrate less developed economies with global markets. However, regulation of harmful Internet content is necessary, without stunting the growth of e-commerce. The WTO, by its 1998 declaration on global e-commerce, established a comprehensive work programme to examine trade-related issues arising from e-commerce. Important issues include access to infrastructure, taxation and import duties and trademark and copyright protection.

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## I Introduction

Rapid technological development in three areas – computer technology, telecommunications technology, and software and information technology – are changing lives faster than anyone predicted less than five years ago. New means of information exchange and ways of transacting business are transforming many aspects of social and economic organisation (4). E-commerce provides direct, universal links, letting companies build active relationships with customers and suppliers. The changes made possible by the Internet and specifically e-commerce are fundamental and strategic. The web has improved cost efficiency of software use and development. Internet use is of great economic benefit to all companies. The development of e-commerce however also has many challenges associated with it (2), (3).

The objective of this paper is to study the growing importance of electronic commerce (e-commerce) in world trade. Special emphasis is placed on the content of electronically transmitted business. Prospects of integration of developing countries in global e-commerce are also examined.

The growing importance of e-commerce led the World Trade Organization (WTO) to adopt a declaration of global e-commerce in May 1998, discussed in Section II. Various activities and agreements of the WTO on e-commerce are discussed in Section III. This is followed by an examination of the necessity and extent of Internet use in developing countries (Section IV). Section V describes growth trends in e-commerce and projections of future growth.



## **II: The WTO Declaration on Global Electronic Commerce**

The WTO adopted a declaration of e-commerce on the 20th May 1998, at their second Ministerial Conference in Geneva, Switzerland. The General Council of the WTO was directed to establish a comprehensive work programme to examine all trade-related issues arising out of e-commerce. They were asked to present a report on the progress of the work programme at the next Ministerial Conference of the WTO (5).

The declaration stated that "members will continue their current practice of not imposing customs duties on e-commerce." A work programme was adopted on 25<sup>th</sup> September 1998 under which related issues would be examined by the Council for Trade in Services, Council for Trade in Goods, Council for Trade Related Intellectual Property Rights, and the Committee on Trade and Development. Each of these bodies produced a report for the General Council at the end of July 1999 (5).

The WTO thus plays an active role in developing e-commerce the world over. It has taken a number of steps in this direction especially in integrating the less developed countries in global trade (3), (4), (6).

## **III. E-commerce and the WTO**

With the growing importance of e-commerce, the WTO has undertaken various activities to help in its development. As a result various agreements have been made on a number of issues.

The WTO has guaranteed easier access to and availability of infrastructure by

- (a) The Agreement on Information Technology which removes a range of tariffs on information technology products,
- (b) Commitments on market access under General Agreement on Trade in Services (GATS) on trade liberalization, and
- (c) The WTO Annex on Telecommunications, which ensures access and use of public telecommunications transport networks and services (4).

A framework has been provided by the WTO for better access to open international markets since issues relating to import duties have been covered. Under the GATS, trade liberalization and security of market access is ensured. The GATS commitment ensures that foreign services and service suppliers will not be subject to more regulation and taxation than domestic ones in signatory countries. The WTO has also tried to improve international trade via e-commerce, allowing for faster and cheaper communication. Among advantages it cites to justify these measures are the following -time can be saved and shipping, administrative and other overhead costs considerably reduced. The trade-related aspects of Intellectual Property Rights are of great importance to the protection of copyrights and related rights and the protection of trade marks and domain names. They are thus essential for the development of e-commerce. Intellectual property protects the innovations made as a result of investment in the development of new technology (4).

## **IV Regulation of Internet Content**

The WTO has identified three types of transactions on the Internet:

- (a) Transactions completed entirely from selection to purchase and delivery.
- (b) Transactions where a good or service is selected and purchased on-line but delivered by traditional means, and

(c) Transactions involving telecommunication transport functions, including provision of internet services (5).

