

## End of Award Report

### SCIENCE, TECHNOLOGY AND WATER SCARCITY: INVESTIGATING THE 'SOLUTIONS'

#### 1. Background

Water scarcity has emerged as one of the most pressing problems in the 21<sup>st</sup> century. It is estimated that 2.7 billion people will face water scarcity by 2025 (UN 2003). Against a growing alarmism of 'water wars' (e.g. Shiva 2002), several global agencies, national governments and NGOs have been concerned with emerging water 'crises' and the causality and solutions around water scarcity (e.g. DFID 2000; UN 2003; FAO 2003). International meetings around water are regular occurrences. Still, there is no clear consensus regarding the optimal water management strategies regarding how to mitigate scarcity or how to enhance access of the world's poor to water (it is estimated that currently about one billion lack access). Polarized and fierce debates continue to persist about the pros and cons of interventions such as large dams, and water markets and privatisation, which are all made out to be some of the 'solutions' to mitigating scarcity and efficiently enhancing access of the world's poorest people to water.

But what is scarcity? How has it been conceptualised? Does the way the 'problem' is constructed shape the 'solutions'? Also do global or theoretical portrayals of scarcity match up to the way the issue is experienced locally and is there sometimes a disconnect between global and local 'solutions' This ESRC funded project sought to answer these questions by investigating the scientific, ideological and technological premises behind the 'solutions' to scarcity put forward by a range of global actors and examining what these mean in India and South Africa, two countries known for their water scarcity.

There is no dearth of research on water scarcity. Since the 1990s, there has been an impressive flurry of reports, papers and global assessments on water scarcity. Most of this literature looks at either the finite nature of global water supplies (e.g. Shiklomanov 1998) or classifies countries according to a 'water stress index' on the basis of their annual water resources and population (see Falkenmark and Widstrand 1992) or creates water scarcity scenarios for groupings of countries or regions based on projections of future water demands and needs (e.g. Seckler et al 1998; WRI 2003; Rosengrant et al 2002). While there is some acknowledgement of the differences between water shortages - which refer to physical amounts - and water scarcity - (which could be a social construct or the result of affluence, lifestyle choices and expectations - (see for example Winpenny in FAO, n.d.), largely most of the literature focuses on volumetric and physical measures. More nuances are provided by a political science and international relations literature that teases out differences in the 'orders' of scarcity ranging from physical (first order scarcity) to second order or socio-economic scarcity (referring to the lack of ability to adapt to the problem of physical scarcity) to third order scarcity that refers to the socio-political, technological and cultural changes that a society must undertake to deal with scarcity (see for example, Wolfe and Brooks 2003; Ohlsson and Turton 2000; Allan 1998). But even these debates fail to distinguish adequately between the socially constructed and biophysical aspects of scarcity. They also lack a focus on how the 'problem' of scarcity is constructed and how a problematic framing might exacerbate scarcity conditions, on the need to disaggregate users and their entitlements and to look at the politics of distribution

within a frame of political economy. Neither do they focus upfront on the social relations underlying how technology choices are made, and their embeddedness in diverse governance and institutional arrangements.

This project fills these gaps by drawing on social and economic theory, science studies and sociological and anthropological analysis. It hypothesises that scarcity is not a natural condition. Instead, the way it is conceived or constructed leads to the deployment of certain solutions that are not neutral. Finally, the project hypothesizes that “scarcity” may be playing a similar role as a totalising discourse in developing societies that “risk” has come to occupy in the industrialized world. In both cases, science and technology are often expected to provide solutions, but such expectations embody a multitude of unexamined assumptions about the nature of the “problem” and gives rise to technocratic expertise that may be disconnected from local needs and priorities. In conducting this research, the project thus hopes to introduce scarcity to science technology study debates more systematically (which have hitherto largely been concerned with risk issues in the industrialised world) and also unpack its taken for granted nature in water debates and environment/ development debates more generally.

