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The Impact of Water Scarcity on the World's Future: An Analysis

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Abstract

The issue of water, or a lack of it, is predicted to have profound transformational effects on the world in the coming century. Robert Kaplan, Ann Baer, and Thomas Franklin Homer-Dixon provide us with common scenarios of this near future focusing on issues of conflict, control, manipulation, violence, and power. This article will review the scenarios presented by them and then present their findings within a sociological framework.

Introduction

In 1994, Robert Kaplan described the coming century as “an epoch of themeless juxtapositions, in which the classifactory grid of nation-states is going to be replaced by a jagged-pattern of city-states, shanty-states, nebulous and anarchic regionalism” (p. 60). This is a powerful and frightening picture of the universal social change Kaplan envisions for the twenty-first century. In particular, the issue of water (one of the necessary resources whose scarcity Kaplan specifically identifies as leading to this distressing future) and its transformational effects upon the world is of critical importance. As Michael Vlahos (quoted in Kaplan, 1994) has said, “We are not in charge of the environment and the world is not

following us. It is going in many directions.”

This article will attempt to explain this view of coming social change envisioned by such experts as Robert Kaplan, Ann Baer, and Thomas Franklin Homer-Dixon and will analyze them from two social change perspectives -- structural functional theory and conflict theory, and lastly, will provide comments as to which paradigm more completely explains this possible future.

Water's Importance to the World

The topic heading seems almost silly. Everyone knows the importance of water, don't they? Perhaps a different questions should rather be asked. Why focus solely on water; why not on the control of energy sources or on population problems or on air pollution? These too are environmental issues that deeply impact our changing world; ones which can't be ignored. Their complex interrelationships are surely what makes environmental stability such a complicated problem. These things are all true and interrelated. Let us then trace the problem of environmental degradation back to its initiating change -- modernization. This is not to say that each of these problems hasn't been seen in single regions unrelated to modernization. They have. But the world-wide, simultaneous occurrence of them at a single moment in history and the parallel widespread social disorganization which has occurred with it can definitely be traced to modernization.

So again, why water? Diener and Diener (1995) identify three requirements universally necessary for continued human existence: “meeting biological needs, coordinated social interaction, and survival and welfare needs of groups” (p. 276). Analyzing all three of these elements and their relationship to modernization would be a life-time project. Instead, then, consider just the first of the Dieners' universal requirements -- biological needs -- and limit that still overly broad topic to its most basic element -- water. Human beings also need adequate food supplies

and clean air, but it can be argued that these other items, regardless of their importance, are not as basic to survival as the need for water. The lack of nothing else, other than a total absence of air, will so certainly and rapidly lead an individual (and perhaps a whole society) to death.

Human society does not just have a need for water in general; it has a specific need for clean and desalinized water. How much does an individual need? Opinions vary, but Baer (1996) identifies three levels of scarcity: stress -- less than 1700 m³ per year; relative scarcity -- less than 1000 m³ per year, and absolute scarcity -- less than 500 m³ per year. Using this categorization, Baer analyzed the sixty countries with the most serious water problems and found that in 1990 forty were at stress levels, eight were at a state of relative scarcity, and twelve at absolute scarcity. Baer projects that by 2050 this picture will be vastly different and with more serious consequences. Of these sixty countries, seventeen will be at a level of water-related stress, twenty will suffer from relative deprivation, and twenty-three countries will be in a state of absolute scarcity.

Where are these countries located that are projected to be in such dire straits? They are mostly Third World countries found in the Near and Middle East, Africa, South America, and the Far East. Those ten countries projected to be suffering the most by 2050 are Djibouti, Kuwait, Qatar, Malta, Saudi Arabia, Jordan, Bahrain, Yemen, the Arab Emirates, and Barbados. When one looks at the list, issues of global conflict (like the one in which the United States has recently been involved with Iraq) take on a whole different perspective. Iraq is not itself on the list, but almost all of its neighbors are. Turkey is the only one of the countries with which Iraq shares a border (including Iran, Kuwait, Saudi Arabia, Jordan, and Syria) that doesn't have a serious projected water problem. Iraq may be poor in many areas, but compared to its neighbors, it is water wealthy. As water scarcity increases, the

possibility of its use as leverage in the region is, unfortunately, a reasonable conclusion to draw and a concern for the world community. Perhaps this most recent Middle East crisis is about much more than just a US vs. Iraq standoff.