There is general disagreement among WTO members on a small number of products, as to whether they should be classified as goods or services. Products such as a book may be thus classified as a service under General Agreement on Trade in Services or as a good under General Agreement on Tariffs and Trade or as a third category where special provisions need to be devised (5).

With the opportunities available to them on the Net, companies which have not made use of them may be at a disadvantage. There are a number of companies which have taken advantage of these opportunities, such as Yahoo!, Amazon.com, Marshall Industries' website (electronic parts) and Time Warner's Pathfinder Internet Site. Various banks also have their websites as do automobile companies. Thus services covering a variety of goods and products are covered on the Net (2), (3).

However, a number of restrictions have to be imposed on the type of goods tradable on the Net. Illegal and harmful content should not be distributed. Governments also have to regulate such concerns. This is important not only for governments but also for parents who may want to pre-select information to which their children have access (4). There are conflicts of interest as to what should and should not be included. Bomb-making instructions, child pornography, violent movies not for child viewing and so on are most definitely unacceptable. As a result most governments take on the responsibility to protect consumers. Under the GATS, measures are taken to protect public morals, human, animal or plant life or health, maintenance of public order and protection of human dignity and security. Many steps are being taken to ensure that harmful information is filtered. "Blacklisting" or "whitelisting" of web sites and software and identification through domain names can ensure this. At the same time the development of e-commerce should not be not stunted as a result of these regulations (4).

Another important issue is taxation of e-commerce. Taxes should be easy to administer and should not be discriminatory (4).

#### **V E-commerce in Developing Countries**

The Internet can provide important information to developing countries. However, due to a lack of infrastructure necessary to stimulate the growth of e-commerce in these countries, their integration into global markets has been slow (4).

Infrastructure is often outdated or non-existent, prices are high and the quality of service is poor. The lack of education further restricts growth (4), (5). However, a number of countries are taking up the challenge of building the necessary infrastructure and promoting the integration of the country into modern global trade through new channels (2), (4), (5), (6).

The following figures are from a study conducted by the International Finance Corporation surveying Internet use by companies in 16 developing countries in 1998. The survey was aimed at industrial, mining firm and financial firms (1).

**Table 1: Extent of Internet Uses Other than E-mail**

	Advertise & Public Relations		On-line Customer Service		On-Line Financial Transactions		On-line Tools (e.g. Credit Access)		Human Resource Management	
	No.	%	No.	%	No.	%	No.	%	No.	%
Indispensable	0	0	1	5	1	5	0	0	0	0
Very Useful	3	14	4	18	1	5	3	15	1	5
Slightly Useful	9	43	6	27	4	20	4	20	6	30
Not Useful	4	19	8	36	11	55	11	55	10	50
Total	21	19	22	100	20	100	20	100	20	100

Source: (5)

**Table 2: Growing Network for E-Commerce (Million Units)**

Category	1991	1996	2001 (Projected)
Telephone Main Lines	545.0	741.1	1000
Cellular Subscribers	16.3	135.0	400
Personal Computers	123.0	245.0	450
Internet host Computers	0.7	16.1	110
Personal Computers with Internet access	4.5	60.0	300

Source: (4)

**Table 3: Internet Connectivity in Developing Countries**

	In Process	No	Yes	Total
Industrial Firms	2	20	58	80
Financial Firms	1	7	25	33
Total	3	27	83	113

Source : (5)

