

**From 'Management' to 'Turbulence': World Bank and  
Irrigation Technologies in India**

*Dissertation submitted to the Jawaharlal Nehru University  
in partial fulfillment of the  
requirements  
for the award of the degree of*

**MASTER OF PHILOSOPHY**

**Deepa Hazrati**



**CENTRE FOR STUDIES IN SCIENCE POLICY  
SCHOOL OF SOCIAL SCIENCES  
JAWAHARLAL NEHRU UNIVERSITY  
NEW DELHI-110067  
2006**



**CERTIFICATE**

This is to certify that the dissertation entitled **From 'Management' to 'Turbulence': World Bank and Irrigation Technologies in India'**, submitted by **Ms. Deepa Hazrati** in partial fulfillment of the award of the degree of **MASTER OF PHILOSOPHY** in **Jawaharlal Nehru University** is original work according to best of my knowledge and may be placed before the examiners for evaluation.

Prof. V. V. Krishna  
(Chairperson)

**CHAIRPERSON**  
Centre for Studies in Science Policy  
School of Social Sciences-I  
Jawaharlal Nehru University  
New Delhi-110067

Dr. Rohan D'Souza  
(Supervisor)

**ROHAN D'SOUZA**  
Assistant Director  
GSSP, SSS  
Jawaharlal Nehru University  
New Delhi-110067

## Acknowledgement

I would like to express my heartfelt gratitude to my supervisor, Dr Rohan D'Souza, for his support, patience, and relentless encouragement throughout my M.Phil period. He has provided me with innumerable lessons and penetrating insights into the dynamics of academic research. His sagacious technical and editorial advice became the *raison d'être* of this dissertation.

I am grateful to the chairperson Prof. (Dr).V.V Krishna for his guidance and support throughout the period of the dissertation.

I also take this opportunity to express my sincere gratitude to the faculty of the CSSP department. Dr Pranab Desai, Dr Nasir Tyabji, Dr. Sardindu Bhaduri and Dr. Madhav Govind for their guidance, time and astute comments and guidance during this period.

I extend my appreciation to all the non teaching staff of the centre for their support during the study, Ms. Shyamla Krishna Murthy, Ms. Raj, Ms. Meena, Mr. Mathur and Mr. Anand.

I would like to acknowledge the libraries of Jawaharlal Nehru University, The Energy Research Institute, Institute of Economic Growth (IEG), The World Bank library, Centre for Science and Environment (CSE), Council for Social Development (CSD) that served as a treasure house of knowledge.

Center for Studies in Science Policy  
Jawaharlal Nehru University  
New Delhi

  
Deepa Hazrati

## CONTENTS

<b>Chapter</b>	<b>Page no.</b>
LIST OF TABLES	i
LIST OF FIGURES	i
GLOSSARY AND ABBREVIATION	ii
1. INTRODUCTION	1
Technology and Power	
Design, Script, Code	
Limitations	
2. THE WORLD BANK AND IRRIGATION IN INDIA	16
History of World Bank in Irrigation	
The World Bank in Indian Irrigation Sector	
Concluding Remarks	
2. FROM 'MANAGEMENT' TO 'TURBULENCE'	38
Policy Document (1993) and the Irrigation Sub –sector	
Water Resources Management Document and India's Water Sector	
The Bank Continues to Evolve	
Concluding Remarks	

**4. CONCLUSION**

**58**

**APPENDICES**

**BIBLIOGRAPHY**

**i -vii**

## **LIST OF TABLES**

<b>1.1: Irrigation share within the agriculture sector from 1948-1971</b>	<b>20</b>
<b>1.2: Average irrigation project financed by the World Bank (per year)</b>	<b>26</b>
<b>1.3: Share for irrigation within the agricultural project</b>	<b>26</b>
<b>1.4: World Bank funded Irrigation projects by decade</b>	<b>27</b>
<b>1.5: Technology trend in Irrigation in India (Total net irrigated area in million hectares): 1950 – 1985</b>	<b>32</b>
<b>2.1: The figures for the Bank’s ‘fresh’ prioritized areas in India’s irrigation sector</b>	<b>54</b>

## **LIST of FIGURES**

<b>1(a): World Bank funding for Dams: 1948 – 1997</b>	<b>33</b>
<b>2(a): Lending for water concentrated in relatively few countries</b>	<b>40</b>
<b>2(b): Post - strategy water ratings are below the Bank average performance</b>	<b>46</b>
<b>2(c): The changing Bank lending for water in India</b>	<b>47</b>
<b>2(d): World Bank Re-engagement with India's water sector</b>	<b>51</b>
<b>2(e): World Bank lending for water supply and sanitation (1993- 2002)</b>	<b>53</b>

## Glossary & Abbreviations

AGR	Agriculture and rural development division.
CAS	Country Assistance Study
Economies of scale	It refers to the size of the project in terms of the area it serves. According to the Bank the size of the project has significant positive correlation with economic returns, calculated using evaluation estimates. Thus, since the coefficients of correlation are high for a single factor in such a complex social phenomena as irrigation, indicates the existence of economies of scale
Economies of scale	Economies of scale refer to the 'Project size'. According to the Bank the size of the project has significant positive correlation with economic returns, calculated using evaluation estimates. If the coefficients of correlation are high for a single factor in such a complex social phenomena as irrigation, indicates the existence of economies of scale
ERR	Economic Rate of Return
Hardware elements	Refers to canals, dams and flow regulators
Marginal cost	The additional input of capital require for the production of extra unit of output.
O&M	Operations and Maintenance
OED	Operation Evaluation Department
PAPs	Projects affected people.
Penultimate draft	The draft that preceded the formal policy paper (of 1993) for review within the Bank.
Soft ware elements	Refers to operating rules, institutions, marketing research, credit, input supplies, extensions, customs.
Unnumbered policy note	Unnumbered policy note refers to the working paper in question, that does not represent a consensus. Due to lack of consensus it remains unnumbered and is issued by 'as advice' by the Vice President and consequently is subjected to editing
User charges	It is a pricing instrument imposed o users of natural resources.

## Introduction

The history of the Bank is a particularly instructive case study in many of the philosophical, political and economic assumptions and currents that have shaped the modern world – and how they have gone awry.<sup>1</sup>

The present study is an attempt to understand some aspects of the World Bank's interaction with irrigation technologies, through its funding preferences. In the past there have been attempts to study the effects of development projects funded by the Bank, or the impacts of water technologies advocated by the Bank.<sup>2</sup> However, there has not been any attempt to study how the World Bank arrives at its preferences of what to fund and what not to. To uncover and understand these various themes the present dissertation explores the Bank's interaction with irrigation technologies. That is, to explore its underlying assumptions in making choices for irrigation technology.

The dissertation covers the period between 1993 and 2005. At the start, it is important to state the reason why the study has been chosen to cover this time frame. In 1993, the World Bank released the *Water Resources Management* policy document,<sup>3</sup> which claimed to advance a new approach to manage water resources. The policy document was assessed as the bench mark for evaluating the Bank and its water policies. In 2005, the World Bank released a document titled *India's Water Economy*,<sup>4</sup> arguing that India was approaching a 'turbulent' water future. Within this defined time frame (1993 – 2005) the present study is an attempt to study the World Bank and how it has sought to shape irrigation technologies in India.

---

<sup>1</sup> Bruce Rich (1994), *Mortgaging the Earth: The World Bank, Environmental Impoverishment, and the Crises of Development*, Beacon Press: Boston, p - ix.

<sup>2</sup> Maggie Black and Rupert Talbot (2005), *Water a Matter of Life and Death: Water Supply and sanitation in Village India*, Unicef, Oxford University Press, New Delhi, *Passim*.

<sup>3</sup> *Water Resource Management* (1993), World Bank Policy Paper, The World Bank: Washington D C.

<sup>4</sup> *India's Water Economy: Bracing a Turbulent Future* (2005), Draft Report: the World Bank.



The dissertation intends to explore the following two questions-

- What are the World Bank's preferences for irrigation technologies in India?
- How does the World Bank constitute this 'preference/ choice' in their rhetoric and funding plans?

The first question, asks which are the irrigation technologies that are preferred by the World Bank? The second question is an attempt to understand the logic that helps the World Bank to constitute these specific 'technology choices' over that of others. In other words, the question is an attempt to 'decode' the logic that constitutes these technology choices; which inspire the Bank's funding plans.

To attempt the above questions, the present study explores the pattern of World Bank funding in the irrigation sector in India. To examine how and why the World Bank tends to prefer large, complex, centralized, and energy intensive infrastructure, often at the cost of decentralized and traditional irrigation schemes. That is, for the World Bank why is big always beautiful. These questions are particularly important given the new wave of funding initiatives, which the World Bank is adopting in recent times. In this regard the present study is within the larger rubric of technology studies and society.

To explore the debate within the Bank for its lending for irrigation technologies in the past decades I will attempt to follow the 'script' to uncover how the Bank arrives at its preferences for irrigation technologies. The study will attempt to recover the World Bank's 'script' from its internal publications and documents and thereby follow the debate and discussions in the Bank's own voices and terms.

Having defined water essentially as an economic good, the World Bank tends to regulate water as a commodity.<sup>5</sup> One of the means as understood by the World Bank is regulating through technology. In other words, technology is used as a means to harness water as a commodity. Since the dissertation is centrally about technology I will engage with four broad frameworks within the Society Technology Studies (STS) paradigm.

Technology and its relation to society are intensely debated and this debate has been divided ever since the deterministic interpretation which perceived technology as an agent of social change was challenged.<sup>6</sup> According to the deterministic interpretation, technology shapes society. However, several questions have been posed to the deterministic interpretation of technology. What constitutes technology? Does technology develop in isolation as a mere artefact or is it a product of clearly stated interests and notions? What is the force that enables technology to prosper – is it the inherent power of technology or is it the power in the hands of society that in turn fuels technology? These questions are significant when explaining the relationship between technology and society.

The determinists treat technology as an autonomous agent of change. They argue that technical forces determine social and cultural changes. According to the determinists,

what matters is technologies intrinsic technical efficiency:  
the intrinsically best technology will ultimately triumph,  
whatever local contingencies affect particular developments.<sup>7</sup>

For example, a printing press became a virtual cause for the ‘Reformation’ (1517-1648); and the navigational equipment that became a necessary precondition for

---

<sup>5</sup> *Water Resource Management* (1993), World Bank Policy Paper, The World Bank: Washington D C, *Passim*.

<sup>6</sup> Esha Shah (2003), *Social Designs: Tank Irrigation Technology and Agrarian transformation in Karnataka, South India*, Orient Longman: Delhi, p-7.

<sup>7</sup> Donald Macenzie and Judy Wajcman (1999), *The Social Shaping of Technology*, Open University Press, Philadelphia, p-19.

Europe's colonizing much of the world.<sup>8</sup> Through these examples the determinists assert that technology has transformative power and its character is to change the texture of daily life. They contend that a change in technology exerts a greater influence on society and their processes than any other factor.<sup>9</sup> This way of interpreting technology as being autonomous locates it 'outside' society as being 'supra-social' or 'exogenous' rather than a product of society and an integral part of it. Thus, determinists present technology as an independent, self-controlling, self-determining, self-generating, self-propelling, self-perpetuating and self-expanding force.<sup>10</sup> It is seen as being out of human control, changing under its own momentum and 'blindly' shaping society.<sup>11</sup> Jacques Ellul (1912 - 1994) declares that technology is autonomous which has fashioned an omnivorous world to obey its own laws and renounce all tradition.<sup>12</sup> He further treats technology as a 'self augmenting' and 'monistic' force that pursues its own course; independent of society. While the determinists argue that the 'intrinsically best technology will ultimately triumph'; the critiques point out that the best technology from one point of view might not necessarily be best from another.

The determinists also argue that the history of technology is path dependent, one in which past events exercises a continuous influence.<sup>13</sup> However, Langdon Winner debates, whether the various paths of technological development are freely and deliberately chosen, or are they instead a product of determinism, necessity, drift or some other historical mechanism.<sup>14</sup> The path dependency is argued within the social shaping studies as,

---

<sup>8</sup> Leo Marx and Merritt R Smith (1994), *Does Technology Drive History- The Dilemma of Technological Determinism*, The MIT Press: Cambridge, pp. 10 - 11.

<sup>9</sup> M.R.Smith (1994), 'Technological determinism in American culture', *In Does Technology Drive History- The Dilemma of Technological Determinism*, eds. Leo Marx and Merritt Roe Smith, The MIT Press Cambridge, pp. 2-3.

<sup>10</sup> *ibid.*

<sup>11</sup> Langdon Winner (1978), *Autonomous Technology: Technics-out-of-control as a theme in Political thought*, The MIT Press: Cambridge, p - 54.

<sup>12</sup> *ibid.*, p-52.

<sup>13</sup> Donald Macenzie and Judy Wajcman (1999), *The Social Shaping of Technology*, p-19.

<sup>14</sup> Langdon Winner (1978), *Autonomous Technology*, p -53.

Which of the two or more technologies eventually succeed is not determined by their intrinsic characteristics alone, but also by their histories of adoption. The technology that triumphs is not necessarily abstractly best, even if there is consensus about what 'best' means. Path dependence means that local, short – term contingencies can exercise lasting effects.<sup>15</sup>

In the context of the present study, I ask the question, is the World Bank 'path dependent' in its choices of irrigation technologies? How far the technologies that are preferred by the World Bank are freely and deliberately chosen or in the words of Winner they are instead a product of determinism, necessity, drift or some other historical mechanism. In other words, does the Bank write its script for irrigation technologies based on its stated preferences for some technologies? The questions are important to uncover the script that dictates the preference for certain technologies over that of others.

Critics of technological determinism on the other hand, argue that no matter how ingenious and powerful technology is, it has always been preprogrammed by its users. And therefore they argue that,

the 'black – box' of technology must be opened, to allow the socio – economic patterns embedded in both the content of technologies and the processes of innovation to be exposed and analyzed.<sup>16</sup>

For the critics, what counts more than the technical features are the social and political issues: concerning the circumstances of production, modes of use, values, purposes, skill, style, choice, control and access.<sup>17</sup> And therefore they question how an activity initiated by humans possibly can be outside of society as an independent

---

<sup>15</sup> Donald Macenzie and Judy Wajcman (1999), *The Social Shaping of Technology*, pp.19-20.

<sup>16</sup> Robin William and David Edge (1996), *The Social Shaping of Technology*, *Research Policy*, Vol. 25, pp. 865 -899.

<sup>17</sup> Donald Macenzie and Judy Wajcman (1999), *The Social Shaping of Technology*, p-preface.

variable? And hence they declare that it is society which shapes technology and not the other way around. According to the ‘constructivists’, technology is shaped by society that in turn causes social changes.

Technology does not develop according to an inner technical logic but is instead a social product, patterned by conditions of its creation and use. Every stage in the generation of and implementation of new technologies involves a set of choices between different technical options.<sup>18</sup>

Hence, while technological determinism is the belief that technical forces determine social and cultural changes. The social constructivists presume that social and cultural forces determine technical change. In other words, how science and technology are internally, culturally or historically contingent.<sup>19</sup> Within the framework of social constructivism, this study will also explore if the World Bank decides its funding choices purely in economic and social terms?

Beyond the debate between technological determinism and social constructivism, Thomas Hughes (1822 – 1896) essay ‘Technological Momentum’ locates technology somewhere between the poles of technological determinism and social constructivism. He argues,

while early work highlighted the close interplay between the technical and the social in a ‘seamless web’ that lacked clear boundaries, today the consensus is emerging that the distinction between the socio – economic and the technical is increasingly hard to sustain.<sup>20</sup>

---

<sup>18</sup> Robin William and David Edge (1996), *The Social Shaping of Technology*, *Research Policy*, Vol. 25, pp. 865 -899.

<sup>19</sup>Esha Shah (2003), *Social Designs*, p -7.

<sup>20</sup> Robin William and David Edge (1996), *The Social Shaping of Technology*, pp. 865 -899.