How does North America fare in this picture? Homer-Dixon (1993) gives the per capita availability of water for the United States in 1990 as 9,940 m³; 109,389 m³ for Canada. By 2025, the United States will have dropped to 8,260 m³ and Canada to 90,880 m³, numbers that hardly indicate the same serious problem with water as faced by those countries identified by Baer. Granted, the availability of water is not evenly spread across North America. Places like the Southwest US are already facing severe water shortages; however, the economic and technological advantages of the Western world (and particularly the United States) would seem to give it an edge in solving these problems before it self-destructs, a luxury often not afforded to many developing countries.

Water, of course, is not only needed for drinking; its impact is felt in many other areas of human life. It also provides the opportunity to develop sanitation systems, critical to reducing disease, a serious problem in water-deprived areas. Baer advises that the World Health Organization has linked malaria, cholera, typhoid, dysentery, and poliomyelitis (among other illnesses) to dirty water and that 14 million children under five die an early death each year due to these diseases. In addition, economic development of any kind -- industrial, agricultural, tourism -- also requires water, and a lack of water will lead to a lack of opportunities in these areas. How does a community run a factory without water; how does a farmer irrigate without water, how does a country attract tourists without water for their baths, food,

swimming pools, and golf courses?¹

What has caused this problem? According to Baer, there has been an explosive global increase in the consumption of water since the beginning of the century, mainly as the result of two interconnected trends -- the quadrupling of the world's population and a severe increase in per capita consumption of water. In 1990, the world's population was at 1.6 billion people, and it is predicted to reach 6.2 billion people by the year 2000 with per capita levels of consumption rising from an average annual use of 400 m³ in 1940 to 800 m³ by 1990. Of course, levels of usage vary globally, and it is probably no surprise that according to Baer, the United States' level of consumption is much higher than most other countries worldwide with its use of 700 liters a day per person. To make these numbers more easily visualized, this is a world where three out of every four people live without adequate or safe water (Vago, 1996).

What Lies in Our Future?

Environmental crises and shortages of resources such as oil, land, and clean air and water are not unique to the modern world. Human society has faced both natural (floods, earthquakes, famines) and man-made (exhaustion of lands, deforestation, pollution) ecological disasters, but the impact of modernization has created a situation where the danger is perhaps more severe than these historical difficulties; today our world suffers from what Szell (1994) calls the "systematic organization" of environmental exploitation. Single nations are not alone at risk; the whole world

¹ Apparently the Southwest has been experimenting with golf courses that integrate the native environment -- cactus, rocks, etc. This is a good example of how advantaged countries can take a negative and switch it to a positive, something not usually available to developing countries.

is. A selected review of literature written by sociologists, economists, political scientists, and journalists within the last fifteen to twenty years concerning what the first half of the twenty-first century holds for the world contains some fairly consistent predictions. As always, these predictions are merely indications of what they see as the *possible* future if changes aren't soon made.

Three experts in this area: Thomas Franklin Homer-Dixon, the coordinator of the Peace and Conflict Studies Program at the University of Toronto and an assistant professor in the Department of Political Science; Ann Baer, a participant in UNESCO's International Commission on Population and Quality of Life, and Robert Kaplan, a contributing editor for *The Atlantic Monthly* and author of *The Ends of the Earth: A Journey to the Frontiers of Anarchy* provide a balanced perspective (academic, governmental, and popular points of view) on the issue of the consequences of water scarcity for global security.