## VI Growth Trends in E-commerce

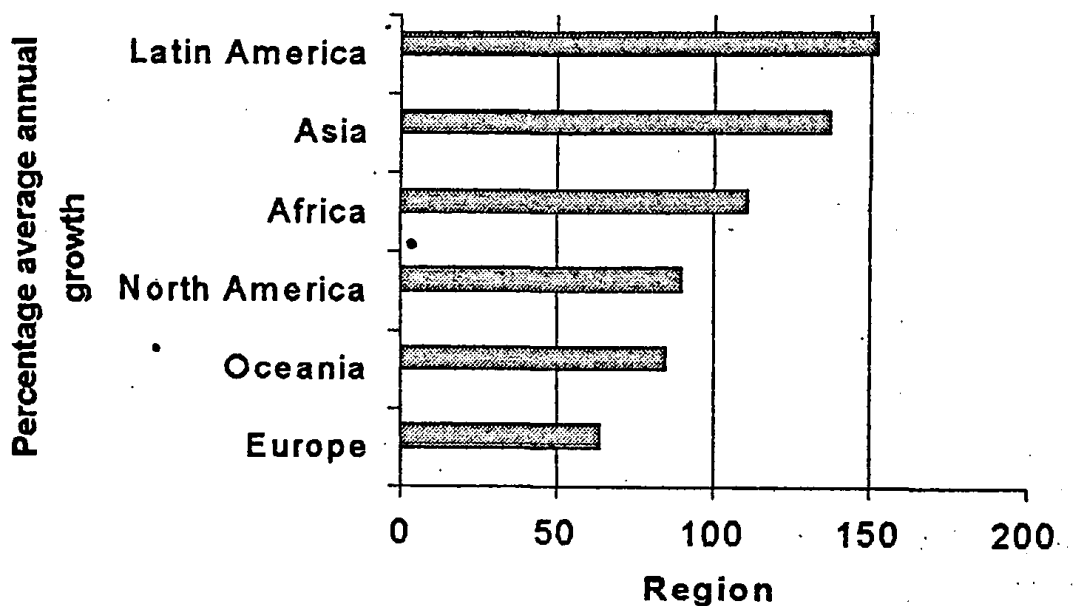
The growth of e-commerce has been very rapid during the last few years. It is fast becoming an important new channel for commerce in a range of business. However, associated with this growth is the challenge of measuring this growth.

There are a number of problems associated with the quantitative analysis of e-commerce. A number of electronic channels together help in conducting e-commerce. These are the telephone, television and the Internet in various combinations. Also used are paper, mail in conjunction with physical shopping or delivery. Thus, proper estimates are very difficult to obtain as there is a definitional problem as to what exactly should be counted under e-commerce. Another disadvantage is the short historic record and the highly speculative nature of all forecasts especially those with regard to developing countries (4).

The following are observations made by members of the WTO:

- Internet based e-commerce will probably account for 2 percent of all commercial transactions in the industrialized countries within the next 5 years. The share of online sales is projected to grow to 42 percent of all sales for companies which already sell their products on the Internet by the end of 2000. The market share of the internet is expected to expand from 2 percent of all electronic sales today to about 50 percent in ten years time (4).
- As regards regional distribution of internet activities, about 70 percent of Internet web sites are located in the United States. Revenue from sales online are also expected to grow rapidly. A leading market analysis company, Forrester Research, expects value-added through Internet access and infrastructure services, online financial services, etc., to reach US \$100 billion. Most businesses are expected to experience change in practices and patterns of communication. There will be a number of new employment opportunities the world over. Consumer spending on Internet access is expected to increase five-fold, while business spending is expected to increase twenty-fold. Other growth areas are advertising, on line education and medical services, legal services, news and information, travel and entertainment services and the delivery sector (3), (4).

Figure 1. Growth of Internet Hosts By Region, 1993-96



Source: (4)

## VII Conclusion

Today's world is a haven of opportunity. To fully capitalize on this opportunity, organizations and companies have to adapt swiftly to the changing environment. E-commerce is revolutionising the way in which companies function and is changing the face of competition within a short span of time. By exploring opportunities and risks, businesses can decide what, if any, investments they should make in e-commerce and

thus build a strategy. E-commerce will lead to growing international trade and transactions.

In the long run there will definitely be a lowering of costs, easier market access and competition on the Net as well. There will also be strong growth in output and employment. The opportunities for developing countries are many. Though potential benefits of e-commerce are numerous, a number of challenges have to be met in the course of its development. To help them, several steps have been taken by the WTO and by various governments to integrate less developed economies into the world economy. The basic objective is for all to benefit as much as possible (2), (6).