He contends that technology can neither be looked at as being purely deterministic or socially constructed and that technological momentum is an alternate, integrated and interpretative concept. For Hughes, a technological system can be both a cause and an effect; it can shape or be shaped by society.<sup>21</sup> According to Hughes technology can be divided into young and mature technological systems. A young technological system is flexible and susceptible to influences. However, in time the young technological systems tend to become deep rooted and more mature; they grow far more rigid and independent of outside influences and hence more deterministic in nature.<sup>22</sup> Therefore he contends that technology is time dependent yet sensitive to messy complexities in society and culture. For Hughes, technological determinists approach to history offered a needed corrective to the conventional interpretation of history that virtually ignored the role of technology in effecting social change. However the question that continues to fuel the debate is whether technology and its rationality is subservient to choices made in the social realm or technology by means of its invincible rationality drives society in the direction of progress.<sup>23</sup> Within these frameworks, one is the language of dynamic global process that moves ineluctably forward transforming every thing in its path. The other is the language of free agency or individual will, deliberation and choice in which the path of technological advance is consciously directed.<sup>24</sup>

A concept that has been downplayed in the above frameworks is the political dimension of technology that has been highlighted by Langdon Winner, who discusses technology as a political artefact. According to Winner, technological systems are not value neutral and instead have inherent political qualities. They invariably favour the interests of some over the interests of others. Winner maintains that society if they are to be equitable and efficient, must understand precisely what sort of implication new technologies may carry with them before they are introduced. He contends that

---

<sup>21</sup> Thomas P.Hughes (1994), 'Technological Momentum' In *'Does Technology Drive History'- The Dilemma of Technological Determinism*, eds. Leo Marx and Merritt Roe Smith, The MIT Press: Cambridge, p-101.

<sup>22</sup> *ibid.*,

<sup>23</sup> Esha Shah (2003), *Social Designs*, p – 7.

<sup>24</sup> Langdon Winner (1978), *Autonomous Technolog*, p-54.

‘technology is itself a political phenomenon’ and as such is potentially subject to political constraint’.<sup>25</sup>

Winner clarifies that, technologies can be designed consciously or unconsciously to open certain social options while closing others. He gives the example of the New York builder Robert Moses who designed road systems to facilitate the travel of certain types of people and to hinder that of others. Thus, in given social circumstances certain technologies are more compatible with some social relations than with others.<sup>26</sup>

At issue is the claim that the machines, structures, and systems of modern material culture can be accurately judged not only for their contributions of efficiency and productivity, not merely for their positive and negative environmental side effects, but also for the ways in which they can embody specific forms of power and authority.<sup>27</sup>

The underlying notion in Winner’s writings is that technologies including physical arrangements have explicit or implicit political purposes. This is because technologies can be used in ways that enhance the power, authority and privilege of some over others.<sup>28</sup>

A substantial literature discusses the relationship between technology and society<sup>29</sup> and therefore the present M.Phil will not rehearse these schools comprehensively. However, beyond the theoretical intervention of the constructivists and the deterministic school claims or in rejecting technology as a rational tool for progress, the role of politics in influencing and transforming technology has generated considerable interest which I will deal in greater detail in the present study.

---

<sup>25</sup> *ibid.*,

<sup>26</sup> Donald Macenzie and Judy Wajcman (1999), *The Social Shaping of Technology*, pp. 5-6.

<sup>27</sup> *ibid.*, p-28.

<sup>28</sup> *ibid.*, p-32.

<sup>29</sup> For detail account on the debate of various schools of technology see Robin William and David Edge (1996), *The Social Shaping of Technology*, *Research Policy*, Vol. 25, p-865 -899.

## Technology and Power

Esha Shah argues that the 'black box' of technology is rarely opened to show how the technical principles or the internal logic of working of technology is shaped by a particular context. She argues that social relations of power in particular historical and cultural contexts shape technology and technology in turn shapes resource utilization – such as water practices. She suggests that power manifests in relationships that not only operates in settings and domains but organizes and orchestrate settings themselves. In other words, technology is interpreted as one such setting that power organizes and orchestrates.<sup>30</sup> Ruth Finnegan raises a similar point as to, 'Who uses and controls technology, what it is used for, how it fits into the power structure and how widely it is distributed'. He asserts that the key issue regarding “technological” is more than “technical” including issues as political control, class interests, economic pressures, geographical access, and relations of production, conflict and ideology.<sup>31</sup> This clarifies the status of technology and its various implications as being central to the discussion of politics and society. Winner, on the other hand, argues that the modern history of technological change is not one of uniform growth instead it is a diverse collection of patterns rooted in specific choices that individuals, groups and nations have made for themselves and imposed on others.<sup>32</sup>

From these various paradigms Shah's work on tank irrigation technology is located within the rubric of social shaping of technology and seeks to understand how tank irrigation technology is shaped as a result of power relations in a particular historical and social context.<sup>33</sup> She argues that technological design such as a tank is socially shaped and through the means of these designs the society orders itself and in the process a certain form of social organization or social arrangement is also reproduced. Within the

---

<sup>30</sup> Esha Shah (2003), *Social Designs*, p – 17.

<sup>31</sup> Ruth Finnegan (1988): *Literacy and Orality: Studies in the Technology of Communication*, pp. 176-177 Oxford: Basil Blackwell sourced at [http://www.aber.ac.uk/media/on\\_2/1/2006](http://www.aber.ac.uk/media/on_2/1/2006), 1:40pm.

<sup>32</sup> Langdon Winner (1985) Do artefacts have politics? *In The Social Shaping of Technology*, eds. Donald MacKenzie and Wajcmen Judy, Open University Press: Philadelphia, p-54.

<sup>33</sup> Esha Shah (2003), *Social Designs*, *Passim*.



larger debate on social shaping of technology, she argues how ‘a certain balance of power relations in a particular historical, environmental and agricultural context, shape tank irrigation technology and institutionalizes a certain pattern of water distribution’. She refers to her work as an exploration of how technology institutionalizes a particular pattern of resource utilization that favours only some users, and discriminates against others. However, a significant point in Shah’s reference is that a particular technology among various alternatives is a manifestation of ‘choice’.

The Present dissertation draws from these various paradigms and amplifies Shah’s work to understand the relationship between technology choice and political context, as to how an institution such as the World Bank constitutes its preferences for rather specific choices – in the present case, irrigation technologies in India. Under the rubric of social shaping of technology choices the theoretical question that the present study has posed is whether and in what way irrigation technologies in India as advocated by the World Bank is an example of social shaping of technological system. That is, the extent to which a spectrum of ‘specific technologies’ emerge in a process of negotiation amongst different actors, who bring with them their own interest, strategies, and resources. Shah points out that a number of studies have shown the socially and historically contingent nature of technology, yet what remains to be shown is how technological logic or principles are context dependent.<sup>34</sup> Adopting this argument one can question what goes behind making a particular choice: in the present context a choice for a particular irrigation technology by the World Bank based on its own stated notions and ideology.

With regard to water the World Bank defines technology – ‘that will enable market discipline to function, and that technology needs to be shaped by economic choices’.<sup>35</sup> This somewhat clarifies that the World Bank uses water technologies as one of the tools to position water management within the market economy. Peter Mollinga through his work shows how the pattern of commoditization, the form of state regulation and the characteristics of the technical infrastructure shape, and how they are in turn

---

<sup>34</sup>ibid., p -11.

<sup>35</sup> S. Datta (1995), ‘A Decision Support System for Micro-Watershed Management in India’, *The Journal of the Operational Research Society*, 46(5), pp. 592 – 603.

shaped by the forms of water distribution in the Tungabhadra Left Bank Canal irrigation system.<sup>36</sup> He uses Benvenuti's framework to emphasize the regulating role of technology-

Technologies are conceptualized as an ordering principle or language constituting a system of prescriptions that express or embody particular social relations of power.<sup>37</sup>

According to radical critics of the 'technological society' technology is a source of domination that effectively rules various forms of modern thought and activity. Thus, technology appears more as an oppressive force.<sup>38</sup>

This places technology in a political context, which is to understand how far these technological choices are made by a funding agency like the World Bank which eventually constitutes the logic of regulating water resources through its technology choices. To clarify further, the extent to which the World Bank funds irrigation technology from tube wells to high efficiency pumps to large canal structures to mega dams in order to keep its 'economic agenda' in focus.

Within the central question of the research I dovetail my analysis to the following: 'how do economic relations help shape the internal logic of technology, taking a case of World Bank in irrigation technologies for India'. The analytical concepts of technical design, technical code and script would be useful to decipher this internal logic that tends to become an integral part of the technology and in turn seems to shape technology in a particular direction.

---

<sup>36</sup> Peter P. Mollinga (2003), *On The Water Front: Water Distribution, Technology, and Agrarian Change in a South Indian Canal Irrigation System*, Orient Longman: Delhi, p-41.

<sup>37</sup> *ibid.*, p-51.

<sup>38</sup> Langdon Winner (1978), *Autonomous Technology*, p-3.

## Design, Script, Code

The present dissertation adopts the analytical concepts of technological design, code, and script to decipher the 'internal logic' which inspires the World Bank to adopt certain specific technological choices. The concept of design is derived from Winner who argues that it is crucial to evaluate certain kinds of technologies and their arrangements in terms other than economic or social. This is because he argues that to choose certain technologies would be to choose a particular form of political life. According to Winner,

to our accustomed way of thinking, technologies are seen as neutral tools that can be used well or poorly, for good, evil or something in between. But we do not usually stop to inquire whether a given device might have been designed and built in such a way that it produces a set of consequences logically and temporally prior to any of its professed uses.<sup>39</sup>

Thus, for Winner, technologies are not an end product in themselves that can be used positively or negatively. Rather, he contends that technologies might well be logically designed in such a way that the end result is actually a logical set of consequences resulting from the way a technology was designed. Thus, one can argue that the modernized technologies that are thought to bring mechanization and 'development' need to be viewed from a broader perspective. Winner argues that technology and its designs can be used in certain ways to enhance power and authority of some over the others. Drawing from Winner, Shah argues that designing is a social process that starts with an idea, translates into an artefact based on certain choices, assumptions and judgment and in the process reproduces or creates a social order.<sup>40</sup> What makes designing social she argues is the human intent which involves an idea, representation of an idea, assumptions, choices, judgment to achieve a deliberate and an intended outcome. This suggests that the

---

<sup>39</sup> Langdon Winner (1978), *Autonomous Technology*, p-32.

<sup>40</sup> Esha Shah (2003), *Social Designs*, p-14.

process of designing involves an act that translates an idea about an artefact into an artefact. This process requires making certain choices, judgments, assumptions, and thus generates patterns of outcome. This notion of designing is adopted in the present study to understand the World Bank's intention to achieve a deliberate and an intended outcome from an irrigation technology choice.

The study also adopts a particular notion of code and script associated with Langdon Winner and Esha Shah respectively. This would further decipher the way power works through technology. Code or coding in a literal sense means conveying the message in a particular manner as well as denoting how the message needs to be decoded by others. Langdon Winner gave the concept of code to clarify how artefacts have politics; he argues using an example of how the bridge to access Long Island (in New York) was designed with a lower height to keep away the buses that would have transported especially black and poor people. The design of the bridge with its low height was thus coded with racial prejudice. In our study, it would be helpful to understand how far these irrigation technologies are coded by the World Bank and how these technologies function or are made to function in a particular context.

Shah adopts the notion of script from Latour and uses it to show how a script structures technological designs in a certain fashion. She quotes Latour who treats script as a prescription for technology that produces a certain order.

Devices or artefacts with texts that builders and/ or users inscribe in a similar way to how authors and /or readers script a story. The builders/ users by scripting a device delegate a character – to maintain a certain order – to non- human characters/ devices.<sup>41</sup>

The study thus explores if behind a particular irrigation technology choice there is a specific 'script' that is 'designed' and 'coded' explicitly or implicitly with values,

---

<sup>41</sup> *ibid.*, p-14.

interests and norms. These codes in turn dictate the script for a particular set of technology choices.

## **Limitations**

The study has its limitations in terms of the unavailability of exact and precise data of the World Bank's lending patterns. Especially, for irrigation technology there is no breakup available to determine what amount of lending goes for each of the irrigation technologies. Moreover, for the irrigation sector that was prone to many debates and ambiguities even within the Bank, it's very difficult to determine with precision the amount allocated for various sub sectors within the irrigation sector. This is because a single technology is allocated under several headings. For example, dams and perennial canals are clubbed as irrigation technologies, rural water resource management, drinking water etc. As a result the funding is fragmented. Therefore, the lending allocations need to be seen as broad indicators to locate the trend they follow.

Chapter one, In this chapter, I explore how the World Bank's policies and preferences were evolved and structured with regard to India's irrigation sector. The chapter will attempt to follow the trajectory of the Bank's preferences for irrigation technologies and lending. That is outlining what have been the Bank's preferences and how they are shaped by its ideological practices. I will follow this lending trajectory mainly from the World Bank's internal documents and publications. Consequently, I will attempt to recover and understand the World Bank's script for making irrigation technologies choices. This chapter largely covers the history of the World Bank in the irrigation sector from 1948 to 1993 in India, until the Bank released the *Water Resource Management –* policy document in 1993.

Chapter two covers the post consolidation period (post 1993). It analyses two World Bank documents *Water Resource Management – World Bank Policy Paper* (released in 1993) and the *India's water Economy: Bracing for a turbulent Future* (released in 2005).

The chapter explains the 1993 policy paper with regard to the irrigation sub - sector and consequently with India's water sector. To determine how far 1993 policy paper was successful in sorting out the debate within the Bank that were prevalent before 1993. And were the irrigation technology choices different in the post consolidation period? Within the frame of 1993 and 2005 the present study will follow the 'design' of the 'script' 'coded' by the World Bank that has in turn been shaped by the Bank's ideological practices.

In the conclusion I hope to argue that the World Bank tends to prefer centralized, costly, large, complex, energy intensive irrigation technologies often at the cost of decentralized and traditional irrigation systems.

## CHAPTER 1

### The World Bank and Irrigation in India

‘Only Economists still put the cart before the horse by claiming that the growing turmoil of mankind can be eliminated if prices are right. The truth is that only if our values are right will prices also be so’.<sup>1</sup>

This chapter explores how the World Bank’s policies and preferences were evolved and structured with regard to India’s irrigation sector. In developing countries, the irrigation sector is considered one of the largest recipients of public agricultural investment.<sup>2</sup> According to the Operations Evaluation Department (OED) the World Bank lending for irrigation is around 7% of the total sector lending, which is more than any other single sector. From 1950 through 1993, the absolute lending figure globally was around \$31 Billion.<sup>3</sup>

The question which I will pursue in this chapter is what has been the Bank’s preferences for irrigation technologies and how have these been shaped by its ideological practices? It would be important first, however, to qualify the words ‘irrigation’ and ‘technology’ as defined by the Bank. According to the World Bank, irrigation refers to the alteration of the ‘natural order’ in order to improve the way crops get irrigated.<sup>4</sup> For technology, the Bank defines it as the one that will enable market discipline to function and that technology choices are determined by economic choices.<sup>5</sup> Does this imply that the economic preferences that lead to a particular technology choice for an efficient market discipline is ‘just’ based on alteration of ‘natural order’ or are there certain

---

<sup>1</sup> Carl Daniel and John Gowdy (2000), *Paradise for Sale: A Parable of Nature*, MIT Press : Cambridge, p-131.

<sup>2</sup> William I. Jones (1995) *The World Bank and Irrigation*, The World Bank Operations Evaluation Study, The World Bank : Washington, D.C, p-1.

<sup>3</sup> *Ibid.*, p-27.

<sup>4</sup> S.Datta (1995), ‘A Decision Support System for Micro-Watershed Management in India’, *The Journal of the Operational Research Society*, 46 (5), pp. 592 – 603.

<sup>5</sup> *Water Resource Management* (1993), World Bank Policy Paper, The World Bank: Washington D C, p-66.

preferences, codes and biases attached to technology preferences and policy choices itself? To get closer to answer this question I will follow the trajectory of the Bank's preferences for irrigation technologies and lending. In other words the attempt will be to uncover the 'script'; the Bank has followed through these years of lending in the irrigation sector in India. The question will be helpful in following the 'design' that has helped the Bank to formulate the 'script'; to determine if 'market discipline' gets designed into the script due to the Bank's certain specific ideological preferences, choices, and biases.