Thomas Franklin Homer-Dixon

Homer-Dixon (1993) identifies water problems due to both scarcity and pollution as a principal resource issue of the twenty-first century. In "On the Threshold: Environmental Changes as Causes of Acute Conflict" (1991), he specifies the ways in which environmental change may shift the regional and global balances of power that presently exist, potentially creating enough instability and conflict to lead to war. The instability, which Homer-Dixon anticipates will first impact developing countries, will be as a result of four interrelated social effects: (1) a reduction in agricultural production, (2) economic decline, (3) the displacement of populations, and (4) the disruption of institutions and normal social relations. While other environmental problems can also result in these difficulties, it is easy to understand how a lack of usable water (or any water at all) can by itself also be solely responsible for them.

While Homer-Dixon admits he does not see a rigidly deterministic causal link between these four social effects and conflict, he does recognize a strong tie between a country's inability to handle damaging environmental issues and the resulting social stress it suffers. In his opinion, this stress can create chronic protest and violence, potentially leading to the establishment of authoritarian regimes which resort to a violation of human rights to maintain control or to the fragmentation of nation-states with the rising up of regions under the authority of individual renegade warlords who rule by their ability to control access to necessary resources. Homer-Dixon believes "as environmental degradation proceeds, the size of the social disruption will increase" (p. 116).

Ann Baer

Baer (1996) has reached many of the same conclusions drawn by Homer-Dixon. "[W]ater is becoming a resource of greater strategic importance than oil in as much as it satisfies vital everyday requirements as well as the production of energy. The issue is no longer simply one of transport, heating or comfort but of survival" (p. 285). Although she doesn't specifically predict a future rift by water-related conflict, she does identify the manner in which water can initiate conflict and how it can (and has been) used as a weapon.

For example, she explains how rivers can be restricted by upstream countries, leaving those downstream without adequate drinking water or enough for other vital processes such as industry. This has already been an issue among African countries using water from the Nile and among Middle Eastern and Near Eastern countries dependent on the Tigris, Euphrates, Indus, and Jordan Rivers. Baer indicates that in the Middle East, there is one country with great strategic strength related to water -- Turkey. Turkey has truly abundant water resources, and this water wealth has already been a source of great conflict in the region and may continue to be

so. Others reinforce this same idea (Gleick, Yolles & Hatami, 1994; Kaplan, 1994, 1996; Morris, 1997).

Baer also sees water as a potential biological weapon. In addition to cutting off water to downstream populations and creating floods to damage property and kill enemies, the practice of introducing poisonous chemicals deliberately during times of conflict and pollution caused by industrial, agricultural, and sanitation processes can all have disastrous effects. As happened during the Gulf War, water can also be polluted due to deliberately created oil slicks or by acid rain produced from huge blazes (like the Kuwaiti oil well fires).

This same problem is presently suffered by Indonesia as a result of its severe fires in 1997. It is worthwhile to consider this country's ecological disaster through the same lens that one analyzes the recent fall from power of Suharto, the Indonesian dictator who was forced from his position by widespread unrest and violence. While there are many factors which contributed to the demand for his removal from office (fiscal irresponsibility, nepotism, criminal behavior, etc.), there is reason to suspect that, at least in part, his inability to deal with his country's dangerous environmental crisis was certainly part of what catalyzed Suharto's fall from power.

Robert Kaplan

Kaplan's (1994, 1996) experiences are less academic than those of the other two experts. He has spent his career traveling (in Africa, the Middle and Near East, the Balkans, and the Far East) and writing about those areas of the world where conflict is endemic. Calling what he has seen a potential "second Cold War ... a protracted struggle between ourselves and the demons of crime, population pressure, environmental degradation, disease and culture conflict" (1996: 10), he points to many of the same problems highlighted by the other two -- pollution, upstream

domination of resources, etc., explaining that he believes there is a worldwide trend towards anarchy, and these are indicators of that trend. His opinion has a germ of its origin in the work of Karl Marx. Referring to an obscure article published by Marx in the *New York Tribune* in 1853, Kaplan ties the issue of water to this coming anarchy when he highlights the connection he believes Marx drew between the emergence of authoritarian governments and the need to establish a large system of waterworks leading to Oriental but not to Occidental despotism. “This prime necessity of an economical and common use of water, which in the Occident, drove private enterprise to voluntary association ... necessitated, in the Orient where civilisation was too low and the territorial extent too vast to call upon voluntary associations, the interference of the centralising power of Government” (1996: 93). According to Marx, this different approach to the issue of water has condemned the “Orient” to its present circumstances.