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# FINANCING INFRASTRUCTURE

GITA MAHAPATRA

M.A. Part I

## Abstract

Both the Government and the market need to work in tandem to finance infrastructure projects, to achieve optimum consumption and production, guard against corruption and narrow political interests and prevent under provision or over pricing of these services. Domestic capital needs to be mobilised, risks shared, incentives and subsidies provided and foreign capital attracted.

Despite privatisation and liberalisation, the growth rate of infrastructure in India has not been spectacular. The power sector is plagued by unprofitable State Electricity Boards, despite attempts at regulation and reform, which bodes ill for the proposed opening up of the sector. In contrast, new initiatives in telecommunications, urban development and road transport have resulted in steady growth.

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## I Introduction

Infrastructure development is a key to economic development. Financing infrastructure projects is very different from financing other industrial projects, since infrastructure is a social good having the characteristics of non-rival and non-excludable consumption. It also involves different kinds and degrees of risk due to its long gestation period. Hence the market cannot efficiently provide infrastructure facilities without the help of proper Government policies and regulations. Also, the availability and applicability of methods of finance differ, depending on the project size, country and sectoral characteristics (15). Therefore the analysis of problems such as who should finance and how to finance is very important.

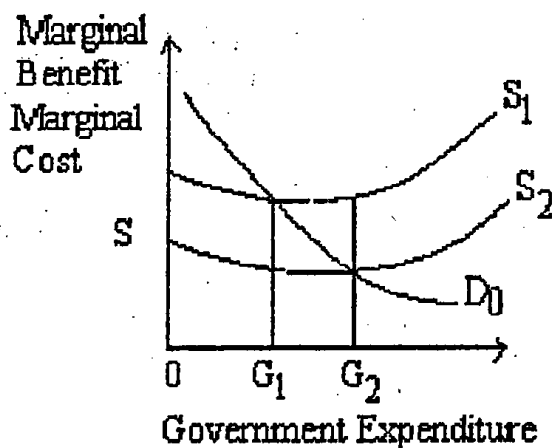
This paper has five sections, Section II deals with "Who should finance" and Section III with "How to finance". Section IV is devoted to the situation in India, followed by conclusions in Section V.

## II Who should finance?

Infrastructure, having a long gestation period and very high cost of production, can easily be financed by the Government, which can take loans at low interest rates. However, that may lead to sub-optimal resource utilisation and production, as the Government is often dominated by political groups with narrow interests. Rampant corruption and the lack of competition from the private sector compound the problem. As the functions are performed by many people in the Government sector, there is no individual responsibility. Incentives to show better performance are almost completely absent. Bureaucrats being more risk-averse, give less importance to investment in risky infrastructure projects (1). At times, the direct provision of services is costly, both for the Government as well as for consumers, if their preferences differ due to the existence of asymmetric information or political interests (1).

The Government provides services with little or no user cost. They are mainly financed by taxation and internal or external borrowing. Corruption facilitating tax evasion, ultimately the price paid by the consumers for these social goods is less than the benefits enjoyed by them. So over-consumption exists; which causes a higher fiscal deficit.

**Figure 1. Social Benefit and Cost of Government Expenditure and Taxation**



Source: (10)

Figure 1 shows that at  $G_1$  amount of government expenditure, society's marginal cost is equal to its marginal benefits. If decisive voters pay less than average voters, the demand for government expenditure increases to  $G_2$ . This level is inefficient, as the marginal cost to society is more than the marginal benefit it receives. Thus the government overspends. To avoid this situation, crude majority-rule politics or a strong President should negotiate to cut down government expenditure, giving tax-saving incentives to the public in return (10).