## **2. Objectives**

The following aims and objectives were outlined in the original proposal. Using an interdisciplinary approach and by building on the insights of science and technology studies the research aims to:

Examine how engineering, economic, hydrological and other scientific perspectives define ‘scarcity’ and how science is used to legitimise divergent management solutions. The research will map out different discourses of scarcity and locate these discourses and the actors involved within their wider socio-political, economic and institutional contexts;

Examine the scientific, ideological and technological premises behind the ‘solutions’ to scarcity put forward by global actors. Specifically the project will examine the solutions framed around ‘privatisation’ and ‘governance’ issues. By drawing on existing empirical material in India and South Africa, the research will examine the ways in which local discourses, policy debates and citizens’ actions resist or engage with these global ‘solutions’;

Lay the foundations for a multi-sited international research project that will generate new data on the impacts of ‘global’ solutions to scarcity on local needs and priorities and the role of science and technology in defining these solutions.

The research largely succeeded in meeting all the objectives with minor modifications. One, the focus on solutions framed around ‘governance’ and ‘privatisation’ emerged as too narrow and somewhat inappropriate given the nature of both global and national debates of scarcity which drew on other categories. Instead, the research focussed on coming up with a typology to understand global and more general debates of water scarcity and its solutions which helped analyse scarcity debates and issues in India and South Africa.

Two, unlike what was in the proposal, much energy was devoted to examining the theoretical concept of scarcity in an interdisciplinary and historical perspective. This is because the initial reading confirmed that the concept was so taken-for-granted in environment/ development and science policy debates that it had emerged as a ‘trope’ to frame problems, justify science/ technological interventions and legitimise specific solutions. Additional funding from the Science in Society programme helped me to organise a major international conference on

scarcity with 50 international participants from both the North and South (including both thinkers and empirical researchers) to engage with the politics of scarcity and examine scarcity debates in foods, water and energy. This was not originally envisaged at the inception stage but has significantly expanded the scope and applicability of the project.

### **3. Methods**

Since this was a modest project, it was not possible to undertake new primary or ethnographic research. Instead, the research largely employed a rigorous qualitative approach to study diverse portrayals of scarcity at the theoretical, global and national level. This was done largely through the textual analysis of prognoses and portrayals of scarcity and water reports (e.g. from the World Bank UN, FAO), government reports and national policies in South Africa and India, from NGOs and think tanks). In addition an extensive literature review was conducted of the theoretical and conceptual literature on scarcity from economics, philosophy, sociology/ anthropology, politics and so on. Although the major thrust of the research was *qualitative*, efforts were made to engage with *quantitative* economic data around estimates of water scarcity, estimates and variations in the financial costs required to enhance access to water and so on. Semi-structured interviews were conducted with policy makers, water advisors, private sector members, activists, academics and NGO members in the US, UK, India and South Africa. I drew on my existing contacts in India and South Africa and in global agencies (e.g. UN) to gain access to a wide range of actors and commentators. The interviews focussed on the person's or institution's perception of the nature of scarcity, the solutions, underlying scientific assumptions and possible implications for poor people's access to water. Largely, the interview process was very positive and I found that most policy makers, activists and academics (especially in South Africa and India) were open and interested to engage with the research, the exception being a few people at the World Bank who were a bit defensive. As and when requested, I have maintained the anonymity of views or those that were off the record. In addition, the research benefited from my participation as an invited speaker or participant observer at global level meetings on water (e.g. the L20 meeting on water and sanitation in Egypt 2004; World Social Forum, 2004; Ditchley Park 2005) which helped me to plug into ongoing popular and scientific debates on water 'crises' and their solutions.

### **4. Results**

The research has generated an enormous wealth of insights which speak to a range of debates concerning water management and water scarcity, the politics of scarcity and science-society relations. These are being written up in full in outputs targeted to a range of audiences (see section 6). This section gives only a brief summary of some of the conclusions and findings, first for notions of scarcity and water scarcity in particular, then for water scarcity debates in India, South Africa and then comparatively.

#### **4.1. Unpacking scarcity and global portrayals of water scarcity**

Scarcity is considered to be the ubiquitous feature of the modern condition and the scarcity postulate (i.e. that human wants are unlimited and the means to achieve these are scarce and limited) underpins modern economics. Authors such as Nicholas Xenos and Hans Achterhuis (Xenos 1987, Xenos 1989, Achterhuis 1993) have both played a key role in demonstrating that scarcity is a child of modernity and that neo-classical economic thought of the eighteenth century led to a shift from *scarcities*, which were temporally bound and spatially differentiated, to an essentialised notion of scarcity which led to the obscuring of ambiguities and regional variations.