In parts of Africa these days, Kaplan sees a Malthusian “pre-modern formlessness” where nature is unchecked and conflict leads to wars like were last seen in medieval Europe prior to the formation of nation-states. This instability (which he sees intensifying in the next fifty years) will spread and overtake the world as a result of its four elements: (1) environmental scarcity, (2) the clash of cultural and racial groups, (3) a remapping of the world into power regions rather than nation-states, and (4) new ways of making war.

Kaplan (like Baer) sees one country, Turkey, as demonstrating great strength in the face of this impending meltdown, a strength that may, in his opinion, allow it once again to dominate the region as it did when it led the Ottoman Empire. What is it about Turkey that seems to be holding it together? First, of course, it has huge water reserves. Also, it has been able to develop a secular state at the same time 99 percent of its population is Muslim; unlike what is seen in other Islamic

countries, the two seem able to coexist successfully. Crime and alcoholism are almost non-existent, and poverty and illiteracy are at much lower levels than one finds elsewhere in the Middle East and Africa. This strongly homogenous population with its successful social organization has created a climate of social solidarity in which religious extremists have been unable to gain a foothold, certainly not the case in other parts of the world. The difficulties facing Turkey are its water-poor neighbors and its own Kurdish minority, the same Kurdish minority against which Saddam Hussein has already used water as a weapon. Turkey's position of power could lead it to play a pivotal role in Middle Eastern conflict.

Common Themes

What are the common elements seen in the analyses of these three experts concerning changes that will impact the world related to water in the next fifty years? All agree that water scarcity is going to continue, and the availability of water will not be evenly distributed. This situation will lead to an increasing amount of conflict in the world, pitting the water wealthy against the water poor. Water and those who can control and manipulate its use will be the determining factors in who has power and who does not. This situation will most likely first impact the developing world.

A Sociological Analysis

How would sociologists explain this possible future? The explanation of this, of course, depends on one's theoretical perspective. Structural functionalism and conflict theory both effectively provide analyses of how and why these massive changes predicted by Homer-Dixon, Baer, and Kaplan can occur.

A Structural Functional Explanation

The overriding idea which defines structural functionalism is that of equilibrium or balance. From this perspective, society is like a huge organism or machine with many different parts. To function effectively, all parts of the system must be in balance. Changes within or outside the system can cause disequilibrium, and then changes must occur within the system to bring it back into balance or stress occurs. Failure to reestablish balance can lead to system damage resulting in a variety of problems including anomie, conflict, violence, etc.

When one applies this perspective to the issue of water scarcity, how does it explain why there is conflict, violence, the breakdown of nation-states, and anarchy, the scenario presented by these three experts? The work of Emile Durkheim can provide us with one rationale for this situation.

In a society functioning in equilibrium, the institutions of that society serve certain specific functions -- protection, education, economics, socialization, etc. -- providing social order and social solidarity. When huge amounts of change occur, as is happening with water scarcity, social order is disordered. The result -- alienation and severe societal stress. A clue to the resulting conflict is given to us by Durkheim in a discussion not about environmental degradation but about the Dreyfuss affair. "When society undergoes suffering, it feels the need to find someone whom it can hold responsible for its sickness, on whom it can avenge its misfortunes" (Lukes 1972: 83 -- quotes in Ritzer). Although Durkheim was not speaking here of water scarcity, the concept holds true for a society suffering severe water deprivation equally as well; it turns and points the finger elsewhere -- Jordan points to Iraq, the Sudan to Egypt, the Southwest US to Southern California. The group in need closes ranks, preserving to the best of its ability its normative structure with other like citizens. These like citizens may not be those people with whom they once grouped in a nation-state. The grouping may be regional, religious,

familial, etc. Who will take the leadership role in this group? It makes sense that people will turn to whomever they can trust to gain them access to the critical water resources.