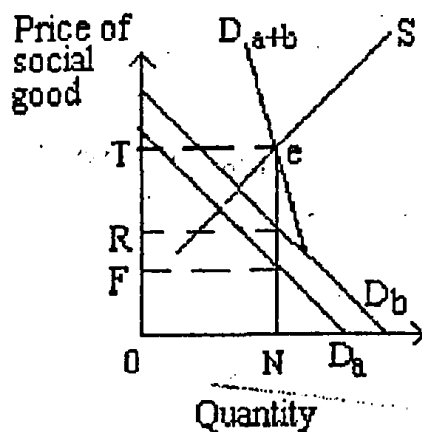
The demand for infrastructure has been growing in all countries for two reasons:

- (i) Rapid urbanisation and a high growth rate.
- (ii) To substantiate macroeconomic adjustment with consequent low investment level.

Government finance alone is inadequate, hence market intervention is needed. However, the market is not efficient enough to provide social goods, since they are characterised by non-rivalry and non-excludability (6).

Assuming that the consumer's marginal evaluation is revealed properly in a market of 2 consumers, A and B, and that a total of ON amount of social goods are supplied (Figure 2). A and B's total demand curve  $D_{a+b}$  (being the vertical summation of individual demand curves) shows that both will consume the same amount but pay different prices, according to their own marginal benefits. This causes the market to fail in providing social goods, as it cannot assess individual benefits and prices properly (6).

Figure 2. Market Failure



Source: (6)

Market failure may also be caused by the existence of good or bad externalities in infrastructure which cannot be internalized (6). For example, construction of a road by an individual could generate a bad externality for neighbors as this increases pollution and accidents. Here social and private costs are different, leading to inefficient resource allocation. Besides these reasons, an imperfect capital market, high private discount rates leading to low savings and non-availability of proper information about the credibility and availability of investors cause a shortage of funds. The profit-maximizing motive of private monopolistic producers also leads to under-provision and over pricing of these goods (1).

Thus both the market and the Government fail in adequately financing infrastructure individually. What is required is a balance between them, depending on various exogenous factors like institutional development, efficiency of Government and political stability.

According to Thirlwall,

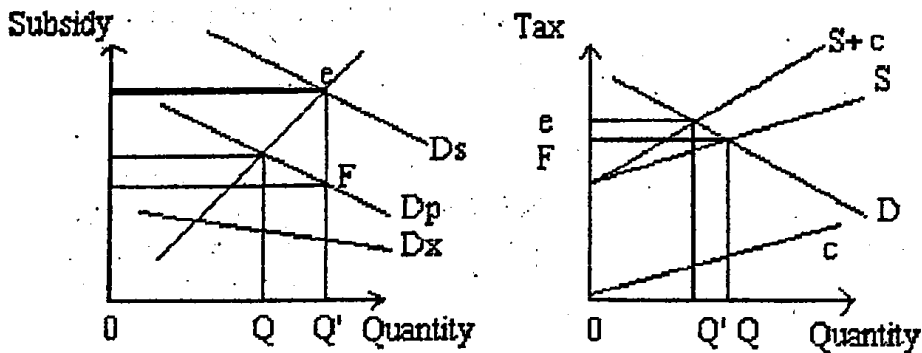
“States should work to complement markets not to replace them.” (14)

The Government can privatise this sector but regulate it properly so that there is efficient use of resources. According to Stiglitz, the Government should support and regulate the financial sector, prevent environmental degradation by imposing tax on providing subsidies and create a safe environment with proper laws to enforce contracts and stable policies.

The Government can avoid under (/over) production of social goods by markets by providing subsidies (/imposing taxes). From the two diagrams in Figure 3 below we can see that when social benefit  $D_s$  is greater than private benefit  $D_p$ , the Government provides subsidies of  $eF$  per unit and increases production to  $OQ'$  level. Similarly when Social Cost exceeds Private Cost, the Government levies tax of  $eF$  per unit and decreases output. Thus by imposing a tax, the bad externality can be internalised and over production controlled. By providing subsidies, the Government can encourage the production of under produced services.



**Figure 3. Effect of Provision of Taxes and Subsidy**



Thus a proper balance between Government and market, as principal and agent, will lead to an optimum level of infrastructure finance and rapid development.