## **History of World Bank in Irrigation**

World Bank through its lending processes has been involved in irrigation for over half a century now. In the following pages, I attempt to briefly follow the World Bank's irrigation lending trajectory, which is divided into three policy periods.<sup>6</sup>

*The Infrastructure Period (1948 – 71),*

*The Agriculture expansion (1972 – 81),*

*The Consolidation period (1982 – 94)*

In the initial years, the Bank's lending for irrigation was considered synonymous with agriculture, which meant lending for irrigation was tied to lending for the agriculture sector as a whole and vice a versa. Through the first two periods (1948 – 71 & 1972–81), irrigation lending expanded rapidly. A major portion of lending for the agricultural sector was through the irrigation component rather than other on – farm works, land reforms, cost recovery, drainage etc. In the consolidation period (1982-94), however, irrigation and other agricultural lending fell both absolutely and as shares of Bank's lending mainly due to the lack of consensus over the irrigation policy within the Bank. What's significant to note is that throughout these periods (from 1948 to 1994) the character of the Bank's irrigation lending had also been changing.<sup>7</sup> The Bank's initial lending was increasingly

---

<sup>6</sup> Jones (1995), *The World Bank and Irrigation*, pp. 33-40.

<sup>7</sup> *ibid.*, p -33.



directed towards building large infrastructure and its expansion, but gradually seemed to divert from infrastructure to other components such as drainage, land reforms, recovery etc.

### ***The Infrastructure Period (1948 – 71)***

The Bank's irrigation lending began in 1948.<sup>8</sup> Till about 1971, irrigation lending policy was quite consistent in its approach. This was because all agricultural projects, including irrigation were processed in a single department called the agricultural department. The OED (Operation Evaluation Department) report notes that the 'consistency' in policies could be assured by discussions amongst colleagues during Bank meetings or informally. Hence, the need for a policy paper for irrigation was never felt. Consequently, the report clarifies that although the Bank was lending and making changes in its policy directives, there is not much of a written record that documented such policy changes. Due to the same reason there are no reliable statistics on global irrigation investments.<sup>9</sup> Another important feature during the infrastructure period was the Bank's refusal to lend for rehabilitation and maintenance of the irrigation structures as it was considered to be the borrower's own responsibility – this policy carried on till late 1960s.

During the infrastructure expansion period (1948 -1971), irrigation lending was directed primarily for construction of hardware element.<sup>10</sup> By 'hardware' the Bank referred to canals, dams and flow regulators. However in the early 1960s, irrigation lending expanded to include complementary investments so that the dam and canal investments could be made more efficient; these complementary investments were referred to as 'software elements' such as the operating rules, institutions, marketing, research, credit, input supplies, extensions, customs.<sup>11</sup> In many instances, the Bank financed only these complementary investments since main hardware had already been

---

<sup>8</sup>Radha D'Souza (2006) *Interstate Disputes over Krishna Waters: Law, Science and Imperialism*, Orient Longman, New Delhi, p- 362 -363.

<sup>9</sup>Ibid., p-365.

<sup>10</sup> Jones (1995), *The World Bank and Irrigation*, p -30.

<sup>11</sup> Ibid.

built. However, even when the Bank was financing software elements it maintained its claim that the returns from large construction projects would always be very high, as compared to small scale projects. In the words of the Bank:

‘The large irrigation projects are most likely to succeed than the smaller ones because of engineering economies of scale, moreover larger projects attract better managers, and because borrowers are more disposed to take action necessary to assure that larger, more visible projects succeed. There is no justification the Bank confirms for a bias against large projects.’<sup>12</sup>

Although the Bank argued that there is no justification for a bias for large projects, they nevertheless pursued the latter. This seemed to follow from the assumption within the Bank which ‘took for granted’ that ‘large irrigation projects’ are most likely to succeed. There seems to be an implicit justification that larger technologies/ projects are economically lucrative than the smaller ones due to ‘economies of scale’. Another justification the Bank offered was on the basis of ‘economic return calculations’ asserting that one of the most important factor that affect the outcome of the project is its size, suggesting the existence of economies of scale.<sup>13</sup> The ‘economies of scale’ refers to the size of the project in terms of the area it serves. According to the Bank there was a significant positive correlation between the project size and economic returns – that is, the larger the project area the higher is the economic returns. This implied that even though the Bank explicitly argued ‘no justification’ for bias towards large projects however there seemed to be enough indication towards preference for large projects based on ‘economies of scale’.

---

<sup>12</sup> Jones (1995), *The World Bank and Irrigation*, pp. 7 - 8.

<sup>13</sup> The World Bank defines ‘project size’ by the measure of area the project serves. According to the Bank the size of the project has significant positive correlation with economic returns, calculated using evaluation estimates. They argue, if the coefficients of correlation are high for a single factor in such a complex social phenomena as irrigation, indicates the existence of economies of scale.

Moreover, the Bank argued that irrigation is more likely to succeed in countries with lower levels of certain kinds of economic distortions.<sup>14</sup> This means the Bank related the ‘success in irrigation projects’ to lower levels of certain kind of ‘economic distortions’ such as ‘subsidies’. It considered that these economic distortions cause hindrance in cost recovery of projects. The Bank also contended that larger projects attracted better managers. This could be because ‘larger projects’ seem to serve ‘larger area’, hence the ‘visibility’ and ‘accountability’ of large project thereby is apparently higher. As a result, the Bank argued that many engineers and managers felt more ‘accountable’ for justifying a larger project.

Within the infrastructure period it is significant to note that while initially irrigation component within the agriculture project was expanding but over the years the share of irrigation within the agriculture sector fell from 77% to 34% of the total agricultural lending.<sup>15</sup> Table 1.1 shows this decrease in irrigation share from 1948 to 1971.

**Table 1.1**  
**Irrigation share within the agriculture sector from 1948-1971**

	Period	Irrigation Share within the agriculture sector
1.	1948 – 63	77%
2.	1964 – 68	44%
3.	1969 – 71	34%

**Source:** The table is assembled from Jones, (1995), *The World Bank and Irrigation*, p 34.

The reason for the gradual decline of the irrigation share is noted as the fall in the ‘hardware element’. The Bank increasingly attempted to make a shift from investing

<sup>14</sup> Lisa Jordan (1997), *Sustainable Rhetoric Vs. Sustainable Development : The Retreat from Sustainability in World Bank Development Policy*, Bank Information Centre sourced at [www.bicusa.org/pub/rhetoric.htm](http://www.bicusa.org/pub/rhetoric.htm), refered on 15/5/2006, 11.30pm, pp. 1-14.

<sup>15</sup> Jones (1992), *World Bank and Irrigation*, p -34.

solely into hardware element to software element. With the result within the sector, 'software elements' gained the maximum share. In the words of the Bank:

'The 'hardware' element in agricultural lending was declining in two ways: non hardware projects were gaining share at irrigation's expense, and non -hardware was becoming a larger share of the irrigation projects themselves'.<sup>16</sup>

### *Agriculture Expansion Period (1972 – 81)*

Around 1971, a need was felt to formalize Bank's irrigation policies to make its lending more consistent which by now was wavering between 'hardware' and 'software' elements. It's significant to note, when the work on first policy paper began in 1972 by the agriculture and rural development division (AGR), 12 sectors and sub sectors were covered by the policy paper except for irrigation sector.<sup>17</sup> This was due to the constant conflict between the AGR and operations department (operations division included chief of main division making irrigation loan and directions), who were unable to reach a consensus on irrigation lending. The AGR felt that proponents of irrigation lending in the operations division did not agree to any policy that might limit their own freedom to design projects and to lend on their own terms.<sup>18</sup> Policies which the AGR perceived as directives, the operations department perceived it as 'meddling'; as a result the main stream economists continued to fight the non -economic technocrats to define the parameters for the Bank's actions and approach.<sup>19</sup> This conflict of opinion between the engineers and the economists continued for more than a decade on what to lend and what not to. Engineering practitioners thus viewed the irrigation policy paper as an attempt by economists to interfere with the engineer's freedom to do their job. What engineers

<sup>16</sup> Jones (1995), *The World Bank and Irrigation*, p -34.

<sup>17</sup> *ibid.*, p -36.

<sup>18</sup> Lisa Jordan (1997), *Sustainable Rhetoric Vs. Sustainable Development : The Retreat from Sustainability in World Bank Development Policy*, Bank Information Centre sourced at [www.bicusa.org/pub/rhetoric.htm](http://www.bicusa.org/pub/rhetoric.htm), referred on 15/5/2006, 11.30pm, pp. 1-14.

<sup>19</sup> *ibid.*, p-2.



TH - 13250

understood as an engineering artefact for irrigation, the economists always weighed it in terms of economies of scale. As a result the economists claimed that,

‘pricing irrigation water closer to its full cost is theoretically the nearest way to promote efficient use and allocation of the resource’.<sup>20</sup>

Since, the Bank was unable to generate consensus within and without consequently, it adopted a ‘less formal’ approach for irrigation lending.<sup>21</sup>

Throughout this period (1972 -81) only two themes were stressed upon – drainage and greater cost recovery. On the formal side, Bank promulgated certain rules which were termed as directives meant to govern staff conduct, conditions for the loan etc.<sup>22</sup> It’s worth noting that formal directives did not play a large role in day to day irrigation policy process. However, they did contribute towards defining the ‘context’ that is, the margins of the environment in which policies were made, and hence the directives (1971–81) established the context for framing the policies.<sup>23</sup> For example, the policy directive on ‘cost recovery’ dated March 1971 was included for all agriculture projects arguing that ‘beneficiaries should pay public costs and in case of agriculture a minimum of Operations and Maintenance (O&M) costs must be completely recovered’. By May 1976, this directive was limited from being applicable to all agriculture projects to only irrigation projects with an emphasis on ‘efficiency’ and it was argued that there was no major reason to focus on O&M costs. The directive was renewed in June 1980 with no major changes in the policy. Interestingly by February 1984, the directive on cost recovery was defined as ‘not applicable’ to irrigation but to ‘all revenue earning sub borrowers’ emphasizing that ‘whether public or private revenue earning enterprises should recover costs’. Within a month’s time by March 1984, this directive once again underwent an

---

<sup>20</sup> Sadra Postel (1999), *Pillar of Sand: Can the Irrigation Miracle Last*, Worldwatch Institute, W.W. Norton & Company, London, p -235.

<sup>21</sup> The Bank defined ‘Less formal approach’ as a lack of consensus on a policy. As a result it did not release any formal directives in lending and all lending norms were proposed through unnumbered working papers so that they could be edited as and when required –In Jones (1995).

<sup>22</sup> Directives are listed in the annexure 1.

<sup>23</sup> Jones (1995), *The World Bank and Irrigation*, pp. 36-38.

amendment that it would be applicable to ‘irrigation projects’; thus affirming the earlier policy but stating that ‘O&M is a serious problem’. Another salient feature for the ‘cost recovery’ was reflected in the Bank’s arguments that ‘the recovery of all projects from beneficiaries is the normal aim for projects financed by the Bank, and as minimum, operations and maintenance (O&M) costs should be recovered completely’.<sup>24</sup> Due to lack of consensus within the Bank the policy on cost recovery underwent a series of amendments and finally in 1984 the Bank issued an *unnumbered policy note*.<sup>25</sup> The note argued in favour of O&M costs recovery and to recognize cost recovery through mechanisms other than water charges, such as land betterment levies and market forces. This decision was subsequently reflected in the Bank funded projects.<sup>26</sup> Hence such directives were made and amended time to time to define the ‘context’ within which the policy was to be implemented. Moreover, most of the rules/ directives were quite general and applied to all the projects and did not particularly relate to irrigation.

The OED report points out that the Bank’s *great expansion* of the 1970s and its constant attempt to meet lending targets, led to downgrading of technical and economic screening of the projects.<sup>27</sup> In ‘irrigation’, it led to the practice of presenting projects for approval before the engineering evaluation was complete.<sup>28</sup> In some cases it was also made clear that the Bank projects do not have much time to refer to the indigenous knowledge of the project area and was completely based on the *economies of scale*, as one of the World Bank project representative remarked,

If you are building a communal system, you do need participation in construction.... But with water supply you donot make decisions in popular meetings. Certain things cannot be delegated. The location of headwork has to be

---

<sup>24</sup> *ibid.*, p-36.

<sup>25</sup> Unnumbered policy note refers to the working paper in question, that does not represent a consensus. Due to lack of consensus it remains unnumbered and is issued by ‘as advice’ by the Vice President and consequently is subjected to editing. In Jones (1995).

<sup>26</sup> The World Bank Water Demand Research team (1993), ‘the Demand for Water in Rural Areas: Determinants and Policy Implications’, *The World Bank Research Observer*, Vol.8 (1), pp. 47 -70.

<sup>27</sup> Jones (1995), *The World Bank and Irrigation*, p-36.

<sup>28</sup> *ibid.*

determined by topography and hydrology, not by referendum. Only a bad engineer would totally ignore people, but you cannot replace engineering knowledge by dipping into folk wisdom.<sup>29</sup>

### ***Consolidation Period (1982 – 94)***

It is significant to note that even by 1982 the Bank's policy papers debated all aspects of agriculture's sub sectors, except the irrigation sector.<sup>30</sup> Also, by this period the Bank's irrigation lending continued to decline due to the increasing internal disagreement over its funding policies. Moreover the increasing criticism directed towards the Bank policies and its choice of 'specific' projects by the recipient countries and the NGOs acted as a check on the Bank to freely finance projects purely on the logic of economies of scale.

Large irrigation schemes supported by the World Bank have had a disastrous impact on what had been an integrated, sustainable local system for watershed management. The financial cost of such destructive approach to development is immense.<sup>31</sup>

An outcome of such criticism was evident in 'changes' made in the policy directives which present an interesting contrast to those of the rapid expansion period (1971 -82). The policy directives during the consolidation period (1982 -94) period were defensive and a 'reaction' to the criticisms directed towards the Bank.<sup>32</sup> For instance, policy directive of 1982 included 'tribal people' (later it was termed as indigenous people) as those effected by displacement due to irrigation projects. However, Bank's

---

<sup>29</sup> Jones (1992), *The World Bank and Irrigation* p - 108.

<sup>30</sup> *ibid.*, p -35.

<sup>31</sup> Bruce Rich (1994), *Mortgaging the Earth: The World Bank, Environmental Impoverishment, and the Crises of Development*, Beacon Press: Boston, p - 19.

<sup>32</sup> *ibid.*, p -37.

continual neglect especially in rehabilitating the project displaced people or the project affected people (PAPs, as called by the World Bank), became a source of criticism by the NGOs and hence this factor became an 'additional hurdle' that irrigation projects had to clear before the Bank funded them. Similarly this clause got extended to wild life, poverty reduction, environment action plan etc stating that before the project is passed the project displaced people must be given due consideration. Consequently these additional themes were added to the traditional themes of cost recovery and drainage along with better technical preparation of projects and water management.

In the late 1980s, the environment became a category of broad significance in the world of development in part because of widespread ecological and social devastation that resulted from Bank projects and policies. To survive the onslaught of criticism that made the Bank into an institution non grata and attracted the critical eye of Northern policymakers, the Bank was forced to engage in major organizational reform.<sup>33</sup>

Nevertheless, the Bank was still unable to generate a consensus on acceptance for a general policy paper for irrigation.

By the year 1981, the Bank's operation evaluation study for irrigation sector highlighted the absence of uniformity in the Bank irrigation cost recovery practice which was a contrast to the former periods.<sup>34</sup> Hence, the evaluation study declared that 'forces other than policy rules and policy statements were shaping policies'.<sup>35</sup> The following Table 1.2 points out the average irrigation project per year financed by the World Bank. While there was a gradual rise in the number of Bank funded projects till about the Agriculture Expansion period (1972-81), their numbers declined in the Consolidation period (1982-94).

---

<sup>33</sup>Michael Goldman (2005), *Imperial Nature: The World Bank and Struggles for Social Justice in the Age of Globalization*, Yale University Press, New Haven, p – 98.

<sup>34</sup>Jones (1992), *The World Bank and Irrigation* p -38.

<sup>35</sup> ibid.