Durkheim would probably not be surprised at the picture Homer-Dixon, Baer, and Kaplan paint. He would more likely point to the situation and ask why is it that it surprises us? Is this not what happens in society when change occurs? Is it not just the normal progression in developing countries from mechanical to organic solidarity, a situation the Western world too went through centuries ago? Perhaps he would have a point. Is today so very much different than what must have occurred in the past? Do we now focus so much more attention on it only because it is painful for us to watch and experience and because we now have major institutions like the United Nations and a huge and organized mass media to bring it to our attention?

From a more modern structural functionalist perspective, an argument can also be made to describe environmental degradation (including water scarcity) as both a latent (or unintended) dysfunction related to modernization. If we accept Merton's definitions of manifest and latent functions and dysfunctions, environmental degradation certainly fits. For example, the development of practices to control the spread of disease has succeeded in extending the life span of many people in Third World countries. Controlling the disease was the manifest function of groups like the World Health Organization, extension of the life span a latent function. A latent dysfunction of this has been the overpopulation which has resulted in the overuse of available resources, one element leading to present and future situations of scarcity and degradation. In a Malthusian frame of mind, one could even say the system is bringing itself back into balance by reducing the unintended population increase through death. How does this relate to water? The manifest functions were many -- increase agricultural production, improve the economy, modernize,

etc. The incidence of water scarcity is then a latent dysfunction of these positive functions.

Ogburn's concept of cultural lag can also provide an explanation of the current situation (Vago, 1996). Water scarcity can be viewed simply as a maladjustment to agricultural and industrial changes -- in other words, the material changes brought about by modernization. There has not yet been adequate corresponding changes in the nonmaterial culture; many developing countries have not yet bought into the idea of making technological advances with an eye toward environmental and social issues. Immediate survival still outweighs future problems.

Merton's modes of adaptation can also be broadly applied here and used to analyze the resulting conflict the three experts anticipate. If the goal is adequate water, and the normal means for accessing it don't exist, isn't using conflict to take the water and the subsequent remapping of the world merely an innovative technique for getting what society needs? While that explanation is a bit hardened, it also pragmatically approaches the issue.

Just from this very limited explanation, one can see here that the predictions of Homer-Dixon, Baer, and Kaplan concerning the next fifty years or so can be both predicted and explained and supported by applying a structural functional perspective.

A Conflict Explanation

Where structural functional theory looks to explain the world in terms of balance, conflict theory *never* expects to find it. From a conflict perspective, the world is about inequality and domination, and this inequality and domination inevitably results in conflict.

It is best to begin by looking at how Karl Marx would analyze this situation since his work has provided the foundation for modern conflict theory. From Marx's point of view, these changes are not at all surprising. "Without conflict, no progress:

this is the law which civilization has followed to the present day.” In fact, these changes are really not even water related; they are economic. What is happening is the building and reinforcing of that ever-increasing chasm between the owners of production who control the water resources and the workers who not only labor for the owners but who must also buy from them the water needed to live. This state of severe inequality will eventually result, according to Marx, in a revolution of labor against owners and the establishment of pure communism with an inevitable end to both change and conflict since the perfect society will have been achieved. This ideological view has, of course, not yet proven to be true anywhere in the world, but it serves as a basis, nonetheless, for some more modern conflict theorists who can perhaps better explain the situation.

Lewis Coser, like Marx, would not be at all surprised at the possible future describe by Homer-Dixon, Baer, and Kaplan. It is through conflict that Coser sees all social change occurring; harmony is not, in his opinion, the normal state of human society. A situation of inequality related to water will continue to exist, from Coser’s perspective, until the conflict becomes so intense that it stimulates the changes necessary to solve the problem. This analysis can perhaps be applied to the situation presently seen in Indonesia. Coser’s view of the social world would see these kinds of conflict as understandable and simply explained. He would also predict this same approach could be used in countless other situations, including issues related to water scarcity.