#### *General financial considerations*

The Government can provide two types of grants. One is the *block grant*, which has an income effect on the investor, encouraging him to produce more. However, this may cause poor performance, as the investor does not get any incentives from the Government. The other type is the *matching grant* or *performance based grant*, which encourages the investors to invest more and more. Commanding a good performance enables the investor to get more grants. Thus, the latter method is better.

### III How to finance

Infrastructure can be financed both by the Government and the market, in many ways. These are as given below.

#### *A. Finance private production through tax incentives and subsidies*

According to the Infrastructure Report '98, tax relief should be provided on equity capital invested in infrastructure development (13). The Government provides tax incentives on income tax excise and custom levies to attract more domestic and foreign capital (6). They are

- (i) Tax holidays granted to new enterprises, which do not generally attract long-term investment, as only initial profitability is high.
- (ii) The Government sometimes commits for long term tax concessions. However this may be unnecessary after a few initial years, for growing industries.
- (iii) To encourage investment in infrastructure, the Government may decrease tax on profits earned and exempt tariff on capital imported.
- (iv) To encourage long term foreign capital, tax concessions on income from infrastructure projects should be provided to Foreign Direct Investment

(FDI). Foreign investors eager to repatriate may be given the incentive of tax sparing.

- (v) Tax incentives should be given to industries important for development of the economy, although this selection may be dominated by political interests.

Thus tax concessions well protected from misuse may induce more investment in infrastructure.

Similarly the Government grants subsidies to avoid underproduction of social goods by the market. Price subsidies on electricity and water supply provided to the consumers sometimes might be misallocated due to Government inefficiency or political reasons (15). For example, subsidised water is available more to the rich than to the poor.

The Government should cross-subsidise infrastructure facilities for the poor by taxing the rich. The Government should subsidise the access to infrastructure facilities for people who cannot even afford to get it collectively. Increasing block tariff on infrastructure provision will be profitable for the poor and check over-consumption. Proper rules should be set up to avoid grant of subsidies to the rich and politically strong.

#### B. *Guarantees*

Provision of guarantees by Government is a confidence-building measure to encourage investment. They are of two types (13):

- (i) Financial guarantees enabling the user of debt to obtain higher credit rating during the maturity period of bonds.
- (ii) Performance guarantees provided only on the basis of performance in the project in each period.

Guarantees provided by the Government are growing at the compound rate of 12 percent, which is a threat to the credibility and sustainability of such debts. The Technical Committee recommends the following measures (9):

- (i) Ceiling on guarantees
- (ii) Selection procedure to be based on intrinsic viability of the project.
- (iii) Transparency and regular reporting of guarantees.
- (iv) Fixed and properly accounted guarantees fee.
- (v) To avoid letter of comfort which increases the implicit liability of the Government.

#### (C) *Land grants*

Lands adjoining canals and railways can be ceded to promoters of these infrastructure projects so that they can gain from the side business emerging around their investment. This attracts investment to these projects (15).

However, land acquisition being very complex, they may delay investment. If the infrastructure project causes land values to fall, land-owners may increase their demands for compensation. Land grants provide incentive for efficient operation.

*(D) Concessional approach*

This enhances the provision of credit at lower interest cost and higher marketability in the following ways:

(i) BOO (Build – Own – Operate)

The project is fully privatised. Lenders are attracted, as the operators are owners of the assets.

(ii) BOT (Build Operate Transfer)

At the end of the concession period the project ownership is transferred from the private owner to the Government directly or indirectly.

(iii) BOLT (Build – Operate – Lease – Transfer)

During the concession period the contract can charge the users some amount of tariff to cover his cost and earn profit.

*(E) Risk sharing*

Risk in infrastructure projects should be shared by the Govt. to facilitate private investment (15). The types of risks are:

*Currency risk:* When a project is financed by foreign capital, the risk of currency devaluation arises. This will ultimately be borne by the consumers. By insuring countries against currency devaluation, this problem can be solved, but the burden of forward cover will still fall on consumers.