**Table 1.2**  
**Average irrigation project financed by the World Bank (per year)**

	<b>Period (decadal trend)</b>	<b>Average Irrigation project /year</b>
1.	1950s	1
2.	1960s	4
3.	1970s	26
4.	1980s	-
5.	1990s	15

**Source:** World Bank Operations Evaluation Study (1995), p -2.

It's however interesting to note that even when the number of irrigation projects were declining as evident from table 1.2, the Bank was increasingly funding irrigation as a component of the agricultural sector. As a result, the amount spent as a share for irrigation within the agricultural project remained high. Table 1.3 points to this rising trend.

**Table 1.3**  
**Share for irrigation within the agricultural project**

	<b>Period</b>	<b>Amount spent as share for irrigation within the agricultural project</b>
1.	1950s	\$ 37 million
2.	1960s	\$ 343 million
3.	1970s	\$ 1,120 million
4.	1980s	\$ 1,273 million
5.	1990s	\$ 1,032 million.

**Source:** World Bank Operations Evaluation Study (1995), p-2.

The reason for the higher share are not highlighted in any policy reviews of the Bank but can be analyzed from the fact that the Bank always believed in financing ‘large infrastructure projects’ and even if the smaller projects were selected for financing they always inevitably led to selecting technologies such as tube wells which proved fuel and energy intensive. Moreover, frequent wear and tear of these technologies led to greater investment in operation and maintenance and hence proved cost intensive.<sup>36</sup> Also, the Bank argued that by this period ‘the cost of developing new irrigation sites was higher, since the most economically attractive ones had already been developed’.<sup>37</sup>

While, on one hand, there was an increasing investment for agricultural projects with irrigation component; On the other hand, there was a decrease in investment for ‘irrigation projects’ per se. Thus lending was understood in two ways: one that was for agricultural projects that contained irrigation as one of the components and the other that involved lending directed entirely towards irrigation projects. This trend is reflected in table 1.4.

**Table 1.4**  
**World Bank funded Irrigation Projects by decade**

	Time frame	Projects containing irrigation (in number)	Lending in projects containing irrigation (in \$US million)	Irrigation Lending in these projects (in \$US million)	Costs of projects containing irrigation (in \$US million)	Irrigation costs in these projects (in \$US million)
	1950s					
Decade		6	430	372	1,805	1,561
Average/year		1	43	37	181	156
	1960s					
Decade		41	3,963	3,426	16,220	14,024

<sup>36</sup> Maggie Black and Rupert Talbot (2005), *Water a Matter of Life and Health: Water Supply and Sanitation in Village India*, Unicef, Oxford University Press, New Delhi, p -91.

<sup>37</sup> Jones (1992), *The World Bank and Irrigation* p -39.

Average/year		4	396	343	1,622	1,402
	1970s					
Decade		256	17,091	11,201	43,466	27,623
Average/year		26	1,709	1,120	4,347	2,762
	1980s					
Decade		258	21,993	12,729	60,512	32,900
Average/year		26	2,199	1,273	6,051	3,290
	1990s					
Decade		53	5,454	3,611	14,023	7,944
Average/year		15	1,558	1,032	4,007	2,270

**Source:** World Bank Operations Evaluation Study (1995), p-44.

For instance, from Table 1.4 during the infrastructure period (1948 -71) the Bank's lending increased for projects containing irrigation from 6 to 41 (in number) subsequently the amount being lent in these projects also increased. While in the agriculture expansion period (1972 -81), the number of projects in lending increased from 41 to 256 (in number), on an average, however, the percentage lending for projects containing irrigation component (in agriculture) was much higher than lending for irrigation projects per se. This trend followed in the consolidation period (1982 -94) as well. Evidently, there is an upward trend through out the Bank's lending for irrigation as a component within a larger project than lending for the irrigation projects itself. Such two – fold trend in irrigation lending was the result of several ambiguities within the Bank; between its policy directives and the lack of consensus on how to frame an appropriate irrigation policy.

Following the 1981 OED<sup>38</sup> study, the AGR shifted its focus from 'cost recovery to diversity in cost recovery' following which the 1983 document on 'irrigation water charges and cost recovery' asked many borrowers to virtually ignore the recovery of

<sup>38</sup> *Water management in Bank supported Irrigation Project Systems: An analysis of past Experience.* (1981), World Bank Operations Evaluation Report, The World Bank: Washington, D.C, p -8.

operation and maintenance costs, through water charges.<sup>39</sup> The OED report addresses that 'directives' were not the only source of policies within the Bank. In the light of this, the policy discussion on 'cost recovery' continued in the consolidation period (1982- 94). Evidently there was an absence of uniformity within the Bank on the issue of cost recovery practices. OED's first irrigation study highlighted this lack of uniformity in Bank cost recovery practices for irrigation.

The study revealed that the Bank's right hand had pressed Turkey hard to get water charges up from 85% to 100% of O&M costs while its left hand was making repeated irrigation loans to Indonesia, where water charges recovered 15% of O&M and there were no serious efforts to reform the system.<sup>40</sup>

It further argued that project experiences did not show any association between water charges and water use. This was because the Bank could not give any empirical evidence for its argument that 'raising water charges to the long run marginal value of water would improve water use efficiency'.<sup>41</sup> This inability to support its claim empirically possibly explains why the policy directive on cost recovery and O&M charges were subjected to many amendments. Such directives were however, highly criticized by the Bank's economists, who saw no reason for pricing irrigation water other than on the basis of 'long- run marginal costs'. Since there was no consensus even at that stage, the Bank presented the irrigation policy as an unnumbered directive rather than a formal policy note.<sup>42</sup>

Following this, a renewed study on cost recovery was carried on by OED in 1986. Once again the study argued that there is no evidence or any theoretical reason to expect that greater cost recovery would produce better O&M. This was mainly due to the past experiences in the Bank projects where higher cost recovery did not necessarily lead to

---

<sup>39</sup> Jones (1995), *The World Bank and Irrigation*, p -39.

<sup>40</sup> *ibid.*, p-38.

<sup>41</sup> *ibid.*

<sup>42</sup> *ibid.*

better O&M. The study concluded that it was time to take a more pragmatic and comprehensive approach to the issue of irrigation. Moreover, by 1991, the Bank was under increasing pressure for its alleged neglect of popular participation (as in case of indigenous people) in irrigation and other water projects (mainly due to dams), and for its failure to see the impact of its water projects on other water uses and on the environment as a whole.<sup>43</sup>

For instance two irrigation projects that attracted much attention were the Narmada dam project in India and Mahawali Ganga in Srilanka. On one hand, where the Bank glorified these projects, 'it's not possible for India to go ahead with the Sardar Sarovar project without the Bank involvement, and that this project offered the best opportunity for modernization of India's irrigation in the direction desired by the Bank.'<sup>44</sup> On the other hand, there was an increasing disagreement within the Bank on what was justifiably imperative and what was not.

Amidst such debates work began on the *Water Resource Management* document: A World Bank policy paper which was published in 1993.<sup>45</sup> The paper argued that 'the Bank, after years of finding irrigation too vast a subject for a policy paper, now found it too narrow'.<sup>46</sup> Even then the Bank policies struggled to accommodate the economists who argued for a simple long term marginal value pricing on one hand and Bank's operating consultants who argued that market imperfections and other irrigation sector circumstances justify more flexibility and hence marginal value pricing cannot dictate the irrigation sector. Interestingly, this argument was being followed since four decades where the economists held their point of view to 'price the water' and valued its cost on a 'long term marginal value'. While the operating consultants argued for more flexibility in cost recovery and O&M charges for they seem to believe that the 'inherent market imperfections' and complexities within the irrigation sector demanded more flexibility.

---

<sup>43</sup> Hardld D. Frederiksen (2003), 'The World Water Crises: Ramifications of Politics Trumping Basic Responsibilities of the international Community', *The Journal of Water Resources Development*, 19 (4), pp. 593 -695.

<sup>44</sup> George Tanham, and Job C.Henning (2000), *Water as a strategic commodity in Asia: Phase I Research and Preliminary Analysis*, Hicks & Associates, Inc., Virginia.

<sup>45</sup> *Water Resource Management* (1993), World Bank Policy Paper, The World Bank: Washington D C.

<sup>46</sup> Jones (1995), *The World Bank and Irrigation*, p - 39.

And so they argued that one cannot be rigid in complying for 100% cost recovery of O & M charges.

Beyond this technical and economic discourse within and outside the Bank, it's important to note the way the 'so called' Policy pronouncements and directives were made operational and how far these directives were responsible for framing the course of action for the borrowers and lenders. The OED report defines that a policy pronouncement was to be at the periphery of Bank's day to day operations. The course of action for the borrowers was through the personal contacts between them and the professionals within the Bank. Even to the extent that sometimes the more experienced staff was inclined to apply certain techniques appropriate in areas where they learned their trade from, to other areas where such techniques might not be so appropriate.<sup>47</sup> The report concluded that this was largely due to the dearth of staff experience within the Bank to the day to day making of irrigation policy.

## **The World Bank in Indian Irrigation Sector**

Within the larger engagement of World Bank in irrigation, it's lending for irrigation in Asia remains the highest as compared to other regions.<sup>48</sup> Within the Asian continent, India's share at 26% makes it the highest client to the World Bank for irrigation.<sup>49</sup> Also, the OED report asserts that past trends have shown that Asian projects have always been 'bigger in total costs, loan size, irrigation area, and in the attention the latter's problems have attracted'.<sup>50</sup>

It's worth noting that during the rapid growth period (1972 -81, expansion of hardware); most of the expansion was concentrated in India and China.<sup>51</sup> These irrigation systems, the OED report points out, soon developed severe operation and maintenance

---

<sup>47</sup> Jones (1995), *The World Bank and Irrigation*, pp. 38-41.

<sup>48</sup> *India's Irrigation Sector Review* (1991), The World Bank Report No. 9518 -IN, the World Bank, p-2.

<sup>49</sup> Jones (1995), *The World Bank and Irrigation*, p-2

<sup>50</sup> *India's Irrigation Sector Review* (1991), The World Bank Report No. 9518 -IN, the World Bank

<sup>51</sup> George K. Pitman (2002), *Bridging Troubled Waters: Assessing the World Bank Water Resources Strategy*, The World Bank Operation Evaluation Study, The World Bank: Washington, D.C, p -30.

problems in the form of salinization, water logging and delayed drainage. As a result, even when maximum investment was happening in Asian public sector neither the farmers nor the society at large could get full anticipated value from these investments. Consequently, irrigated area per person, which held steady in the 1960s and grew in 1970s, followed a downward trend throughout the 1980s and 1990s.<sup>52</sup> The OED report acknowledges that reviews under – report small – scale pump irrigation because they figure in Bank records in the form of rural credits, electrification or other projects. Consequently, share of large scale gravity irrigation projects in Bank lending is generally over reported.<sup>53</sup>

Moreover, the irrigation review points towards an increasing share for certain specific technologies such as canal irrigation, and tube wells. For example Table 1.5 shows a technology trend in irrigation from 1950- 1985. The values indicate the percentage share increase in tube wells stand the highest at nearly 11 % and only a slight increase is also evident in the net irrigated area by other wells (from 6.0 to 8.7 in million hectares).

**Table 1.5**  
**Technology trend in Irrigation in India (Total net irrigated area): 1950 – 1985**  
**(Net Irrigated area in Million hectares)**

	Technology trend	1950-51	1960-61	1970-71	1980-81	1984-85
1	Canal irrigation	8.3	10.4	12.8	15.3	15.9
2	Tanks	3.6	4.6	4.1	3.2	3.3
3	Tube Wells	n/a	0.1	4.5	9.5	11.3
4	Other wells	6.0	7.2	7.4	8.2	8.7
5	Other sources	3.0	2.4	2.3	2.6	2.6
6	Total net irrigated area	20.9	24.7	31.1	38.8	41.8

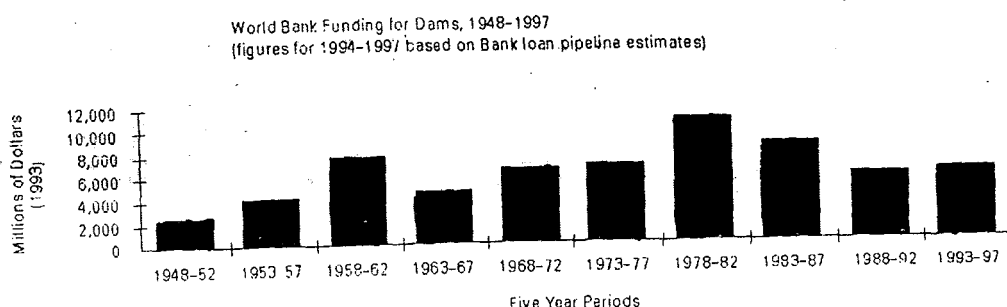
**Source: India Irrigation Sector Review (1991), the World Bank p-2.**

<sup>52</sup> *ibid.*

<sup>53</sup> Jones (1995), *The World Bank and Irrigation*, p-42.

In terms of the Bank lending for dams, between 1947 and 1994 it had financed 604 large dams in over 93 countries, in which two third were built in ‘developing countries’.<sup>54</sup> Since then the Bank emerged as the ‘single largest’ source of international finance for large dams, currently lending more than US\$1 billion for dam related projects. Figure 1(a) shows the Bank lending for dams peaked during the infrastructure period and the agriculture expansion period.

**Figure 1(a)**  
**World Bank Funding for Dams: 1948 - 1997**



**Source:** Sklar and Mc Cully(1994), adopted from Radha D’Souza (2006) *Interstate Disputes over Krishna Waters: Law, Science and Imperialism*, Orient Longman, New Delhi, p- 362

In 60 years (1944-94) of the Bank’s lending to India, clearly certain trends are revealed for example,

In early years of relationship the Bank involvement was not visible and direct as compared to 1980s and 90s. However, after 80s, the Bank along with the IMF has started a direct and visible role in India’s policy making. Nevertheless, there has been continuity in the Bank’s philosophy and ideology over the past 50 years. The philosophy of diluting the basis of economic planning, dismantling

<sup>54</sup> Radha D’Souza (2006) *Interstate Disputes over Krishna Waters: Law, Science and Imperialism*, Orient Longman, New Delhi, p- 362.



of public sector, encouragement to private sector and greater emphasis to market forces has been forcefully articulated by the Bank since 1950s.<sup>55</sup>

One can trace the irrigation lending trend back to the year 1991, when the World Bank concluded that, 'in many respect Indian irrigation sector is at the crossroads. The reality is that one of the World's largest irrigation investments is performing unevenly and on average far below potential'.<sup>56</sup> Stating India's irrigation performance as mediocre the Bank argued 'India is critically dependent on better performance from irrigation and therefore needs better sector planning, financial management and adequate water management'.<sup>57</sup> Thus declaring that the government of India must begin to divest as much implementation and investment as possible to non – government sector. This was because the Bank considered failure of the government sector as one of the main reason for the irrigation sector's mediocre performance. The *India's Irrigation Review* (1991) argued that the Bank funded projects that constantly emphasized on new construction and massive expansion of surface – irrigation led to sector's current problems.<sup>58</sup> This was because the *Review* (1991) maintained that the focus of Bank's projects had been on 'construction', and so the broader management needs of the sector got neglected. Due to the rising crises within the irrigation sector (mainly due to inadequate performance) the Bank advocated that India needed a coherent water policy to prioritize its investment decisions. However, the *Irrigation Review (1991)* disentangled the knot by attempting to summarize all possible reasons that led to the irrigation sector's financial crises.

Over the past decade the situation appears to have worsened: Lack of financial discipline and accountability, neglected maintenance, and construction abuses have become endemic and is throwing the sector into financial crises.<sup>59</sup>

---

<sup>55</sup> John A. Williams, John (1982), *What Indian Water means to the West: A source book*, Vol.1, Western Mexico, New Mexico.

<sup>56</sup> *India's Irrigation Sector Review* (1991), The World Bank Report No. 9518 –IN, Executive Summary.

<sup>57</sup> *ibid.*

<sup>58</sup> *India's Irrigation Sector Review* (1991), The World Bank Report No. 9518 –IN, Executive Summary.

