WATER AND SUSTAINABLE DEVELOPMENT: A SOUTHERN PERSPECTIVE

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Summary

The challenges confronting water resource managers are considerable, particularly in the developing world. Water deficit is a debilitating condition that results in ecosystem failure and economic stagnation. Social and political instability is therefore likely under these conditions. Water poverty is a unique condition that exists when a social entity is facing water scarcity and has limited social resources with which to manage this problem. Structurally induced relative water abundance (SIRWA) is a condition whereby a social entity facing water scarcity can manage its way out of the problem due to the existence of sufficient social resources. A range of coping strategies is thus necessary if sustainable development is to be possible. These coping strategies will need to embrace aspects such as water demand management (WDM), regime creation, and virtual water importation in order to balance the water budget in a sustainable manner. If these strategies are implemented effectively, then natural resource reconstruction can be implemented. Before this happens though, reflexivity is necessary in society. Reflexivity is a response to changing perceptions of water and environmental impacts of development, so perceptions are the crucial variable in the overall equation. Changing public perceptions of water and hydraulic landscapes, as reflected in the hydro-social contract, ultimately induce politicians to embrace notions of sustainability. The focus for understanding this problem therefore shifts to second-order resources as these are the fundamental determinants of sustainability in the long-term.

1. Introduction

The concept of "sustainable development" sounds so tantalizingly nice that it flows off the tongue as if it has real meaning. In reality, it is extremely difficult to define what sustainable development actually is, or more accurately, how to achieve it as a coherent policy strategy, especially for a developing country. This contribution will explore some of these contradictions and nuances, and will attempt what has just been said is almost impossible to achieve—a reasonable definition of sustainable development within the context of water and aquatic ecosystems—from the perspective of a developing country.

2. Defining Sustainability in Dynamic Political Economies

For developing countries, mostly found in the South, the concept of "sustainable development" is as elusive as the proverbial mirage in a desert. An example serves to illustrate this. Namibia is an extremely arid country with a large surface area, low precipitation levels, and a relatively small population relative to geographic size. Yet Namibian water sector officials like Piet Heyns acknowledge that,

For a number of reasons the call for sustainable development and the need to increase the use of water in Namibia seem almost incompatible. … Can Namibia afford sustainable development? The answer for the short-term may be no! This year and next year it may be cheaper and more expedient to supply whatever water is wanted, wherever it is wanted, to whoever is demanding it.

Such is the dilemma for developing countries in arid regions. Two empirical examples illustrate the point precisely. Figure 1 shows the demographically induced water consumption curve for the city of Windhoek in Namibia. From this it is evident that there is a close correlation between water consumption and population growth, hence the most appropriate name for the phenomenon being the demographically induced water consumption curve. As population grows, so too does water demand. Yet this data set only shows a small part of the problem. The heart of the problem being confronted by developing countries in arid areas lies in the population factor, and this is where it starts to get complicated. The population factor consists of a number of issues that are difficult to do much about in the short-term, at least for many governments in the developing world.

First, there is the population migration factor. It is this factor that is evident in the Windhoek case presented in Figure 1. People are migrating to the urban centres in response to at least two stimuli. Population-push factors include aspects such as a complex interaction between ecological marginalization, which is a political and economic factor, and resource degradation, which is an ecological factor caused from over-exploitation and the resultant collapse of aquatic ecosystems. Then there is the population-pull factor. This is what serves as an attractant to urban centres and it is driven by the interaction of the existence of better opportunities for employment in urban centres, which is a political and economic factor, and the perceptions that people have about a better life, which is a social or psychological factor. In reality there may not be a better life in the urban centres, but this is not a deterrent. People are driven

largely by perceptions of reality, rather than by reality itself. This is what makes the problem complex.