*Commercial risk:* This arises out of uncertainties on either demand side or supply side. The latter can be shifted to a private sponsor. If it can be shifted back to the Government, then the incentive for efficiency decreases. Private investors should be insured against commercial risk.

*Sector-Policy-Induced risk:* Generally, power project sponsors focus on the Government's credibility and solvency as it is the dominant buyer. Hence they enter into a contract of "Take on Pay" with the Government. When the Government is just a collector of user cost payments, not a buyer, it has to give a collection guarantee.

*Country risk:* Sometimes lenders want the creditor countries to provide guarantee against country risk. For example- Export credit agencies in economically developed countries (OECD) provide national exporters guarantees against risk in offering of direct credit to overseas importers.

Besides these, risks occurring due to political instability, market competition, improper estimation of output etc. should be taken care of (13).

*F) Mobilising domestic capital*

Through financial liberalisation, domestic savings rates can be increased, institutional investors can freely hold shares and assets and contractual savings such as pension funds and life insurance funds become available for long term investment. Regular and perfect information will be available to investors by establishing Government benchmarks and credit rating agencies and domestic capital can be mobilised for investment in infrastructure (15). Privatization will help

in risk diversification and smoother management in stock markets (15). The provision of fiscal incentives to investors, low and stable interest rates, performance based grants and the introduction of "Quasi Blind Pool" will attract private domestic capital to infrastructure. In addition, the Infrastructure Development Fund (IDF) can raise the investor base, reduce borrowing cost and provide stable access to capital market (12).

According to the Reserve Bank of India's October 1999 Monetary and Credit policy announcement, banks can sanction term loans exceeding the group exposure norm of 50 percent, to the extent of 10 percent, provided the additional exposure is to finance infrastructure.

#### G) *Attracting capital from external sources*

Shortage of domestic capital can be compensated by availability of foreign capital, although the debt servicing charge is very high in case of foreign debt.

The World Bank and Asia Development Bank, among others, provide long term debt for infrastructure finance. The World Bank offers partial guarantees and shares risks with the private lenders of long term loans. The Foreign Investment Promotion Board (FIPB) and the Securities and Exchanges Board of India (SEBI) also encourage foreign infrastructure funds. The Government can pull in Foreign Direct Investment by offering tax incentives (13).

#### H) *Interest rate subsidies*

A fall in interest rates facilitates loans for infrastructure projects. As the inflation rate has been decreasing over the past two years, the interest rate is expected to fall. However it is almost 9 percent in India, in contrast to only 2 - 3 percent in developed countries (4). A high interest rate increases fiscal deficit and reduces borrowings.

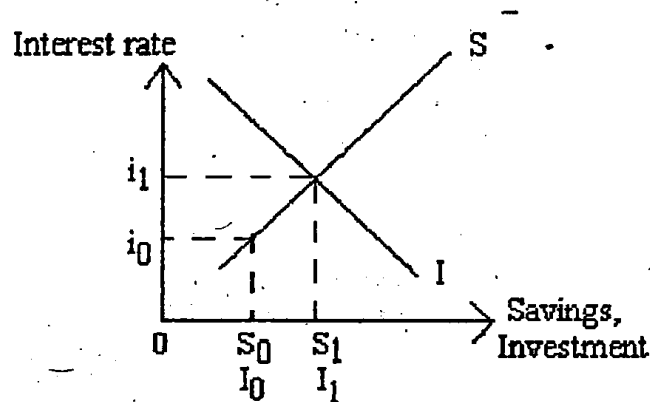
In October '99 the RBI reduced the Cash Reserve Ratio (CRR) from 10 percent to 9 percent through the Monetary and Credit Policy in the second half of the fiscal year. Banks were free to decide the Prime Lending Rate (PLR). The Government also reduced the mandatory interest rate on the Public Provident Fund and Small Savings to 11 percent and 8 - 10.5 percent respectively (4).