<sup>59</sup> *ibid.*

Ironically, *India Irrigation Sector Review* (1991) on one hand pointed to ‘the large irrigation construction projects responsible for throwing the sector into financial crises’. On the other hand it argued that the,

current sectoral malaise stems from the fact that irrigation is largely managed by government monopoly, that a culture of government needs to do it prevails, and that the sector’s bureaucracy has grown unwieldy, not adaptive to changing needs with narrow engineering interests and lacking training and incentives to improve performance.<sup>60</sup>

This implied that the stated World Bank focus for Indian irrigation sector shifted from ‘efficient use of scarce public resource as paramount for future investment choice / expenditure’ to ‘actions with high economic viability with near term impact and supporting investment through private sector’.<sup>61</sup> To address the problem of non-performance of government, the Bank advocated for the divestment from part of the irrigation sector by introducing ‘*corporate management culture*’ at least in two areas: ‘ground water and credit for farmers’.<sup>62</sup> The introduction of ‘corporate management culture’ seemed a product of prevalent belief within the Bank that the ‘corporate’ or the ‘private’ sector has a better ability to carry on the projects with ‘higher accountability’ and its ‘higher customer orientation’. However, such claims or beliefs were themselves not grounded in fact or empirical evidence.

It is important to note that while the Bank argued for encouraging private investment in the ground water sector; for surface water system it asserted that improving management of surface system is a key element in obtaining maximum benefit from past and future irrigation investments,

---

<sup>60</sup> *ibid.*, p-12.

<sup>61</sup> *Ibid.*, pp.1 -5.

<sup>62</sup> *ibid.*

The point of modernization is to raise the returns to existing surface irrigation systems by improving performance capabilities and operating characteristics. The degree of change depends upon economic returns possible. Modernization yields quite high rate of returns if it overcomes constraints to reliable and effective water distribution.<sup>63</sup>

Evidently, the World Bank in time seemed to have carefully shifted its stance for India's irrigation Sector from '*Engineering*' to '*Management*'. And advocated for India's irrigation Sector to create an '*autonomous command*', which meant market 'discipline over maintenance and operation cost'. It also sought to divert a part of functional control to farmers but stated that the water charges must be retained by the 'command'.<sup>64</sup> According to the World Bank loan document,

'The GOI is committed to treating water as an economic good, rather than a human right as demanded by Indian water activists. The Bank's projects are focused on promoting cost recovery and privatization by facilitating the necessary institutional reforms. Given the political basis of irrigation investments in the contemporary period, it is "rational" for ruling government to continue to adopt the colonial policy enunciated in 1867 of endowing as many villages as possible along a canal system with claims to water'.<sup>65</sup>

---

<sup>63</sup> Leslie Abbie, James Q.Harrison and John W.Wall (1982 ), *Economic Returns to Investment in Irrigation in India*, World Bank Staff Working Paper No- 536, p-3.

<sup>64</sup> *India's Irrigation Sector Review*. (1991). The World Bank Report No. 9518 –IN.

<sup>65</sup> As quoted in Frank Van Steenberger (2003), *Creating markets with the poor: Selling treadle pumps in India*, GateKeeper Series No- 107.

## **Concluding Remarks**

The World Bank's dealings with India (1944 -1994) involved certain kinds of discourses and have chosen certain routes to opt for specific technological choices. In the span of 60 years of the World Bank's engagement with irrigation there were various attempts to bring a suitable, comprehensive and pragmatic irrigation policy. This chapter followed the trajectory of events and amendments that went on before the work began on a comprehensive policy. However, even before the 1993 policy document was released the period between 1944 and 1994 shows that Bank clearly had certain set objectives and notions based on which it understood managing irrigation policies. The Bank understood irrigation water clearly in terms of an economic discourse always locating its irrigation policies chiefly within a cost - benefit analysis framework. Also there is an explicit trend towards favouring privatization of water for agriculture / irrigation, this was largely because the Bank argued that divesting as much implementation and investment as possible to non – government was the sole solution to upgrade irrigation performance. There was also a preference for large dams and canals again based on the notion of 'economies of scale'. When the Bank was surrounded by much criticism it tried to shift from large to small – scale irrigation technologies. But these technologies such as the tubewells too proved to be fuel and energy intensive. On one hand, the Bank's lending was dwindling between the 'hardware' and 'software' elements. On the other hand the Bank was making a shift from the engineering side of irrigation polices to management side.

The 'script' that the World Bank has followed over the years (1948 -1994) clearly shows certain trends for preferences for an 'economic discourse' on water. However, it is important to note that during this period the script was subject to both debate and criticism within the Bank itself. As a result, one finds an unevenly articulated set of preferences by the Bank to shape its script in a particular direction such as – economies of scale, privatization, economic rate of return, large irrigation structures and intensive irrigation technologies.

## CHAPTER 2

### From Management to Turbulence

'We attach ... a lot of conditions to our loans. I need hardly say that we never get away with this if we did not bend every effort to render the language of economics as morally antiseptic as the language the weather forecaster uses in giving tomorrow's prediction. We look on ourselves as technicians or artisans. Words like 'savings' and 'investments' and 'productivity' are tools of our trade, and like good artisans we try to develop proper standards for their use'.<sup>1</sup>

– Eugene Black (third President  
Of the World Bank, 1962)

To understand the post consolidation period (post 1993), one of the important document brought out by the World Bank was the '*Water Resource Management Policy Paper*', released in 1993.<sup>2</sup> The previous chapter discussed how this policy document was attentive to the growing debate between the economists and the engineers within the Bank. Following the lack of consensus over the Bank's water lending policies there was a need for a 'comprehensive' and 'pragmatic' policy for water resources. However, before the formal policy document was released, its draft was reviewed within the Bank. This draft also known as the penultimate draft reflected divisions and debate within the Bank between those who favoured privatization and market forces to solve the problems of the water sector and those who preferred a more comprehensive and participatory approach.<sup>3</sup> The final policy document was therefore an attempt to accommodate both the above perspectives as far as possible. This penultimate draft was followed by a comprehensive statement- *Water Resources Management (WRM)*, a World Bank Policy Paper that the Bank issued in 1993. The policy paper took three years to complete before it was released; and the Bank considers this span of time as a measure of the range and the

---

<sup>1</sup> Bruce Rich (1994), *Mortgaging the Earth: The World Bank, Environmental Impoverishment, and the Crises of Development*, Beacon Press: Boston, p-63.

<sup>2</sup> *Water Resource Management* (1993), World Bank Policy Paper, The World Bank: Washington D C.

<sup>3</sup> George K. Pitman (2002), *Bridging Troubled Waters: Assessing the World Bank Water Resources Strategy*, The World Bank Operation Evaluation Study, The World Bank: Washington, D.C, p-2.

intensity of debate that surrounded the issue of water lending. As a result, the 1993 policy document is considered benchmark for evaluating the Bank's lending in the water sector.<sup>4</sup> Another reason for the policy paper to have been assembled was the failing water operations and growing international concern. This essentially seemed due to the mismanagement of the global water resources and poor service level in the Bank funded projects over the years.<sup>5</sup> As a result the Bank could no longer carry on with the arbitrary lending, rather it now required to dictate a properly thought out plan for lending in the water sector.

As the policy document is considered the bench mark for evaluation, the essential question therefore is that following this document what has been the nature of the World Bank's lending for water resources/ irrigation since then. In other words, since the advent of the 1993 policy (in the following pages the *Water Resources Management Policy* document will be referred to as the 1993 policy), have the 'rules of engagement' really changed in theory and practice from those that were prevalent before 1993 for over 5 decades?

The period before the 1993 policy document is referred to as 'pre strategy period' while after 1993 is considered the 'post – strategy period'.<sup>6</sup> It's important to note that the Bank's lending before and after the 1993 policy was always concentrated on a few countries and this remained more or less consistent through the years. For instance figure 2(a), illustrates how the volume of Bank's lending for water remained heavily concentrated before and after the 1993 policy period, with more than half going to: China, India, Indonesia and Mexico. This trend has remained more or less consistent in the post consolidation period (post 1993) as well. From figure 2(a) it's apparent that the World Bank's lending –was highest for China followed by India.

---

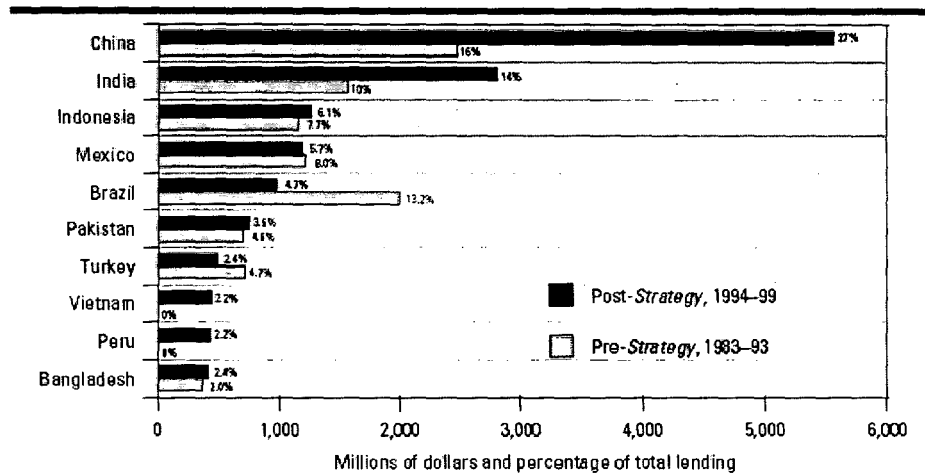
<sup>4</sup> George K. Pitman (2002), *Bridging Troubled Waters*, p-1.

<sup>5</sup> Patrick Mc Cully, 'World Bank takes low on Water Policy', sourced at [http:// www.irm.org](http://www.irm.org) referred on 1/5/2006, 1.21pm.

<sup>6</sup> George K. Pitman (2002), *Bridging Troubled Waters*, p-11.

Figure 2(a)

Lending for water concentrated in relatively few countries



Source: OED.

**SOURCE:** George K. Pitman (2002), *Bridging Troubled Waters: Assessing the World Bank Water Resources Strategy*, The World Bank Operation Evaluation Study, The World Bank: Washington, D.C, p-11.

The 1993 policy document mainly includes three central themes<sup>7</sup> : a). Comprehensive analytical framework for identifying priorities; b). the institutional and regulatory systems that promote reform (with emphasis on decentralization and participation); and c). the financial and opportunity costs of water in all its competing uses (an economic good). Through out this policy paper the above general themes are elaborated without the mention of any particular policy declaration. The reason for this can be understood from the Bank's argument that the 1993 policy was mainly an attempt to sort out the 'confusion' and debate within the Bank and among its borrowing nations. The Bank intended the policy paper as an opportunity to win the minds of as many as possible. Thus, 1993 policy paper was more of a consensual document to satisfy or at least attempt to bring the economists and engineers at a platform for negotiation. The Bank argues that the 1993 policy was largely an attempt to gratify those who favoured the policy paper within the Bank but at the same time the policy paper could not neglect

<sup>7</sup> Ibid., p- 45.

the other side who did not favour the policy in its entirety. Hence, there was an attempt to reach a balance that could satisfy both the engineers and the economists. In the words of the Bank,

the paper gratified those who had sought an irrigation policy paper without disturbing practitioners who feared that such a policy statement would prevent them from applying the best combinations of engineering and economic solutions to highly site – specific problems of irrigation projects.<sup>8</sup>

Although the 1993 policy paper is not too difficult to comprehend I would, however stress upon four essential and relevant points from the perspective of the present dissertation.

- Was the 1993 policy paper successful in sorting out the conflict over water lending between the engineers and the economists within the World Bank?
- Was the lending in various sectors within the water sector different in the post consolidation period (post 1993)?
- Which technologies were preferred for irrigation in the post – consolidation period and what preference/space did traditional technologies have within the Bank's lending?
- What effect did the 1993 policy have on the debate on user - charges and economics of water?

I would begin by first addressing the last question on user - charges and the economics of water. Ever since the Bank started to lend in the water sector, one of its key

---

<sup>8</sup> William I. Jones (1995), *The World Bank and Irrigation*, The World Bank Operations Evaluation Study, The World Bank: Washington D.C, p -39.



instruments to allocate water was to price it.<sup>9</sup> The Bank believes that under priced water is frequently misallocated, mismanaged and wasted. It argued that the only means to check this misallocation of water is its efficient pricing combined with appropriate fee collection and good management.<sup>10</sup> The operations evaluation study report points out that initially the 1993 policy seemed to advocate high flexibility on water pricing and other issues within the water sector, which aroused considerable debate during the review of the penultimate draft.<sup>11</sup> In view of the growing debate within the Bank, over issues of pricing water and appropriate technologies, this policy paper seemed as an attempt to provide a solution involving both the economists and engineer's perspective as far as possible. While the economists continued to argue in favour of a long term 'marginal value pricing',<sup>12</sup> for water, the operations division debated from the perspective of market imperfections and other irrigation – sector circumstances, and hence argued that marginal pricing cannot dictate the irrigation sector. Interestingly, amidst such debate the Bank seemed to offer a win – win situation through the 1993 policy paper by claiming to embrace both desirability of marginal – value pricing and the need for flexibility.

At the core of its 1993 policy was a comprehensive framework that advocated treating water essentially as an economic good, combined with decentralized management and administrative delivery structures.<sup>13</sup> It also placed greater reliance on pricing, participation by stakeholders, incentives for adopting technologies and management approaches that increase the efficient use, allocation and distribution of water. Such technology and management approaches the Bank argued would make it easier to conserve water and increase the efficiency of water use.<sup>14</sup>

---

<sup>9</sup> Peter Rogers (1992), *Comprehensive Water Resource Management – A concept paper*, The World Bank: Washington, D.C, p-15.

<sup>10</sup> Jones (1995), *The World Bank and Irrigation*, p-39.

<sup>11</sup> George K.Pitman (2002), *Bridging Troubled Waters: Assessing the World Bank Water Resources Strategy*, p -25.

<sup>12</sup> Jones (1995), *The World Bank and Irrigation*, p-37.

<sup>13</sup> *Water Resource Management* (1993), World Bank Policy Paper, the World Bank: Washington D C, p-10.

<sup>14</sup> *ibid.*, p-66.

With regard to technologies the Bank through the 1993 policy advocated the use of modern technologies for better management of water. According to the Bank the relevant technology would be the one ‘that will enable market discipline to function, and that technology needs to be shaped by economic choices.’<sup>15</sup> Following the 1993 policy, the Bank has maintained that water should be perceived essentially within an economic discourse. Treating it as an economic good or a commodity and reiterating the need to place water within the arena of markets and price so that water can be managed as a sustainable resource.

However, to satisfy those who were not in favour of the marginal value pricing, the Bank in no time added a clause that given the political sensitivity of pricing, it is essential to be realistic in setting targets and linking them with institutional reforms.<sup>16</sup> Such ambiguity was evident within the Bank’s water policies both in theory and practice. Eventually following the release of 1993 policy, there was an attempt to reach a consensus to mainstream the economic and the financial aspects of pricing water that somewhat led to uniformity within the Bank but not in client countries or international arenas.<sup>17</sup> Moreover, the Bank till date continues to emphasize on the use of institutional reform and management tools such as water entitlements and user - charges. This clause is significant because ‘user - charges’ and ‘economic rate of return’ were the point of conflict between the economists and the engineers ever since the Bank started to lend to the water sector. It seems that till date there has not been a well defined pragmatic way to enforce the user - charges. The Bank continues to argue that it would strongly consider a variety of investments with regard to their ‘economic’ and ‘social returns’. However, the definition of economic and social returns still remains ambiguous.

---

<sup>15</sup> S.Datta (1995), ‘A Decision Support System for Micro-Watershed Management in India’, *The Journal of the Operational Research Society*, 46 (5), pp. 592 – 603.

<sup>16</sup> George K Pitman (2002), *Bridging Troubled Waters*, p- 26.

<sup>17</sup> *Irrigation and Drainage Sector Study* (1995), The World Bank Operation Evaluation Study, The World Bank: Washington, D.C, p-4.

## **Policy Document (1993) and the Irrigation sub sector**

Within the water sector, irrigation and drainage sub sectors have been the weakest on policy and institutional issues.<sup>18</sup> The operations evaluation study argues that the reason why the Bank's irrigation strategy had weak foundations is because the Bank always tend to focus on costly participation approaches that enhance ownership while have left some of the important factors untouched.<sup>19</sup> This is evident through the decades, when the Bank has been lending for irrigation sector.