Scarcity legitimizes the need to allocate and manage property either through the means of the market or through formalizing rights regimes (e.g. formalization of water rights, for example, has gained much currency in contemporary donor discourses not least due to 'scarce' water resources). Economics uses scarce resources as a point of departure. Thus economic goods, i.e. goods that are scarce – are made the objects of systematic human action. Of course, whether all 'resources' / goods can be viewed unproblematically as 'economic' goods is highly contested. The declaration of water as an 'economic good' in the early 1990s is still deeply controversial in the water domain since many still feel that this legitimizes the commodification of a life-giving resource and justifies its privatization, as opposed to declaring it as a human right or the global commons where access is not dependent on one's ability to pay (see Mehta 2003).

There are academic challenges to this universalist portrayal of scarcity. Karl Polanyi (1944) and Marshall Sahlins (1972) have critiqued formalism in modern economics and the notions that material wants are unlimited and highlight the importance of the moral economy or 'subsistence' realm where the rationalities of 'Homo economicus' need not prevail. Institutional approaches and common property scholars have shown how Hobbesian notions of anarchy where states, regions and people fight over scarce resources may not be an accurate or predictable scenario. Instead, local people have a deep understanding of their immediate environment and co-operate with each other in times of adversity to avoid high transaction costs in their failure to comply (e.g. Ostrom 1990). Amartya Sen's entitlements analysis when applied to water would indicate that some people's lack of water does not necessarily imply that water is scarce. Instead, it means that that certain parts of the population are unable to gain access to water for one reason or another, be it that water is too highly priced, lack of infrastructure, or due to social exclusion (Sen 1981).

Finally, socio-political perspectives offer other ways of looking at scarcity by drawing on variety of disciplinary approaches including political ecology (e.g. Blakie and Brookfield 1987; Peet and Watts 1993 and 1996 and Forsyth 2003), Foucauldian discourse analysis and science studies (e.g. Jasanoff 1996; Rayner 2003; Visvanathan 1997) to look at competing meaning of scarcity, the prevalence of dominant discourses as well as competing claims over resources. Such an analysis tries to marry an ecological phenomenon (ie a shortage of food/ water etc) with political economy. Similarly, the historian Ross (1993) distinguishes between socially-generated scarcity (insufficient necessities for some people and not others) v/s absolute scarcity (insufficient resources, no matter from equitably distributed).

#### **4.2. Global portrayals of scarcity**

In the course of research for this project I found that very few official documents explicitly dealt with exact definitions of and solutions to water scarcity. Instead, the terms crisis, water shortage, scarcity and stress were used very loosely, often in the context of sustainable development. While authoritative comprehensive global assessments and reports seek to integrate interdisciplinary perspectives and provide comprehensive understandings of different aspects of the water debate by paying cognisance to regional variations, most of them lack a clear statement on how they understand scarcity and the global water crisis, on the basis of all the knowledge gathered. Examples include the UN's World Water Development Report (2003) and the Millennium Project's task force report on water (2005), both very comprehensive global assessments to date on water

There are many different ways to define scarcity. Most definitions tend to take physical (and

finite) supplies as a starting point. Many analysts would distinguish between physical scarcity (where water consumption usually exceeds supply) and economic scarcity where a country may have sufficient water supplies but lacks investments to create storage or transport facilities. There are several problems with these conventional global definitions: One, determining an available supply of water based purely on physical characteristics is fraught with difficulty. Water supplies are relative to exogenous factors such as rainfall, seasonal differences and agro-ecological considerations which mean that water is highly variable across time and space and defined by its locality, making notions of 'global' crises etc. rather misplaced. New uncertainties are also created through unknowns arising due to global climate change and none of the above follow national boundaries which are used for global classifications. Two, demand projections are based on current use patterns and do not insist on major adjustments in reducing norms or enhancing equity. Three, global definitions also fail to distinguish adequately between the scarcity or limitedness of water in the hydrological cycle and the scarcity of access of the poor for their drinking and survival needs (due to the lack of water, its poor quality or their exclusion due to the prevailing social and power relations). Even the notion of economic scarcity takes an aggregate view of the population lacking access to water, instead of breaking down groups by gender, caste, race etc. This confusion is usually found in popular portrayals of scarcity in the media where words like 'crisis' prevails. Finally, most of the mainstream portrayals see scarcity as a natural phenomena, and not something that is either exacerbated or even caused as a result of socio-political processes.