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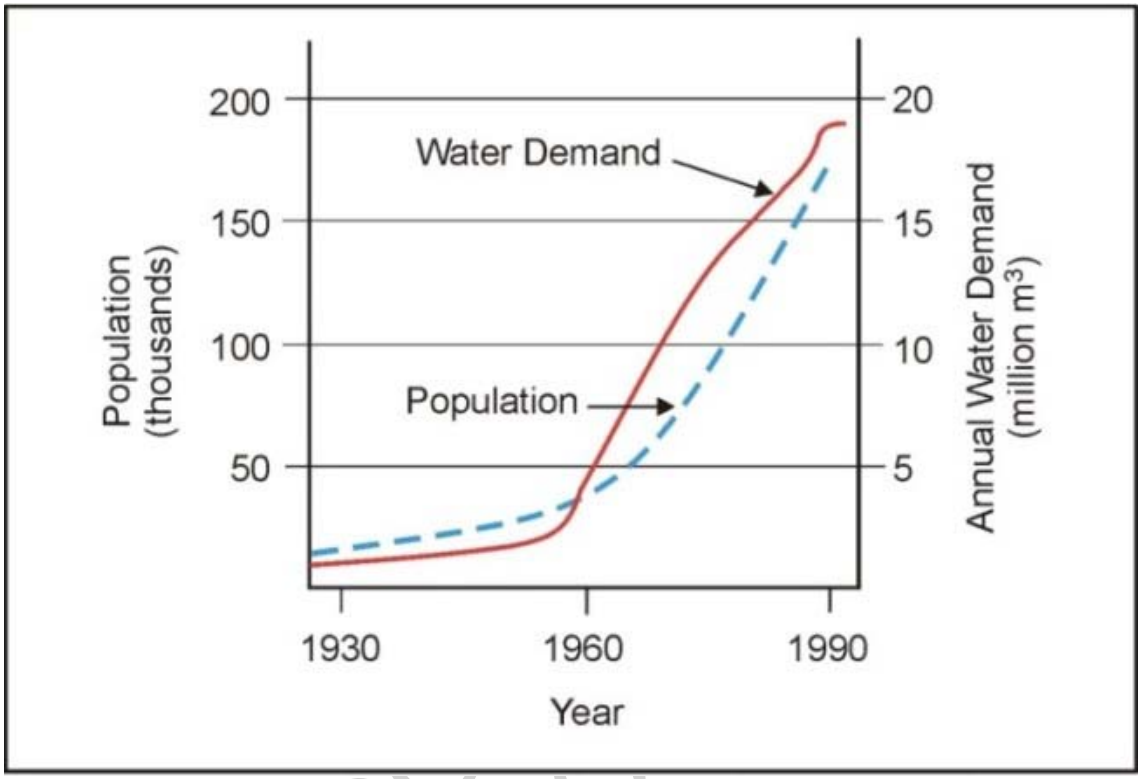

Figure 1. Example of Demographically Induced Water Consumption for the City of Windhoek (after Jacobson *et al*.,

These two factors interact and cause the second phenomenon, which lies at the heart of the dilemma. Because people aspire to a better life, they want to experience a degree of upward mobility. This is logical and indeed morally justifiable. People ought to be able to live better lives in the future than they did in the past. Yet for large parts of the developing world this is not the case and is manifest as a set of slums around urban centres. The problem is that the developing world is trying to model itself on the developed world, but the latter only achieved development at the cost of severe ecological degradation. Northern-based consumption patterns are thus not the ideal model to follow, but there is no viable alternative.

Figure 2 shows what happens to water consumption as the result of urbanization. Again this data set comes from Windhoek, Namibia as it illustrates the point being made. Squatters, or those unfortunate people who live in informal settlements around the urban centres, consume a minute volume of water per capita per day. There is a naturally occurring limiting factor at work here. The absence of piped water in each house acts as a physical deterrent. It is arduous to carry water in a bucket on your head for great distances under the blazing sun, so water consumption is limited. But people aspire to more stability and a better quality of life, and rightly so. Squatters move into low-

income houses when they can afford it, and the impact on their daily life is enormous. Security of tenure and the existence of running water on the property itself is a major milestone of development. The social impact is better political stability, which is clearly a desirable state of affairs. This manifests as an increase in demand for water. It is easier to turn on a tap than to carry a bucket, so more water is consumed. For many, this is a tangible manifestation that their quality of life has improved and they relish it. The same thing happens as people become upwardly mobile, but with each jump in income group, an exponential growth in water consumption occurs. The result is that the water consumption per capita in Windhoek is about one order of magnitude more for a person living in a high-income neighborhood than for a person living in an informal settlement.