For instance, in the 1980s the investment in irrigation projects changed from a primarily 'engineering focus' to 'rural development' projects with an irrigation component. This was because of the complexities within the irrigation sector and difficulty in trying to define user - charges. Hence the Bank was more inclined to finance large sectors such as agriculture rather than specific irrigation schemes, to do away with ambiguity in its irrigation policy. However, the OED report concludes that such project loans suffered from problems of impracticality because of their complexity and diverse geographical nature. The trend continued until the 1990s when the Bank once again was inclined to finance specific large irrigation projects based on its 'old' logic of economies of scale. The evaluation report concludes that, 'the Bank should continue to finance large irrigation schemes because of their economies of scale and higher economic rate of return'.<sup>20</sup>

With regard to the traditional technologies there is no substantial data to show that the Bank was ever inclined to fund traditional technologies. The Bank till date, infact, maintains its argument for traditional technologies as follows,

'The quest for regaining the glorious past of the tanks has been pursued without success for 150 years. The World Bank experience

---

<sup>18</sup> George K. Pitman (2002), *Bridging Troubled Water*, p -53.

<sup>19</sup> *Irrigation and Drainage Sector Study* (1995), The World Bank Operation Evaluation Study, The World Bank: Washington D.C, p-8.

<sup>20</sup> *ibid.*, p-55.

with tank restoration in Karnataka is that many of the tanks have not filled for years. And in heavily-stressed basins it is close to a zero sum game, in which creation of new rights for some means curtailing existing rights of others'.<sup>21</sup>

Through such arguments the Bank contends that where water is already scarce, it is a 'zero sum game', as the schemes that are used to solve the problem of one person does so at the cost of someone downstream. The Bank uses such arguments to endorse large technologies and decides against the use of traditional technologies such as wells, tanks etc. In the words of the Bank:

'While traditional technologies such as rainwater harvesting and tanks can play an important role, they also create new and additional demands which often clash with existing uses, and they sustain the wishful thinking that supply side options (both large and small scale) are what will solve the Problem'.<sup>22</sup>

Strangely, though beyond all the arguments that the Bank gives, according to the Operations Evaluations department (OED) report, water related projects have been among the poorer performers in the Bank's portfolio. The 1993 policy was an attempt to recover from this 'troubled past', however, even after 1993, the performance for the water sector projects funded by the Bank have remained below the Bank's average performance<sup>23</sup> (in comparison to the Bank's project performance in other sectors the average performance of irrigation sector has remained low). A comparative picture of the pre and post strategy period confirms that the various aspects within the water sector like institutional development, sustainability and outcome remained much below the Bank's average as depicted in figure 2(b)

---

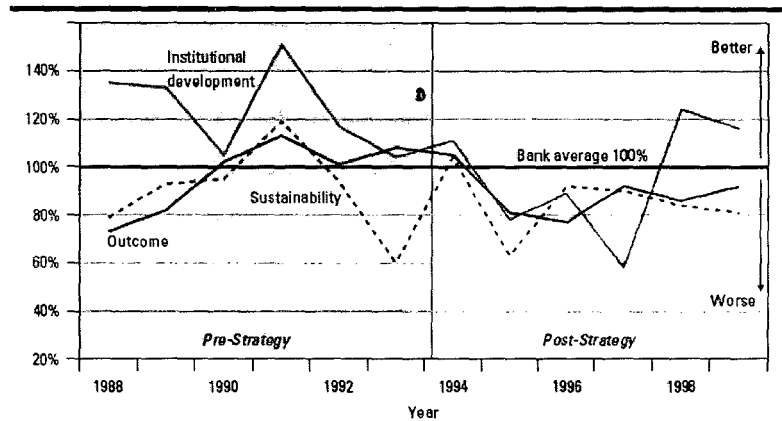
<sup>21</sup> *India's Water Economy: Bracing a Turbulent Future* sourced at <http://www.siteresources.worldbank.org/INTIndia/resources> on 2/5/2006, 2:45am.

<sup>22</sup> *India's Water Economy: Bracing a Turbulent Future* (2005), The World Bank Draft Report, p-9.

<sup>23</sup> George K. Pitman (2002), *Bridging Troubled Water*, p -55.

Figure 2(b)

Post - Strategy water Ratings Are Below the Bank average performance



**SOURCE:** George K. Pitman (2002), *Bridging Troubled Waters: Assessing the World Bank Water Resources Strategy*, The World Bank Operation Evaluation Study, the World Bank: Washington D.C, p-55.

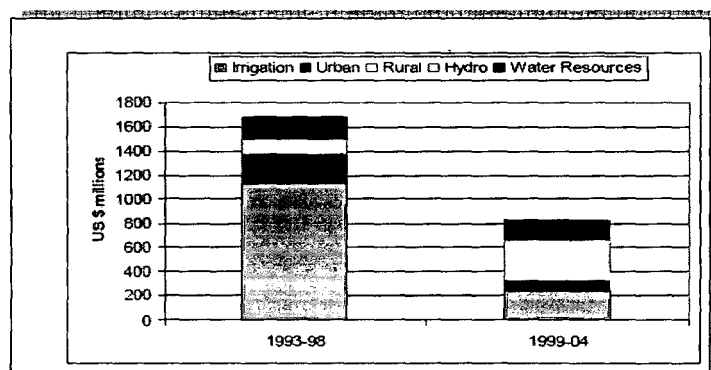
The graph in figure 2(b) explains Bank lending in the pre and post strategy period (before and after 1993) and shows the overall performance of 336 water projects funded by the Bank in the period between 1988 -1999. The projects were assessed along three dimensions – a). institutional development impact, b). sustainability of project benefits and c). project outcome. The OED report defines project ‘outcome ratings’ as – whether the project achieved most of its major relevant goals efficiently. That is how relevant the project objectives were to the country’s development strategy. The figure depicts the Bank’s portfolio in its project outcome. There is a marked improvement in the outcome from 1988 till about 1991. After this, the outcome ratings decline steadily until 1996. It’s important to note that the drop in the project outcome ratings was also the time when the 1993 policy was released. One can thus argue that the 1993 policy release did not seem to have substantial impact on the outcome of its projects. The OED report argues that in the year between 1996 and 1998 although the outcome ratings improved it nevertheless remained below the Bank average performance.<sup>24</sup>

<sup>24</sup> George K. Pitman (2002), *Bridging Troubled Waters*. p -56.

## Water Resource Management Policy Document and India's water Sector

The previous chapter gave a detailed account of Bank and its varying engagements with the irrigation sector. The 1993 policy document claimed to propose a new approach for India to manage its water resources.<sup>25</sup>

**Fig 2(c)**  
**The changing Bank lending for water in India**



**Source:** *India's Water Economy: Bracing a Turbulent Future* (2005), The World Bank Draft Report, p-84

The Bank's lending to India's water sector in the post strategy period (post 1993). The Bank's lending was increasingly towards the irrigation sector followed by urban and rural water supply; as in figure 2(c). This lending trend continued till 1998, after which the Bank started to divest from irrigation projects from 1998 onwards. This was mainly due to the increasing criticism the Bank was facing for its lending to energy intensive and complex projects. It's significant to note that in the name of irrigation the Bank was

<sup>25</sup> *India Country Assistance Study* (2004), The World Bank group, the World Bank, p-15.

mainly advocating technologies such as large dams and perennial canals which were large, centralized, and complex with high economic and social costs. Even amongst the smaller technologies, the Bank increasingly favoured technologies such as tube wells which were again energy intensive and could lead to various ecological consequences. Strangely though, the Bank continued to advocate such energy intensive of small scale technologies in spite of the fact that in the previous years there was no such empirical data explaining the success and sustainability of such technologies. The *Indian Irrigation Review* argues,

that the Bank financed tubewells in Uttar Pradesh, Bihar, West Bengal estimating the economic rate of return (ERR) at 30% - 40%, however, such assumptions were over optimistic. On re - estimating average ERR was close to 9%. In analysis, the Bank concluded that deeper government owned tubewells are not workable rather fostering private groundwater irrigation with shallow tubewells is more attractive development option.<sup>26</sup>

The Bank with the help of its comprehensive and pragmatic water resource management policy seemed to have understood that the way to overcome the crises of water management was to support either small scale energy intensive technologies such as tube wells or cling to the argument of economies of scale that prefers technologies such as large dams. The OED report argues that,

The Bank should continue to finance large irrigation schemes because of the economies of scale and high rates of economic return.<sup>27</sup>

---

<sup>26</sup> *India's Irrigation Sector Review* (1991), The World Bank Report No. 9518 -IN, p- 11.

<sup>27</sup> Gorge K. Pitman (2002), *Bridging Troubled Waters*, p -55.

However by the year 1998, due to the growing international concern and criticism over the Bank funded projects with regard to environmental and social implications the Bank withdrew from irrigation lending especially from the controversial large technologies such as large dams. There was hence a marked shift in the Bank's lending policy that led it out of 'complex areas' which might have proved reputationally risky to them. In the words of the Bank:

There was a marked shift in Bank lending out of complex areas which were perceived to be 'reputationally risky' for the Bank especially in the light of the controversies surrounding the Bank's engagement with the Sardar Sarovar Projects. As a result post 1998 there was once again a sharp reduction in lending for irrigation and urban water supply and sanitation with only increase being in the uncontentious areas of rural water supply.<sup>28</sup>

Another important point regarding the irrigation sector was Bank's unclear and inadequate resettlement policy. As a result, its application was more often unsatisfactory both from the Bank's and the borrower's side. This became an added reason for the Bank to shift away from financing projects involving resettlement, particularly dams. Other irrigation technologies that the Bank continued to advocate were perennial canals and private tube wells. There is considerable literature on the impact of technologies such as tube wells, dams, canals on the social and environmental impacts.<sup>29</sup>

One of the major goals of large dam construction has been to provide water supply to support the introduction and expansion of irrigated agriculture. However, performance reviews of 52 irrigation dams conducted by the World Commission on Dams found significant failures to meet

---

<sup>28</sup> *India's Water Economy: Bracing a Turbulent Future*, (2005), The World Bank Draft Report, p-84.

<sup>29</sup> For account on impacts of technologies refer Patrick McCully (1996), Satyajit Singh (1997), Barbara Rose Johnston (2003).



irrigation targets, salinization or water logging has occurred in some 20 percent irrigated fields. Dams flood some of the most agricultural productive land in the world. Dams and water diversions are the primary cause of endangerment or extinction of one – third of the world’s fresh water fish.<sup>30</sup>

Beyond the debates on impact of such technologies the significant point is that each time the Bank advocated a ‘new water strategy’ by the Bank and concomitant shifts in the particular technologies, however, through it’s lending strategies continued to maintain its basis for lending as ‘economies of scale’: thereby glorifying the size of the project. Arguing that, the bigger the project the better it is and higher the risk factor the greater is the probability for better returns.<sup>31</sup>

In India through it various reports and the country assistance study (CAS) report the Bank has maintained its argument for large dams. As it contends in the recent document titled *India’s Water Economy: Bracing a Turbulent Future* (2005),

Much of the major water infrastructure which will be built in India in coming decades includes hydropower. Hydropower projects generate large revenues, and in most cases the number of people to be resettled by hydropower projects in India will be relatively small. The bottom line is that these new hydropower projects should be a big boost to local economies and that the aspiration of developers and host governments should be to make such projects so attractive to local people that communities compete with each other to become ‘host communities’ for such projects.<sup>32</sup>

---

<sup>30</sup> Barbara Rose Johnston (2003), ‘The Political Ecology of Water: An Introduction’, *The Journal of Political Ecology*, 14 (3), pp. 73- 87.

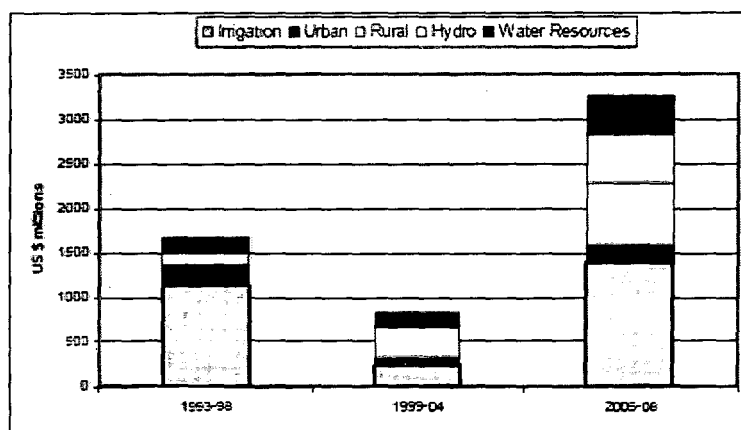
<sup>31</sup> *India’s Water Economy: Bracing a Turbulent Future* (2005), The World Bank Draft Report, p -86.

<sup>32</sup> *ibid.*, p - 71.

The above sentiment reflects, that the concerns of the 70s and the 80s have not been explicitly addressed and the Bank has bounced back with confidence to declare the major changes in its composition of the water sector lending in India. As it continues to favour large technologies it has added a clause that it will engage with hydro projects that have limited environmental and social impacts;<sup>33</sup> however defining ‘limited’ is context dependent, place specific and ambiguous in itself.

The bottom line being, that post 1993 the Bank has not been able to make major shifts with regard to its composition for lending for irrigation sector in India. Rather, it has maintained its argument that has only wavered between its highs and lows. Post 1993 Bank’s policy preferences have undergone little change as is also evident in the recent document that the Bank’s released on India’s turbulent water economy released in 2005. Figure 2(d) depicts the lending pattern in the post strategy period that has gone through little change.

**Fig 2(d)**  
**World Bank Re-engagement with India's Water Sector**



**Source:** *India's Water Economy: Bracing a Turbulent Future* (2005), The World Bank Draft Report, p-87

<sup>33</sup> *India's Water Economy: Bracing a Turbulent Future* (2005), The World Bank Draft Report, p- 84.

For example, post 1993, the lending for irrigation increased substantially within the water sector, followed by lending in urban water resources, hydro etc. This eventually decreased following the controversies and debates surrounding the Bank supported projects from the year 1999 to 2004, only to bounce back with same technologies and same arguments in the year 2005. The trajectory evident in figure 2(d) reflects the Bank's lending composition that has not really changed and reflects Bank's portfolio which has largely remained unchanged.

The significant question is whether there is a change in composition or the Bank's declaration to reengage and revert back to the same projects that once voiced concern within and outside the Bank. The 2004 *country assistance study* (CAS) for India indicates the Bank lending from the year 2004 to 2008. It declares that the overall water lending will rise from \$700 million over the previous four years to \$3200 million in the next four years.<sup>34</sup> The Bank asserts that,

it is expected to sharply increase irrigation and water resources lending, and re – engage with large hydropower projects.<sup>35</sup>

With all the instruments and managerial tools on paper the World Water Vision (2000) estimates that there will be a rise in the annual investments to meet the ends within the water sector – irrigation, water supply and sanitation, industry, environment etc.<sup>36</sup>

## **The Bank continues to evolve**

The OED study argues that the Bank has not widely adopted the comprehensive principles of the 1993 policy at the heart.<sup>37</sup> However, the Bank argues that this is less a

---

<sup>34</sup> *India Country Assistance Study* (2004), The World Bank group, the World Bank, p-15.

<sup>35</sup> *India's Water Economy: Bracing a Turbulent Future* (2005), The World Bank Draft Report, p -87.

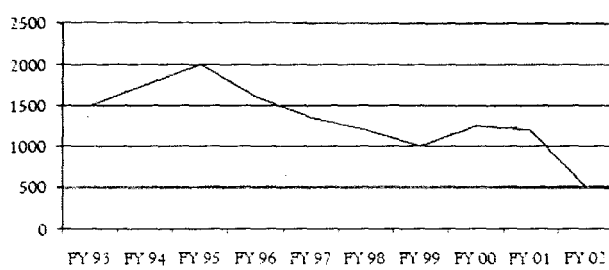
<sup>36</sup> WJ.Cosgrove and F.R.Rijsberman (2000), *World Water Vision: Making Water Everybody's Business* World Water Commission Report, Earthscan publications, London., p-8.