Table 1 provides a summary of a typology to analyse and understand different portrayals of water scarcity (building on Wolfe and Brooks 2003). It distinguishes between four kinds of scarcity (physical, economic, third order and socially constructed scarcity). Under each, the table provides the main characteristics, the disciplinary underpinnings and the accompanying solutions. Largely, global agencies draw on physical and economic characteristics of scarcity which focuses on the relationship between supply and demand (1 and 2).

If the cause of scarcity is constructed as a lack of supply or an excess of demand in order to equalise the imbalance either an increase in water availability (a supply-side response) or more efficient use of the available resource (a demand-side response) is required. Supply-side responses seek to increase the availability of water. Traditionally these tended to be 'high-tech' engineering related solutions such as inter-basin transfer through pumping and pipe systems, the building of dams, or desalination. At the other end of the scale 'low-tech' or even 'no-tech' solutions such as basic gravity fed water systems, the digging of wells and rainwater harvesting. By contrast, demand-side responses critique supply-oriented ones for their 'inefficiency', loss and wastage and focus instead on regulation, pricing, reallocation and privatisation or public private partnerships. The spread of these approaches in the developing world is certainly due to the influence of the international finance institutions such as the World Bank who since the 1990s have introduced water and land reform as part of structural adjustment and conditionalities packages which is also reflected in the 1992 Dublin declaration of water as an economic good. Some elements of supply and demand oriented measures are highly controversial (e.g. the building of large dams and the extra basin transfer of water on the supply side and water pricing and privatisation due to possible harmful impacts for the poor on the demand side).

While global agencies are not a monolith, based on the analysis of documents and the interviews, most global positions are still in the comfort zone of supply/ demand and efficiency discourses. These also include water and food policy institutes such as the International Water Management Institute and the International Food Policy Institute which focus on different future scenarios which span first – third order scarcity (e.g. business as usual, water crisis and

sustainable water use). But here too the analysis sticks to aggregate notions of scarcity, even though social adaptation, the role of education and social marketing are raised. There is still a remarkable lack of questioning of the 'natural' state of scarcity and the moving away from aggregate analyses. Similarly, the politics of framing, decision making, technological choice and distribution/ allocation are not addressed upfront. The World Bank has in the past years re-declared its support of large-scale infrastructure of being one of the key ways to address the water crisis (WB 2003) despite the controversies of the 1990s. It also openly rejected processes such as the World Commission of Dams which have tried to create more bottom up decision making processes around large dams. Most of these positions tend to evoke science and technology as the solution, be they around low cost salination techniques to the more controversial large-scale infrastructure projects such as large dams.

**Table 1 Diverse ways to view scarcity**

	<b>(1) Physical / first order scarcity</b>	<b>(2) Economic/ second order scarcity</b>	<b>(3) Third order scarcity/ adaptive capacity</b>	<b>(4) Scarcity arising through socio-political processes</b>
<b>Characteristics</b>	Volumetric quantities; Population growth ; Projection of future demand; industrial growth	Inadequate development of water infrastructure; Poor management and institutional arrangements;	Social, political and economic context of water management;	Scarcity as a product of discursive and socio-political processes; Technology embedded in social processes
<b>Water management solution</b>	Enhancing supply through storage (e.g. small v/s large dams debate); Desalination; Extra basin transfer of water	Water reallocation through water markets; water reform; Technological fixes; pricing; Increasing efficiency	Social adaptive capacity through education, cultural change and lifestyle change	Deliberation; Decision making processes; Equity and reallocation
<b>Access solution</b>	MDGs Lifelines	Water as an economic good; pricing; privatisation ; Community management/ PPPs	Social adaptive capacity through education, cultural change and lifestyle change; decision making	Redistribution / enhancing equity; Instituting entitlements to water (e.g. human right to water)
<b>Disciplines</b>	Largely	Largely	Interdisciplinary	interdisciplinary

	engineering	economics		
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### 4.3. National debates – South Africa