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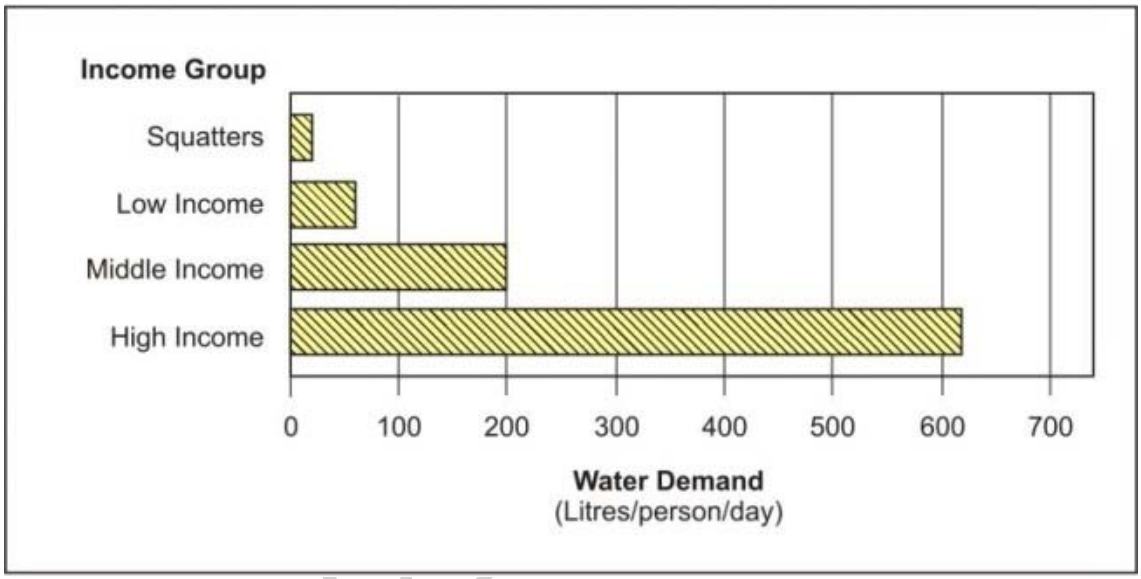

Figure 2. Graph Showing Daily Water Consumption per Person Expressed as a Function of Income for the City of Windhoek (after Jacobson *et al*.,

This is the dilemma. Governments must provide basic services like water and sanitation and they must meet the minimum level of expectations that the electorate has, or else political instability is imminently likely. The latter is clearly an undesirable condition so governments seek to avoid this, even if this means long-term ecosystem collapse. This is perceived as less of an immediate danger than the very real problem of widespread social or political instability that can occur in the short-term. In effect, the environmental endowment of a future generation is sold off cheaply in order to satisfy the needs of the current generation. The problems of the here and now are more pressing than those of tomorrow. This is the crux of the matter when it comes to water and sustainable development from the perspective of a developing country. It is a vicious spiral that is difficult to break.

2.1 Some Theory: the Environmental Karshenas Curve

Those are the facts, as illustrated by the Namibian example. What do theoreticians say about the situation? Probably one of the most useful sets of environmental theory that

serves to explain aspects of the above-mentioned phenomenon is that known as the Karshenas Curve.