<sup>37</sup> George K. Pitman (2002), *Bridging Troubled Waters*, p -15.

failure rather an indication of the complexity of water sector reforms. The post strategy period had (post 1993) seem to have shown a positive impact in the overall water sector. Below fig 2(e) shows the downward trend in water supply and sanitation sector in the post strategy period till 2002.

**Figure 2(e)**

**World Bank lending for water supply and sanitation (1993- 2002)**



FY: Fiscal year

**Source:** World Bank Water Week (2004), 'The World Bank and water Resource Management and Development' PowerPoint presentation by David Grey, Senior Water advisor sourced at [www.worldbank.org/Watson/waterweek2004](http://www.worldbank.org/Watson/waterweek2004).

Figure 2(e) illustrates the amount pf lending in water and sanitation projects by the Bank in the post strategy period, have gone down. One can argue that such a trajectory is helpful to understand how far the 1993 policy had an impact on the Bank funded projects in the post strategy period (post 1993).

It's significant to note that over the years the Bank has not only limited its role as an advocate of water policy options but has also emerged as a knowledge producer. Michael Goldman through his anthropological account constructs the way the World Bank acts as a knowledge producer through its training and research programmes. He argues that, through the Bank's well- financed knowledge production machinery it sets various 'rules for reformers.'<sup>38</sup>

<sup>38</sup> *India's Water Economy: Bracing a Turbulent Future* (2005), The World Bank Draft Report, p -10.

The Bank knowledge circulates widely and has become an important tool in policy making and debate; more specifically, it lays the groundwork for Bank innovations, new political rationalities and new ambitions. Over time, we have taken it for granted and it has become widely accepted world wide. Knowledge is indeed power for the World Bank.<sup>39</sup>

The Bank has been trying to widen its knowledge base in order to set benchmarks for water supply and other projects within the water sector so that the project quality can meet its criterion. However it is not the case with irrigation sector since for irrigation there are virtually no bench marks. In 2005, the Bank declared that India's water economy is bracing a 'turbulent future'. Strangely though, as the Bank continues to evolve its role within the recipient countries it has maintained its arguments and has shown little deviation from its lending choices in water sector.

Following table below gives the figures for the Bank's 'fresh' prioritized areas in which it wishes to engage through its lending in India's water sector. It's significant to note that the table does not show a major shift from the past trend. Rather it reiterates the lending trend that the Bank had been following for India for all these decades.

**Table 2.1**  
**Bank's Priority Areas for Lending**

	COMPONENT WITHIN THE WATER SECTOR	PRIORITY AREAS FOR LENDING	AMOUNT ESTIMATED FOR LENDING (\$US million). From 2005 onwards
	Water Resources	Developing information systems, rehabilitating and modernizing major infrastructure, watershed management, water rights, capacity building	\$ 400million over the next four years

<sup>39</sup> Michael Goldman (2005), *Imperial Nature: The World Bank and Struggles for Social Justice in the Age of Globalization*, Yale University Press, New Haven, p-102.

	Watershed management	As part of rural livelihood programs	\$200million over the next four years
	Irrigation	de-linking irrigation services and WRM, Utility Reform, Strengthening Cost Recovery, Regulation, Beneficiary Participation, Increased Productivity of Water, Water Rights	--\$1400million over the next four
	Rural Water and Sanitation--	Continue demand responsive approach, moving from pilots to scale through Centrally Funded Schemes (SWAPs)	\$700Million over the next four years.
	Urban Water and Sanitation	Utility Reform, Improving Services to the poor, PSP	\$100Million Over the next four years
	Hydro	One element in an overall energy program; key for Peaking/ Base load mix; Bank will engage with hydro that has limited environmental and social impacts	\$ 600million over the next four years
	RWSS	Continue demand responsive approach, moving from pilots to scale through Centrally Funded Schemes (SWAPs).	\$700Million over the next four years.
	Hydro	One element in an overall energy program; key for Peaking/ Base load mix; Bank will engage with hydro that has limited environmental and social impacts	\$ 550million over the next four years

TOTAL BANK LENDING FOR WATER FOR INDIA: Will increase from \$200 million to \$900 million a year.

**SOURCE:** *India's Water Economy: Bracing a Turbulent Future* sourced at <http://www.siteresources.worldbank.org/INTIndia/resources> on 2/5/2006, 2:45am.

From the table, it appears that the Bank once again chooses to invest in its high prioritized area of irrigation by increasing its lending to \$1400 million over the next four years. It's important to note that the priority areas within the irrigation lending remain the same: strengthening cost recovery, regulation, beneficiary participation etc. In lending

priority the Bank places its preference for Irrigation followed by rural water and sanitation and then hydro. In a sense one could question the Bank commitment to change 'India's turbulent water future', when the priority areas within its lending regime remains the same. In other words the Bank's irrigation technology script shows little inclination to orient differently from established practice.

The post strategy period (post 1993) is already more than a decade old now. However, the Bank continues to evolve its lending policies, despite many criticisms it tends to bounce back to the same earlier policies. Thus, the Bank continues to endorse 'big' and 'complex' irrigation technologies. Ironically, this is despite huge opposition and international concern in the past over the Bank support for such irrigation technologies and strategies.

## **Concluding remarks**

It's important to note that since the past decades there is no substantial evidence that the high risk projects are high rewarding as well. However, through its ongoing evolution the Bank asserts it 'hopes to contribute new water ideas into the heads of all'.<sup>40</sup> At the same time, it declared to re – engage with high reward/ high risk hydraulic infrastructure using a more effective business model.<sup>41</sup> The sentiment between the lines confirms that although the Bank has woken up to the need to comply with social and environmental standards, at the same time it is unable to detach itself from its 'old' attachment to glorify big and high risk infrastructure.

Reflecting on the four concerns mentioned at the start of the chapter,

- In an attempt to sort out the conflict over water lending between the engineers and the economists within the Bank, the 1993 policy was a consensual document that

---

<sup>40</sup> *India's Water Economy: Bracing a Turbulent Future* sourced at <http://www.siteresources.worldbank.org/INTIndia/resources> on 2/5/2006, 2:45am.

<sup>41</sup> *India's Water Economy: Bracing a Turbulent Future* (2005), The World Bank Draft Report, p -86.

claimed to embrace both perspectives as far as possible. The OED report reflected the on –going ambiguity in Bank projects, essentially because the 1993 policy although more comprehensive it did not suggest a practical irrigation strategy.

- The Bank lending composition does not show a marked deviation even though many times the Bank projects met vigorous criticism. Both in the pre and the post consolidation (period before and after 1993) the Bank continued to favour established policies; glorifying its notion of large and complex projects. Confirming thereby that the Bank was unable to detach itself from its ‘old’ attachment to big and high risk infrastructure.
- The Bank understands technologies in terms of how they enable the market discipline to function. This notion of the Bank helped it to shape its technologies through economic choices. There is no substantial data to support that the Bank was ever inclined to fund traditional technologies.
- Since the policy paper did not deviate substantially from the pre strategy period the Bank essentially maintained an economic discourse on water through market pricing.

In short, the Bank has carefully carried on and followed its script with mild changes from time to time. As a result, the design and codes of the particular script has not allowed the ‘rules of engagement’ to really change for the Bank in theory and practice.



## CONCLUSION

Modernity's failure is the failure of a global techno - economic short term projects, locked into itself because it has become 'unhinged' from natural and social realities. It works against the local and concrete interest of every human society (even if it serves immense private interests) and also against the general, long – term interest of the planet as a whole and its inhabitants.<sup>1</sup>

- Jean Chesneaux.

This dissertation sought to uncover the technological 'script' of the World Bank; in order to reveal its preferences in making choices for irrigation technologies. This study largely surveyed the period before and after 1993 and concluded that the World Bank tended to prefer large, complex, centralized and energy intensive irrigation technologies, often at the cost of decentralized and traditional irrigation structures.

This dissertation shows that over the span of 60 years (from 1944 -1994) the Bank maintained a strong support for certain specific technology choices such as large dams, perennial canals, tube wells etc. It is significant to note that despite various debates, discussions and criticisms within and outside the Bank, it largely retained these set preferences and notions for technology, based on which it decided its interventions in irrigation. These six decades (1944-1994), moreover, was dominated by an economic discourse which located irrigation policies within a narrow cost – benefit analysis framework. The Bank through its forums like World Business Council has reiterated time and again that the only way to manage water is to treat it as an economic good. It believes that managing water itself can be a business opportunity. From the Bank's perspective:

---

<sup>1</sup> As quoted in Bruce Rich (1994), *Mortgaging the Earth: The World Bank, Environmental Impoverishment, and the Crises of Development*, Beacon Press: Boston, p - 273.

‘Providing water services to the poor presents a business opportunity. New pipes, pumps, measurement and monitoring devices, and billing and record keeping systems will be required to modernize and expand infrastructure’.<sup>2</sup>

Michael Goldman argues that the Bank through its clarion call has always promoted an ‘economic’ discourse which is also reflected in its policy works and professional training seminars. Through an ethnographic exercise Goldman constructs the way the World Bank acts as a knowledge producer through its training and research programmes. He maintains,

The World Bank’s policy on water is channeled through the ideological lens of interpreting water strictly as an economic good; its progress seeks to reform public water utilities around the world.<sup>3</sup>

This not only clarifies the Bank’s position for managing water as an economic good but also its ideology to reform public water utilities and promotes privatization. Consequently, this dissertation also identified an explicit trend of the Bank in favour of privatization, divesting investments to non- government sector, and preference for irrigation technologies based on ‘economies of scale’. However, the various economic and ethical arguments from the Bank for its ‘style’ of development continually faced pressures and criticisms from within and outside; compelling the Bank to often respond to such reactions:

Commodified water is failing to deliver the goods, or even the profits. More crucial still, the neo –liberal ‘reforms’ we can observe in S. Africa are being resisted by the other side: those

---

<sup>2</sup> World Business council for Sustainable Development (2002), ‘Water for the World Poor’, WBCSD: Geneva, p-9.

<sup>3</sup> Michael Goldman (2005), *Imperial Nature: The World Bank and Struggles for Social Justice in the Age of Globalization*, Yale University Press, New Haven, p -238.

who would decommodify water, and no doubt much else thereafter.<sup>4</sup>

Due to such responses and criticisms for its irrigation projects, the Bank was often forced to respond to these criticisms. However, most often than not, the Bank's lending during the period (1964-1994) moved from its emphasis on 'hardware' to a more pronounced shift towards concentrating on 'software' elements. That is, a movement from an overtly engineering view of irrigation policies to the management side for maintaining existing irrigation infrastructure.

In the post 1993 period, the Bank continued to try and change the thrust of its lending policies for irrigation. However, despite this attempt to shift gears, the Bank could not make a substantial detour away from its previous preferences and continued to endorse 'big' and 'complex' irrigation technologies. Nor, on the other hand, did the Bank seem to sort out the intensifying conflict over water lending between its engineering department and its economists. Bruce Rich argues that the Bank has always stuck to its ideological preferences and retained its biases regarding its lending projects,

The Bank would lend only for 'specific projects' – in practice, dams, highways, power plants, etc.- 'except in special circumstances'. The Bank must 'ensure that the proceeds of any loan are used only for the purposes for which the loan was granted, with due attention to consideration of economy and efficiency and without regard to political or other non – economic influences or considerations.'<sup>5</sup>

---

<sup>4</sup> Patrick Bond (2004), 'Water Commodification and Decommodification Narratives: Pricing and Policy Debates from Johannesburg to Kyoto to Cancun and Back', *Capitalism Nature Socialism*, 15(1), pp.7-25.

<sup>5</sup> As quoted in Bruce Rich (1994), *Mortgaging the Earth: The World Bank, Environmental Impoverishment, and the Crises of Development*, Beacon Press: Boston, p – 57.

It's significant to note that the basis of Bank's position is its set ideologies that in turn are reflected in its preferences. These ideological preferences then shape the Bank's knowledge regime, which is made evident in its documents, publications and training programmes. Goldman argues that what is important to ponder is the way these power /knowledge regimes are established and supported, and how they eventually become common sense, and to what extent they bring about change? He argues that,

A new transnational policy network has arisen with the ambition of generating a global policy agenda on water. Its arguments are constructed in situ, in the process of building alliances, writing policy statements, negotiating plans, and soliciting expert advice and opinions. It has grown as it moves from one venue to another; each year, new ideas, initiatives, coalitions, and networks are born – while others – disappear – in the process of constituting a green – neoliberal water – policy action plan.<sup>6</sup>

Such transnational policy networks as defined by Goldman tend to act as a 'script' that in turn dictates an entire discourse; being explained by a particular 'design' reflected in its 'codes'. These codes that form a design dictate a script and are reflected in 'new ideas', 'initiatives', 'coalitions' and 'networks'.

Within the Society, Technology Studies approach the present study at many instances showed explicitly and implicitly that technologies follow a 'script', that in turn it is 'designed' using 'codes', 'preferences' and 'biases'. The central strength of the present study is to 'decode' these 'codes' and recover the 'script'. The study argues how the relations of power in a particular context through a particular organizational setting such as the World Bank shape technology choices. In other words, the design of the script informs

---

<sup>6</sup> Michael Goldman (2005), *Imperial Nature: The World Bank and Struggles for Social Justice in the Age of Globalization*, Yale University Press, New Haven, p – 224.

the Bank of its lending preferences. Esha Shah in *Social Designs* argues that technologies are products of power relations. She contends that,

Technological designs are inherently political sites. Relations of power, then acts of dominations and resultant contestations against acts of domination are articulated in producing and reproducing technological designs. Or in other words, technological designs are crystallized as a result of the balance of power relations.<sup>7</sup>

Shah defines 'designing' as a social process that is a result of power manifested in acts of negotiations, well articulated within the set ideological preferences. She maintains that these acts of negotiations are acts involving power and domination. These acts get translated into technological designs giving rise to artifacts that in turn are inherently political sites.

Over the years, the Bank's rules of engagement with regard to irrigation technologies do not seem to have deviated because the Bank seems to remain locked into certain specific ideological preferences. As a result, the 'traditional' technologies which are perhaps arguably much more sound do not fall within the rubric of the Bank's funding.

Traditionally people were able to choose technologies appropriate to their micro ecology and were more concerned about the sustainability of the resources base than at present.<sup>8</sup>

However, for the Bank it seems that terms such as 'economies of scale', 'economic rate of return', 'marginal cost of recovery', 'privatization' and 'market economy' dominate its ideological preferences in its script than any other argument.

---

<sup>7</sup> Esha Shah (2003), *Social Designs: Tank Irrigation Technology and Agrarian transformation in Karnataka, South India*, Orient Longman: Delhi, p - 275.

<sup>8</sup> Anil Agarwal and S.Narain (1997), *Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting Systems*, Centre for Science and Environment: New Delhi, p – 293.

The study thus brings out that technologies (in the present context irrigation technologies) are conscious designs, and that these physical arrangements have explicit or implicit political purposes. This theoretical vantage enables us to explain tension between institutions, technology choices and ideological preferences in the shaping of Science and Technology strategies.

## ANNEXURE NO. 1.

### *List of Irrigation Related Bank Directives*

**TABLE 2.1: EVOLUTION OF IRRIGATION-RELATED BANK DIRECTIVES**

<i>Topic</i>	<i>Date</i>	<i>Instrument<sup>a</sup></i>	<i>Application</i>	<i>Substance</i>
Cost recovery	Mar 71	OPM 2.61	All agriculture	Cost recovery section of particular interest for irrigation. Beneficiaries should pay public costs. In agriculture, as minimum, O&M costs completely recovered.
	May 76	CPM 8.4	Irrigation	Guidance in applying OPM 2.61 to irrigation: volumetric water charges desirable; efficiency emphasized; second bests include land betterment levies; no <i>prima facie</i> reason to focus on O&M cost; progressivity preferred.
	Jun 80	CPN 2.10	Irrigation	No major change from CPM 8.4.
	Feb 84	OMS 2.22	All revenue-earning subborrowers (but not applied to irrigation)	Whether public or private, revenue earning enterprises should recover costs, including debt service, and contribute to expansion by selling products and services.
	Mar 84	unnumberedVP policy note	Irrigation	Earlier policy affirmed but O&M is serious problem; water charges should at least meet O&M cost.
	Dam safety	Jun 77	OMS 3.80	All dams
International waters	Oct 77	OMS 2.32	Cross-border waters	Bank will not finance projects on international waters that would cause appreciable harm to other riparians. Prior consultations, planning, and agreement urged.
	Apr 90	OD 7.50	(same)	Same policy, more detail.
Participation	Aug 78	OMS 2.12	All projects	Beneficiaries and government agencies should be involved from identification and design.
Project preparation	Oct 78	OMS 2.28	All projects	Detailed design should be completed before Board approval. (Inspired by developments in irrigation lending.)
Involuntary resettlement	Feb 80	OMS 2.33	All projects (mainly irrigation and power)	Oustees must get reasonable chance to regain or better earlier standard of living. Resettlement should be minimized, planned.
	Oct 86	OPN 10.08	(same)	Advice on how to implement OMS 2.33; emphasis on land for land lost, productive capacity.