Research in India and South Africa focussed on tracking local and national responses to these ‘solutions’. In both countries the research followed official and critical debates around the causes and magnitude of ‘scarcity’ and examined key initiatives around scarcity mitigation. Both countries are officially considered to be ‘water-scarce’ and have vibrant citizen action around water issues (in particular, around dam technologies in India and privatisation issues in South Africa). Both experience variability in river flow and a highly geographically skewed occurrence of both rain and groundwater in the country.

Post-apartheid South Africa since 1994 has one of the world’s most dynamic water ministries committed to overcoming the problems of poor water access and provision and water scarcity (Kihato and Schmitz 2002). The Department for Water Affairs and Forestry (DWAF) has assumed a strong profile both nationally and internationally in its efforts to both move away from being engineering and supply dominated to assuming responsibility for retail water and sanitation service delivery as well as overcoming huge inequalities in access to water due to historical legacies (in 1994, 12-14 million lacked access to water and sanitation and large-scale (white) farmers controlled as much as 95 per cent of irrigation water).

Interestingly enough official scarcity discourse in policies and debates focus on all the four aspects of scarcity as addressed in Table 1. In official speeches and the media South Africa is often referred to as ‘water scarce’ drawing on Falkenmark’s ‘internationally recognised definition.’ However interviews with policy makers revealed a strong focus on other debates too: for example, future water scarcity scenarios due to the growing demands, a strong awareness about the role of social adaptation and demand management and the problems with aggregate values that do not focus on current inequities in access to water resources for the poor and historically disadvantaged communities. Official programmes that address these inequities include the recently launched water allocation reform (WAR) programme.

Unlike India and due to the apartheid past, equity is upfront in South African water debates, in terms of access to water and sanitation as part of basic human rights; equity in access to water resources (regarding the productive uses of water) and equity in access to benefits from water resources. These are reflected in National Water Act of 1998 which is a powerful piece of legislation that seeks to both redress past inequities around water use on the basis of race and gender and ‘efficiently’ manage water. Water is a national subject in South Africa, not surprisingly, given that prior to 1994 65% of the water was controlled by private individuals. South Africa is also one of the few countries that explicitly recognises the right to water, and its Free Basic Water policy provides a basic level of water free to all citizens (25 litres per capita per day based on a household size of eight people). This completely goes against the grain of dominant global discourses that shy away from explicitly recognising the human right to water. Moreover, the concept of the Reserve in the White Paper on National Water Policy stipulates that a portion of water in the rivers will always be reserved to meet basic human needs and basis environmental needs.

Despite these promising policies on paper, South Africa’s water realm is not without contradictions. Let me focus on three examples. One, interviews with commentators on the WAR programme which is currently being implemented in three pilot basins highlight that that reallocation processes will have to deal with the challenge in meeting the need to balance the

'welfare' allocations of water with allocations geared towards promoting economic growth and the maintenance of ecosystem functions. Powerful players may continue to appropriate land and water resources and dominate decision making processes in the catchment management agencies. There are competing scientific claims about how 'pristine' the reserve should be. Another challenge is to synchronise the roll-out of the WAR programme with the ongoing land reform, which is progressing very slowly.

Two, alongside the remarkable commitments to providing free water, several World Bank influenced policy changes have led to the controversial disconnections of poor households to water that contravene their basic rights as well as privatisation contracts with international firms that have led to water becoming very expensive for many poor people. Thus in dancing to the two tunes of markets and rights, equity considerations are being compromised. Finally, while critical NGO commentators and activists argue against supply oriented measures to deal with scarcity, official policies seem to be revisiting controversial measures such as large dams. South Africa has 13% of its storage potential under-utilised and there are now plans to execute 20 more large dams in the country. While South Africa officially endorses the recommendations of the World Commission on Dams in Cape Town and is open to deliberative and participatory decision making processes on large dams, interviews conducted in Cape Town regarding the controversial Berg water project suggest that 'scarcity' debates were strategically used to legitimise the controversial dam instead of addressing the unequal water consumption practices in an already highly skewed social fabric (given the high proportion of whites in the city). Moreover interviews with activists revealed that the so-called stakeholder processes were top-down and constituted a rubber stamping exercise where authoritarian 'scientific' notions of risk and scarcity blanked out a genuine debate around the options to the dam.