Dr. Masoud Karshenas is a resource economist, who worked in conjunction with Prof. Tony Allan at the School of Oriental and African Studies (SOAS) in London, and they set out to explain linkages between the environment and economic development. They isolated what they considered to be two key variables. The independent variable consists of the stock of environmental resources such as water that is available to a political economy. This is plotted on the horizontal axis, with a critical threshold being the minimum beyond which development would become unsustainable. This is evident as the vertical dotted line on Figure 3, with the area to the left of that representing ecological catastrophe. The dependent variable is the standard of living, and this is plotted on the vertical axis. A critical threshold in this regard is a minimum standard of living, shown as a horizontal dotted line in Figure 3, with the area beneath that representing a Malthusian catastrophe. The concept of water and sustainable development can thus be represented graphically as coinciding with the area on the graph above these two minimum threshold points. In other words, sustainable development would exist in the upper right-hand portion of the graph.

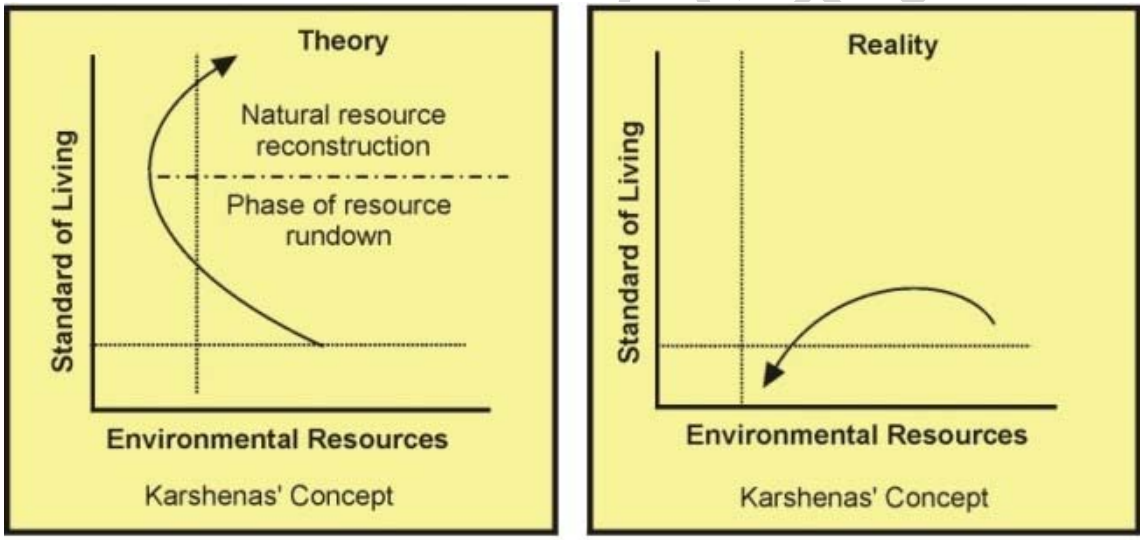

Figure 3. A Rendition of the Karshenas Curve Showing Phases of Resource Rundown and Subsequent Natural Resource Reconstruction (after Allan & Karshenas, 1996).

The Karshenas curve shows that in theory, as a political economy starts to develop, it initially reduces its stock of environmental capital (water). This developmental trajectory may cross the threshold into unsustainability, but then through a series of policy interventions, the government can change this trajectory sufficiently to bring the curve back into the area of sustainability. This is shown in the left-hand graph of Figure 3. The portion before the trajectory change can be called the phase of resource rundown, with the portion after the trajectory change being called the phase of natural resource reconstruction. In reality, the political economy concerned may not show evidence of crossing the threshold that is represented in the left-hand graph. This is shown merely to illustrate the point being made—that a government can change the developmental trajectory if it chooses to adopt the so-called "precautionary principle" that is central to

an understanding of the concept of "sustainable development". The graph on the right-hand side shows what happens in reality in many developing countries found in sub-Saharan Africa. As the country tries to develop, it consumes its stock of environmental resources such as water, but fails to translate this into an improvement in the standard of living for its citizens. The Namibian case mentioned in the beginning of this article is indicative of the early phases of this phenomenon. As more natural resources are consumed, the resultant ecosystem degradation does not effectively translate into an improved standard of living. This in turn means that government is impoverished and rendered incapable of making the policy interventions that are needed to change from the phase of resource rundown to a phase of natural resource reconstruction. As ecosystems collapse, this triggers a series of events that can result ultimately in social and political collapse if left unchecked. Under such conditions, the government is rendered incapable of rectifying the problem, so political decay and social instability set in and become increasingly manifest over time.