Ralf Dahrendorf, another conflict theorist, would look instead to the unequal distribution of water and the resulting conflict and identify its cause as an unequal distribution of *authority* related to water; those with water have authority, and those without water do not. This would inevitably lead to social conflict, in his opinion, because those groups without authority would not just sit back and accept their lot in life. A situation of

water scarcity is a highly charged and emotional one, and because of this, Dahrendorf would predict that the violence of the conflict would be intense. This is exactly what is envisioned by Homer-Dixon, Baer, and Kaplan. Additionally, a peaceful negotiated solution to the problem would probably not be the first choice of the subordinate group, because water scarcity does not allow the luxury of extended negotiation.

The conflict perspective, then, also provides us with a picture that logically explains and supports the world predicted by the three experts, particularly Kaplan's (1996) view of "an epoch of themeless juxtapositions, in which the classificatory grid of nation-states is going to be replaced by a jagged-pattern of city-states, shanty-states, nebulous and anarchic regionalism" (p. 60). The big question to be answered in this credible future is, "Who can dominate whom and take control of the water?"

Which Paradigm Fits Best?

As the applicability of both structural functional and conflict explanations demonstrate, there is almost never a single paradigm which can completely explain social phenomena. In fact, the strongest explanation can perhaps be found in a combination of ideas. For example, there is particular merit to Ogburn's idea of cultural lag. Technological changes have created hundreds, probably thousands, of situations world wide where the nonmaterial world is trying to catch up with the every changing material culture. Modernization is occurring at an ever more rapid rate, but the individuals impacted by these changes and the societies of which they are a part are taking a bit longer to catch up. On the other hand, the conflict perspective also has merit. Coser strongly argues that societies do not exist in harmony, and Dahrendorf's picture of violent conflict also succeeds in explaining the possibility of water-related war in the next century. Both paradigms can work well together to provide a strong explanation

of the frightening future envisioned by Thomas Franklin Homer-Dixon, Ann Baer, and Robert Kaplan, one where, as Marx explained so succinctly, "Without conflict, [there is] no progress."

References

- Baer, Ann. 1996. "Not Enough Water to Go Round?" *International Social Science Journal*. 48: 277-292.
- Diener, Ed and Carol Diener. 1995. "The Wealth of Nations Revisited: Income and Quality of Life." *Social Indicators Research* 36: 275-286.
- Gleick, Peter H., Peter Yolles, and Haleh Hatami. 1994 "Water, War, and Peace in the Middle East." *Environment*. 36" 6-23.
- Homer-Dixon, Thomas F. 1993. *Environmental Scarcity and Global Security*. New York: Foreign Policy Association.
- . 1991. "On the Threshold: Environmental Changes as Causes of Acute Conflict." *International Security*. 16: 76-116.
- Kaplan, Robert D. 1994. "The Coming Anarchy: How Scarcity, Overpopulation, Tribalism, and Disease Are Rapidly Destroying the Social Fabric of Our Planet," *The Atlantic Monthly*. 273: 44-63.
- . 1996 *The Ends of the Earth: A Journey to the Frontiers of Anarchy*. New York: Vintage Books.
- Lipovsky, Igor. 1995. "The Deterioration of the Ecological Situation in Central Asia: Causes and Possible Consequences." *Europe Asia Studies*. 47: 1109-1123.
- Morris, Mary E. 1997. "Water and Conflict in the Middle East: Threats and Opportunities." *Studies in Conflict and Terrorism*. 20: 1-13.
- Ritzer, George. 1996. *Sociological Theory*. New York: McGraw Hill.

- Szell, Gyorgy. 1994. "Technology, Production, Consumption, and the Environment." *International Social Science Journal*. 46: 213-226.
- Vago, Stephen. 1996. *Social Change*. Upper Saddle River, NJ: Prentice Hall.
- Wallace, Ruth A. & Alison Wolf. 1995. *Contemporary Sociological Theory: Continuing the Classical Tradition*. Englewood Cliffs, NJ: Prentice Hall.
- Yeung, Yue man. 1997. "Geography in the Age of Mega-Cities." *International Social Science Journal*. 151: 91-104.