In sum, then, the South African case reveals that national debates in part endorse and in part go against donor and global discourses. There is a similar politicisation of scarcity to justify certain ends, despite the recognition of its multi-faceted nature. The focus on access and equity is to be commended but it risks being jeopardised due to parallel commitments to market solutions and problems in creating genuine participatory processes that could help manage and distribute resources equitably.

#### **4.4. National debates – India**

India's hydraulic mission is very different to that of South Africa. Its water management approaches to water scarcity until very recently focused primarily on technocratic and engineering solutions in a supply-driven framework with social and institutional issues only recently coming to the fore. The adherence of India's endorsement of the more physical and volumetric definition of scarcity is evident from both conversations with key policy makers as well as from the analysis of several policy documents which also draw on Falkenmark's 'internationally recognised definition' even though the average cubic metre availability per capita is above the water stress index highlighting the wide range of national per capita annual availability of water in the country. Water resource development in India has largely become synonymous with large dam-and-reservoir projects and supply-oriented solutions which a confluence of engineers, business lobbies, politicians and bureaucrats promote (Mehta 2005). Controversies around dams continue to plague India's water debates with official discourse using 'scarcity' to justify the extra-basin transfer of water from water-rich to water-poor parts to enhance storage and alleviate drought conditions. By contrast, critics highlight their high social, economic and environmental costs and point to localised solutions such several successful

rainwaterharvesting schemes which India is also very famous for.

Officially, India, along with China and Turkey, has rejected the recommendations of the World Commission on Dams report and has declared its intention of constructing additional 'storage' of 200 billion cubic metres (BCM) within a period of 25 years. This is despite the key role played by Indian academics, bureaucrats and activists in the Commission's work. Despite all the ongoing controversies and battles around large dams, not least the ongoing struggles in the Narmada valley around several dams under construction there, the ambitious Interlinking River Project has been proposed which is supposed to link the water systems of the more endowed North to the drier rivers of Southern India. Not surprisingly the scheme is again justified due to the 'scarcity' conditions in South India's water-stressed basins resulting in highly polarised debates between proponents and opponents of the scheme.

Unlike South Africa, India does not have a national water law or code. Instead, there are several laws at the state and central level that are related to water. There is a National Water Policy of 2002 but it has no statutory backing. Water has been included in India's constitution as Entry 17 of the State List though the Central government has a role in decisions over inter-state river issues significantly (Iyer 2004). Several institutions within the government machinery manage water resources and there is a marked lack of co-ordination between the different ministries. All this manifests itself in several contradictory outcomes in practice: For example, the right to water (as part of the right to life in the constitution) and implied in the Environment Protection Act and court rulings can be overruled by the colonial notion of 'eminent domain' which can be used to justify infrastructure projects that alleviate scarcity and also displace thousands of people, all in the name of 'national purpose'.

Like South Africa, reforms of India's water sector have also taken place largely due to the influence of the World Bank and dominant donor discourses. They were more systematically implemented under a programme called *Swajaldhara* (*your own water*) in 2002. A few key features include: a shift from supply oriented target based, government interventions that encourage the perception that water is a social right to be provided free by the government to one that is demand driven and 'participatory' (Government of India 2003). However, interviews reveal that in practice participation largely refers to financial contribution to schemes or contributing unpaid labour, as opposed to genuine participatory decision making around the choice of technology and so on. The same focus on access and equity as in South Africa's policies is not evident. Unlike South Africa, India does not have the concept of a free lifeline. Instead, the government aims to supply 40 litres per capita per day and with the reform process, 10% of the capital costs would need to come from the users (GOI 2003: 6).