(Table 2.1 continued)

Topic	Date	Instrument <sup>a</sup>	Application	Substance
Tribal people	Jun 90	OD 4.30	(same)	Same policy, more detail.
	Feb 82	OMS 2.34	All projects	When projects encroach on lands of "tribal peoples" who are not the intended beneficiaries, their interests must be safeguarded and, if feasible, their well-being enhanced.
	Sep 91	OD 4.20	(same)	"Indigenous peoples" must benefit; their informed participation is required.
Wildlands	June 86	OPN 11.2	All projects	Seek balance between converting wildlands to more intensive human uses and preserving their environmental values. Public goods from wildlands may be poorly understood or undervalued. Irrigation is particularly concerned because these include reservoir protection.
Environment: dams and reservoirs	Apr 89	OD 4.00 Annex B	Dams and reservoirs	Bank only finances projects in compliance with environmentally and economically sound policies. Adverse environmental impacts should be avoided, minimized, or compensated for. Opportunities to increase environmental benefits should be sought in project design.
Disclosure of information	Jun 89	AMS 1.10	All projects	Bank wishes to be open about its activities. Presumption in favor of disclosure in absence of compelling reasons to the contrary.
Nongovernmental organizations	Aug 89	OD 14.70	All projects	Staff should avail of opportunities to work with and through NGOs. (Possible importance of NGOs mentioned in earlier directives on dam safety, resettlement, and tribal peoples.) Reasons not to.
Environmental assessment	Oct 89	OD 4.00 Annex A	All projects	Environmental consequences should be recognized early in the project cycle and taken into account.
	Oct 91	OD 4.01	(same)	Same policy, more detail.
Poverty reduction	Dec 91	OD 4.15	All projects	Makes this an explicit purpose in Bank operations from initiation onward.
Environmental action plan	Jul 92	OD 4.02	All projects	Bank fosters preparation and implementation of environmental action plan in country; reflects findings and strategies of plan in its work.

a. Instruments may be divided into those that are directives—operational policy memoranda (OPM), operational policy statements (OPM), and operational directives (OD)—and those that are meant to provide staff guidance—central projects' memoranda (CPM), central projects' notes (CPN), operational policy notes (OPN), unnumbered policy notes, and administrative manual statements (AMS).

Source: Adopted from William I. Jones (1995), *The World Bank and Irrigation*, pp. 34-35.



## Bibliography

- Abbie Leslie, James Q.Harrison and John W.Wall (1982 ), *Economic Returns to Investment in Irrigation in India*, World Bank Staff Working Paper No- 536.
- Agarwal Anil and S.Narain (1997), *Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting Systems*, Centre for Science and Environment: New Delhi.
- Barlow Maude and Tony Clarke (2002), *Blue Gold: The Fight to Stop the Corporate Theft of the World's Water*, New Press: New York.
- Baviskar Amita (2003), For a Cultural Politics of Natural resources, *Economic and Political Weekly*, Vol. 38(48), pp.5051 -5055.
- Beyer G. Martin (May1991), The Global Consultation on safe Water and Sanitation for the 1990s, *Natural Resources Forum*, pp. 118- 122.
- Black Maggie (2005), *The No – Nonsense guide to Water*, Rawat Publications: New Delhi.
- Black Maggie and Rupert Talbot (2005), *Water A Matter of Life and Heath: Water Supply and Sanitation in Village India*, Unicef, Oxford University Press: New Delhi.
- Bond Patrick (2004), Water Commodification and Decommodification Narratives: Pricing and Policy Debates from Johannesburg to Kyoto to Cancun and Back, *Capitalism Nature Socialism*, Vol. 15(1), pp.7-25.
- Briscoe John and Harvey a Garn (1995), Financing Water Supply and Sanitation under Agenda 21, *Natural Resources Forum*, Vol.19 (1), pp. 59-70.
- D'Souza Radha (2006), *Interstate Disputes over Krishna Waters: Law, Science and Imperialism*, Orient Longman: New Delhi.
- D'Souza Rohan (2003), Damming the Mahanadi river: The emergence of multi –purpose river valley development in India (1943 - 46), *The Indian Economic and Social History Review*, Vol. 40(1), pp. 81 -105.

- D'souza Rohan (September 6, 2003), Supply- Side Hydrology in India: The Last gasp, *Economic and Political Weekly*, pp.3785 – 3790.
- Daniel Carl and John Gowdy (2000), *Paradise for Sale: A Parable of Nature*, The MIT Press: Cambridge.
- Easter K. William, Mark W. Rosegrant and Ariel Dinar (February 1999), Formal and Informal Markets for water: Institutions, Performance, and Constraints, *The World Bank Research Observer*, Vol. 14(1), pp.99-115.
- Edwards, K.A (February 1993), Water, environment and development: A global agenda, *Natural Resources Forum*, Vol.17(1), pp.59-64.
- Edwards, K.A and A.S. Goodman (February 1992), Integrated Water Resources Planning, *Natural Resources Forum*, Vol. 16(1), pp. 65 -70.
- Finnegan Ruth (1988), *Literacy and Orality: Studies in the Technology of Communication*, pp.176-177, Oxford: Basil Blackwell sourced at <http://www.aber.ac.uk/media>.
- Fletcher R. Susan and Betsy A. Cody (1994), 'International Financial Institutions and Environment: Multilateral Development Banks and the Global Environment Facility', sourced at [www.ncseonline.org.NLE](http://www.ncseonline.org/NLE).
- Frank Steenberger (2003), *Creating markets with the poor: Selling treadle pumps in India*. GateKeeper Series No- 107.
- Frater Alexander (1990), *Chasing the Monsoon*, Penguin Books, New Delhi.
- Frederiksen D. Harald (2003), The World Water Crises: Ramifications of Politics Trumping Basic Responsibilities of the International Community, *Water Resources Development*, Vol. 19(4), pp. 593-615.
- Ghosh Gourisankar and Ashok Nigam (1995), Comments on 'Financing water supply and sanitation under Agenda 21' by John Briscoe and Mike Garn, *Natural Resources Forum*, Vol.19 (2), pp. 161-165.
- Goldman Michael (2005), *Imperial Nature: The World Bank and Struggles for Social Justice in the Age of Globalization*, Yale University Press: New Haven.

- Goldman Michael (2005), 'Tracing the Roots /Routes of World Bank Power', *International Journal of Sociology and Social Policy*, Vol. 25(1), pp. 10-29.
- Huffman E. Roy (1957), The Role Enterprise in water Resources Development, *Law and Contemporary Problems*, Vol. 22(3), pp. 433-443.
- Hunter David (2001), 'The World Bank: A Lighter Shade of Green', *Year book of International Co-operation on Environment and Development* sourced at [www.greenyearbook.org/articles](http://www.greenyearbook.org/articles).
- India's Irrigation Sector Review* (1991), The World Bank Report No. 9518 –IN.
- India's Water Economy: Bracing a Turbulent Future*, (2005), The World Bank Draft Report: The World Bank.
- Irrigation and Drainage Sector Study* (1995), The World Bank Operation Evaluation Study, Washington, D.C: The World Bank.
- Johnston Rose Barbara (2003), 'The Political Ecology of Water: An Introduction', *The Journal of Political Ecology*, 14 (3), pp-73- 87.
- Jones I. Williams (1995), *The World Bank and Irrigation*, Operationa Evaluation Department, The World Bank, Washington D.C.
- Jordan Lisa (1997), *Sustainable Rhetoric vs. Sustainable Development: The Retreat from Sustainability in World Bank Development Policy*, Bank Information Centre sourced at [www.bicusa.org/pub/rhetoric.htm](http://www.bicusa.org/pub/rhetoric.htm).
- Krishanan Rekha, Suruchi Bhadwal, Akram Javed, Shaleen Singhal, S.Sreekish (2003), Water Stress in Indian Villages, *Economic and Political Weekly*, September 13, 2003, pp.3879 – 3884.
- Landy Frederic (2003), 'Irrigation in rural India and the decentralization test' sourced at [www.environmenttimes.net/article](http://www.environmenttimes.net/article).
- Larsen A. Tove and Willi Gujer (1997), 'The Concept of Sustainable Urban Water Management', *Water, Science, Technology*, Vol. 35(9), pp. 3-43.

- Lee R Terence (1995), Comments on 'Financing Water Supply and Sanitation under Agenda 21' by John Briscoe and Mike Garn and on the comments by Gourisankar Ghosh and Ashok Nigam, *Natural Resources Forum*, Vol.19 (4), pp. 339-340.
- Lee R Terence, 1996, Alternatives for private participation in the provision of water services, *Natural Resources Forum*, Vol. 20(4), pp.333-341.
- Liu Changming and Hongxing Zheng (2002), South- to -North Water Transfer Schemes for China, *Water Resources Development*, Vol. 18(3), pp. 453-471.
- Livingstone Andrew and Harry J. McPherson, November1993, Management Strategies for rural water development: A case study from Sudan, *Natural Resources Forum*, pp. 294 -301.
- Lordan Lisa (1997), *Sustainable Rhetoric vs. Sustainable Development: The Retreat from Sustainability in World Bank Development Policy*, Bank Information Centre sourced at [www.bicusa.org/pub/rhetoric.htm](http://www.bicusa.org/pub/rhetoric.htm).
- Mac Kenzie Donald and Judy Wajcman (1985), *The Social shaping of Technology*, Open University Press: Philadelphia.
- Marx Leo and Merritt R Smith (1994), *Does Technology Drive History - The Dilemma of Technological Determinism*, The MIT Press: Cambridge.
- Mateo Martin Ramon (May1992), Administration of Water Resources: Institutions Aspects and Management Modalities, *Natural Resources Forum*, pp. 117-125.
- McCully Patrick (2002), 'World Bank takes low on Water Policy', sourced at <http://www.irn.org>
- McCully Patrick (1996) *Silenced Rivers: The Ecology and Politics of Large Dams*, Zed Books: London.
- Mitchell, Timothy (1995), 'The Object of Development: America's Egypt'. In *Power of Development*, ed. Jonathan Crush, Routledge: London.
- Mollinga Peter (2003), *On the Waterfront: Water Distribution, Technology, and Agrarian Change in a South Indian Canal Irrigation System*, Orient Longman: New Delhi.

- Mosse David (1999), Colonial and Contemporary Ideologies of 'Community Management': The Case of Tank Irrigation Development in South India, *Modern Asian Studies*, Vol. 33(2), pp. 303- 33.
- Oblitas Keith, J. Raymond Peter, Gautam Pingle, Halla M. Qaddumi, Jayantha Perera (1999), *Transferring Irrigation Management to Farmers in Andhra Pradesh, India*, The World Bank: Washington D. C.
- Pitman K. George (2002), *Bridging Troubled Waters: Assessing the World Bank Water Resources Strategy*, The World Bank Operation Evaluation Study, The World Bank: Washington, D.C.
- Postel Sandra (1999), *Pillar of Sand: Can the Irrigation Miracle Last?* The Worldwatch Institute, New York.
- Reidinger B. Richard (1974), Institutional Rationing of Canal Water in Northern India: Conflict between Traditional Patterns and Modern Needs, *Economic Development and Cultural Change*, Vol. 23(1), pp.79-104.
- Rich Bruce (1994), *Mortgaging the Earth: The World Bank, Environmental Impoverishment, and the Crises of Development*, Beacon Press: Boston.
- Rogers Peter (1992), *Comprehensive Water Resource Management – A concept paper*, The World Bank: Washington, D.C.
- Rogers Peter (February 1993), 'Integrated Urban Water Resources Management', *Natural Resources Forum*, pp. 33-41.
- S.Datta (1995), 'A Decision Support System for Micro-Watershed Management in India', *The Journal of the Operational Research Society*, Vol.46 (5), pp. 592-603.
- SANDRP, *Dams, Rivers, and People*, February 2003, available at [www.narmada.org/sandrp](http://www.narmada.org/sandrp).
- Schneider Kathrin Ann (July 2004), 'A Critique of the World Bank's Country Assistance Strategy for India', sourced at [www.irn.org](http://www.irn.org).
- Schultz Bart (2002), Role of Dams in Irrigation, Drainage and Flood control, *Water Resources Development*, Vol. 18(4), pp. 147 – 162.

- Sengupta Nirmal (1985), Irrigation: Traditional vs. Modern, *Economic and Political Weekly*, Special Number, Vol.20 (Nos. 45, 46, 47).
- Shah Esha (2003), *Social Designs: Tank Irrigation Technology and Agrarian Transformation in Karnataka, South India*, Orient Longman: New Delhi.
- Singh Nirvarker and Alan Richards (2002), Inter – State Water Disputes in India: Institutions and Policies, *Water Resources Development*, Vol. 18(4), pp. 611 -625.
- Singh Satyajit (1997), *Taming the Waters: The Political Economy of Large Dams in India*, Oxford University Press: New Delhi.
- Singh Dharendra Kumar and Anil Kumar Singh (2002), Groundwater Situation in India: Problems and Perspectives, *Water Resources Development*, Vol. 18(4), pp.563 - 580.
- Tanham George and Job C.Henning (2000), *Water as a Strategic Commodity in Asia: Phase 1 Research and Preliminary Analysis*. Hicks & Associates, Inc., Virginia.
- The World Bank Water Demand Research Team (January1993), The Demand For water In Rural Areas: Determinants and policy Implications, *The World Bank Research Observer*, Vol. 8(1), pp.47-70.
- Thobani Mateen (1997), Formal Water Markets: Why, When, and How to Introduce Tradable water Rights, *The World Bank Research Observer*, Vol.12 (2), pp. 161 - 179.
- UNDP- World Bank (1999), ‘Water and Sanitation Program – South Asia’ sourced at [www.worldbank.org](http://www.worldbank.org).
- Williams A. John (1982), *What Indian Water means to the West: A source book*, Western Mexico, New Mexico.
- Williams Robin and David Edge (1996), The Social Shaping of Technology, *Research Policy*, Vol.25, pp.865 -899.
- Winner Langdon (1978), *Autonomous Technology: Technics-out-of-control as a theme in Political thought*, The MIT Press: Cambridge.

- Winner Langdon (1985), Do artifacts have politics? In *The Social shaping of Technology*, eds. Donald Mac Kenzie and Wajcman Judy, 28 – 40, Open University Press: Philadelphia.
- Wolff Peter and Rolf Hubener (1999), 'Irrigation in the World – The Future Will Not Be like the Past', *Natural Resources and Development*, Vol.51, pp. 84-97.
- World Business Council for Sustainable Development (2002), *Water for the World Poor*', WBCSD: Geneva.
- World Bank (1981), *Water Management in Bank supported Irrigation Project Systems: An analysis of past Experience*, World Bank Operations Evaluation Report, The World Bank: Washington D.C.
- World Bank (1991), *India Irrigation Sector Review*, Report No. 9518 –IN, The World Bank.
- World Bank (1993), *Water Resource Management*, World Bank Policy Paper, The World Bank: Washington D C.
- World Bank (2006), *India: Water Supply and Sanitation, Bridging the gap Between Infrastructure and Service*, The World Bank: New Delhi.
- World Bank Group (2004), *Country Strategy for India*, The World Bank.
- World Bank Operations Evaluation Report (1981), *Water management in Bank supported Irrigation Project Systems: An analysis of past experience*, The World Bank: Washington D.C.
- Young, Zoe (2003), *A New Green Order: The World Bank and Politics of the Global Environmental Facility*, Pluto Press: London.