Thus from a theoretical point of view, the Karshenas curve shows that a country tends to initially run down its stock of environmental resources in the quest for development. While this is clearly undesirable from an ecological point of view, it is what happens in reality and therefore needs to be understood as such. If this development is successful, then the developmental trajectory will translate this resource consumption into an improvement in the standard of living for its citizens without compromising ecosystem integrity. The early phases of this process represent resource rundown, but at a point when the government has sufficient capacity to do something about it, a series of policy interventions alter the developmental trajectory and make it move into the area of sustainability. This second trajectory becomes sustainable and a phase of natural resource reconstruction is launched during which degraded ecosystems are rehabilitated and environmentally friendly development practices become the norm.

In technical terms, the phenomenon of "turning the curve" is known as reflexivity. Social theorists Prof. Ulrich Beck and Prof. Anthony Giddens argue that the late twentieth century is increasingly characterized by a new phase of modernity, which they call "reflexive modernity". The popularization of environmental principles represents a reflexive response to the problems that are associated with a risk society. This has a direct implication for the notion of sustainable development. Before development can be considered to be sustainable, reflexivity has to take place. In other words, sustainable development can be considered to be the dependent variable, with reflexivity being a necessary pre-condition (or interceding variable) for it to exist. If there is no reflexivity, then consumption of environmental capital will continue until such time as the ecological catastrophe that Karshenas predicts occurs.

Significantly, endeavors such as the EOLSS can be categorized as being evidence of reflexivity. The central theme of the EOLSS project is to change perceptions about the environment and the relationship that people have with organisms that co-inhabit the environment.

Central to the notion of reflexivity is the whole North/South development debate. Stated simplistically, the developed North has become reflexive and hence concerned with the unintended outcomes of industrial modernity. They wish to reduce the consumption of

natural resources, limit carbon emissions, and restore ecosystem health on a global scale. The best example of this is the United Nations Framework Convention on Climate Change (UNFCCC). An analysis of the cleavage lines that exist in this complex series of negotiations reveals this North/South debate dramatically. The issue is that they can afford to become reflexive in the North, because they have reached population stability, and therefore have a reasonable standard of living per capita with which to achieve this objective. The developing countries of the South are not so fortunate. They are confronted with large population growth levels and increasingly complex problems that need to be solved, all of which needs to be done with an ever diminishing budget in human, financial, and environmental terms. In essence, most developing countries need to run very fast, simply in order to stand still! One therefore needs to understand this aspect more if one tries to understand the complexities of water and sustainable development from the perspective of a developing country, such as the Namibian case quoted in the beginning of this article.

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Biographical Sketch

Anthony Turton is the Head of the African Water Issues Research Unit (AWIRU) at the Centre for International Political Studies (CIPS), Pretoria University. Mr. Turton is a political scientist by training with a specialist focus on water and aquatic ecosystems. An active participant in various international water-sector fora, Mr. Turton is a member of Pugwash, the Water Institute of Southern Africa (WISA), the Coordinating Committee for Water Ecosystem Research (CCWER) at the South African Water Research Commission, the South African Institute of International Affairs (SAIIA), the Southern African Society of Aquatic Sciences (SASAQS), the International Union of Anthropological and Ethnological Sciences (IUAES) and the Professional Association of Dive Instructors (PADI). Mr. Turton is currently completing a D.Phil. degree at Pretoria University on the political determinants of regime creation in various Southern African international river basins.