India (like South Africa) has its own national mission to enhance drinking water coverage. I found very little or no Millennium Development Goals discourse in both countries which is the *raison d'être* of many global processes around water. While there is (as yet) no official endorsement of water as an 'economic good', in India the reform processes highlight that water should be treated as a 'socio-economic' good (Government of India 2003). Indeed, privatisation debates of both water services in cities such as Mumbai, Delhi and Bangalore as also river privatisation in Madhya Pradesh are emerging as highly controversial with 'efficiency' discourses being used by the state to promote privatisation measures. Unlike the South African case, there are no comprehensive provisions in India's water domain regarding stakeholder consultation, participation, public hearings and social and environmental impact assessments, especially with respect to large-scale infrastructure development. Water scarcity is also not defined or conceptualised in official debates as a problem of access or equity. Instead, there remains a focus on aggregate perspectives, suppressing alternative packages of technical,

social and institutional measures for more effective and localised water management that also pays attention to the distinguishing between the water use patterns of the rich and poor and between people's livelihood / survival water needs over and above other water uses (Jairath, interview).

#### **4.5. Conclusions and comparisons:**

Globally as well as in India (but not in South Africa) official definitions of scarcity usually look at absolute population numbers and absolute quantities and talk little about the politics of distribution. When pushed most policy makers/ commentators would concede that scarcity is a multifaceted and complex phenomenon. Still, in most popular and official discourses (even in South Africa), scarcity is universalized and naturalized and is it convenient to stick to this simplified notion of scarcity. This is because scarcity is a concept that can provide meta-level explanations for a wide range of phenomena over which humans ostensibly have no control. For example, in South Africa's western Cape geography is blamed and made out to generate scarcity condition instead of looking at demand management strategies to deal with Cape Town's water scarcity or indeed the growing water needs. This in turn justifies the Berg River Water Project. When scarcity emerges as the meta-level explanation or as a trope for the justification of need, it emerges as a technical term and all subjective, constructivist and socio-political elements are weeded out. In South Africa, unlike India and in most global discourses, questions of equity and access have emerged as key and the socio-political nature of scarcity is recognised in official debates. However, there are serious implementation problems and risks that the poor and historically excluded may not benefit from redistribution for a variety of reasons. In all the cases described, the technological choices that are exercised are often considered to exist outside of politics and technology is supposed to provide 'solutions' that are neutral. Technology is made out to be an anti-political instrument – scientific committees and experts are sought as 'arbiters' (Barry 2001) around which scarce resources are managed and allocated. But in reality, technology and techniques are deeply political – and contestations around the solutions (be they water markets or India's fantastical river interlinking project) are sites of politics (both in the cultural and material realm). Still technocracies are made out to be neutral sites to resolve decisions around how best to deal with and manage scarcity which ignores their deeply political nature and tendency to be dominated by technocratic elites.

### **5. Activities**

#### **Phase I: Preparation (November 2003- February 2004)**

- Recruitment of an RA
- Consultations with users
- Participation in meetings
- Laying the foundation for the research

#### **Phase II: Desk study and review (March 2004 – July 2004)**

- Research on and analysis of global portrayals of water scarcity
- Review and analysis of a wide theoretical literature on scarcity
- Preparation and writing of two papers (one theoretical and one on global policy debates)

#### **Phase III: Interviews and in-country research (August 2004 – April 2005)**

- Interviews and collecting documentation in the USA, India and South Africa
- Participation at high-level meetings / policy workshops in India, South Africa, the US and UK

Popular articles  
Data analysis

**Phase IV: Dissemination** (Since December 2004 onwards)

Presentations at meetings and workshops to present findings  
International conference at IDS on 'Scarcity and the Politics of Allocation'  
Preparation of written outputs  
Interactions and discussions with a range of people and groups on follow up research, advocacy and policy relevant work (e.g. The Cornerhouse, DFID, Overseas Development Institute, UK; SasiWaters and Jawarhlal Nehru University, India; International Water Management Institute; University of the Western Cape; NORAGRIC, Norway).

**6. Outputs**

Mehta, L. The politics of scarcity: contestations and constructions. Edited volume based on the IDS conference. Proposal submitted to Earthscan for the Science in Society book series. (Work on this will take place in 2006).