The RBI can cut its bank rate only if fiscal deficit is under control. On the other hand, the Government, with a heavy debt burden cannot do without inflationary finance, with the fear of making debt unsustainable.

If the interest rate is administrated lower than market-determined interest rate, then savings and investment will be low. Due to asymmetric information, inefficient investment will be facilitated. Thus, financial repression leads to an unorganised financial market (7).

In Figure 4 below, the Government administered rate  $i_0$  is lower than the market determined rate  $i_1$ .

**Figure 4. Financial Repression**



Source: (1)

#### **IV The Case in India**

In India, the infrastructure development rate has declined in April-November '98. Despite privatisation and permission of foreign equity, some sectors are incurring heavy losses.

##### **(i) Power Sector**

State Electricity Boards (SEBs) are supposed to earn a net rate of return of minimum 3 percent, which was achieved by only four SEBs in 1996-97 (3). The others are incurring a loss of almost 45 percent (2). The reasons are :

- a) Increase in subsidies to agriculture. The introduction of the proposed national minimum agricultural tariff of 50 paise /kwh, even if implemented is less than what is actually provided (3).
- b) High Transmission and Distribution losses due to inadequate investment in distribution, improper billing etc.

To commercialise the power sector, the Government issued the Electricity Regulatory Commissions Bill to set up a Central Electricity Regulatory Commission (CERC) and State Electricity Regulatory Commissions (SERCs).

However these will create more problems, as long as there is improper coordination between agencies framing policies and those actually dispatching load. First technological development and financial control should be ensured. High corruption rate, the lack of accountability and poor performance makes the introduction of the Insurance Regulatory Authority (IRA) Bill dangerous for SEBs. A policy to allow foreign equity upto 100 percent and to set up a power trading company, which would purchase power from private mega projects and sell it to the concerned SEB, has been proposed. The establishment of SERCs and privatisation of distribution is being encouraged (3). SEBs are advised to open escrow accounts to hedge against contingent losses. These escrow accounts should be transparent and the limit of use should be clear (7).

(ii) *Telecommunications*

This sector has witnessed steady growth. The Telecom Regulatory Authority of India (TRAI, established 20.2.97) regulates revenue sharing arrangements derived from providing telecommunication services between different service providers. (2) With the issuance of a consultation paper on Telecom Pricing and Quality of Services, the TRAI is trying to achieve accountability and ensure quality of service (3).

(iii) *Road Transport*

In 1998-99 the Government enhanced allocation of funds by 42 percent over the proceeding year. An additional tax of Re 1 per litre petrol levied in the Union Budget 1998-99 increased funds with the National Highways Authority of India (NHAI). There is automatic approval to foreign equity upto 100 percent. Several projects have been awarded on BOT basis. Some land acquisition procedures have been streamlined to encourage private participation in developing highways (2).

(iv) *Urban infrastructure*

The introduction of Municipal Bonds from local Governments requires fixed incentives for investors to invest in these bonds. These can either be general obligation bonds, where all legally permitted taxes and general revenue of local authorities can be used for debt servicing, or revenue bonds, which rely on specified sources of revenue from facilities financed from bond proceeds (2). Agencies like Hudco, LIC and {IL and fs} contribute significantly to urban infrastructure (3). Additionally, the Central Govt. facilitates State Governments in mobilisation of funds.

## V Conclusion

Thus with the changing demand for infrastructure, both in terms of composition and magnitude, the Government Of India has to take immediate measures to provide adequate funds for financing. Generation of domestic resources through appropriate policy is very important. An appropriate pricing policy, taking both consumer and producers' interests into account can attract more domestic investment. The Gross Domestic Investment in infrastructure in India is expected to be 7 percent of GDP in 2000-01 (3). By development of debt market and liberalisation of financial market, long-term domestic funds will be available to replace the need for foreign capital, reducing the burden of external debt and risks of exchange rate fluctuations.

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