Mehta, L. The scare, naturalisation and politicisation of scarcity. Paper presented at the IDS conference at scarcity and at the ESRC Cultures of consumption conference on 'the Politics of necessity' (Draft and was invited to submit to Journal of Consumer Politics).

Mehta, L. A tale of water scarcity in two countries: The case of South Africa and India. In preparation for journal submission.

Mehta, L. Scarcity and property rights. The case of water in western India. This was presented at the Property rights conferences in Aas, Norway. A revised version will appear in Land Policy (the theoretical review and conceptual framing for this paper drew on the project's literature review)

Mehta, L. and L. Thompson. Contesting scarcity in Cape Town. IDS Working paper (in preparation and to be completed by March 2006 as a joint product of this project and the Science and citizenship theme under the DFID funded research centre on citizenship, participation and accountability).

Wright, P. Review of global policy debates on water scarcity. Draft.

Mehta, L. BBC website piece on the water debate, November 2004.

Mehta, L. Scarcity and the politics of allocation. Workshop report. (Will be published as a science in society publication).

IDS Conference statement on scarcity ([www.ids.ac.uk/ids/KNOTS/Projects/Scarcity.html](http://www.ids.ac.uk/ids/KNOTS/Projects/Scarcity.html)).

Plenary address at the Norwegian Association for Development Research (NFU) conference in 2005. Presentation at panels on water at the World Social Forum, Mumbai; L 20 water meeting in Alexandria, Egypt; property rights conference at NORAGRIC, Norway and at the Carnegie Council, New York in 2004 and at the IDS conference and ESRC cultures of consumption

conference on the 'Politics of necessity', Oxford in 2005;

## **7. Impacts**

Inevitably, bringing about change in established discourses and practices in water management institutions and water-related research is a slow process, especially where these discourses are strongly entrenched and polarised, as with scarcity. I hope that over time examples of application and impact will emerge as the study findings continue to be published and disseminated, and to feed through media communication into wider public debate. Still, a few impacts can be noted.

The most significant impact is that the findings are currently feeding their way into the current Human Development Report (HDR) coordinated by the UNDP which is on water and human development. I will be writing the main conceptual background paper for the report and one of the aspects that I will focus on is the politics of scarcity. I have had extensive discussions with the project's lead writer and the concept note introducing the HDR report reflects these perspectives.

In the UK, the research findings were documented on the BBC website in a special discussion on the water crises and water scarcity (see above). Activist organisations such as the Cornerhouse will be using the conference statement for their work with other networks.

In India, the UK and South Africa, organisations associated with the project from the very beginning such as Saciwaters and Capnet (India), International Water Management Institute (Pretoria), Water Policy Programme (Overseas Development Institute) are incorporating the insights and findings into their talks, writings and work along with many of the academics who attended the scarcity conference at IDS. I hope to continue to communicate the project's findings to government officials and policy makers in the UK, South Africa and India over the next few months.

## **8. Future Research Priorities**

An immediate future priority, drawing on the research from this project is the analysis, writing up and publication of a systematic comparison of India and South Africa regarding the policies and practices concerning water scarcity, in relation to global and theoretical debates of scarcity and water management. Furthermore, there are a number of further lines of research, which I hope to take forward in interaction with colleagues, participants at the workshop and funding sources over the next few years which would allow for developing the intended multi-sited research project. These include:

- Ethnographic research on how citizens and local people perceive and respond to scarcity in a range of contexts. This would generate ethnographic data which this project was unable to do due to the limited scope of the project.
- More comparative research on the experiences, problems, portrayals and politics of water scarcity in diverse contexts globally and how they relate to global portrayals and solutions (here again this could be through ethnographic research at the local level and through a study of policy processes at the regional, national and global levels).

- Investigation of how different ways of seeing scarcity on the part of local people and ordinary citizens can feed into national and global policy processes around water management and water scarcity mitigation;
- A more systematic investigation of whether scarcity debates, policies and practices differ across the sectors such as water, food and energy. Again this research should be conducted both through ethnographic research and a study of the policy processes in diverse contexts globally;

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