

2011

# Water Resource Distribution: Neoliberal Versus a Social Provisioning Approach

Laura Dotson

*Wright State University - Main Campus*

Follow this and additional works at: [https://corescholar.libraries.wright.edu/econ\\_student](https://corescholar.libraries.wright.edu/econ_student)



Part of the [Business Commons](#), and the [Economics Commons](#)

---

## Repository Citation

Dotson, L. (2011). Water Resource Distribution: Neoliberal Versus a Social Provisioning Approach. .  
[https://corescholar.libraries.wright.edu/econ\\_student/10](https://corescholar.libraries.wright.edu/econ_student/10)

This Master's Culminating Experience is brought to you for free and open access by the Economics at CORE Scholar. It has been accepted for inclusion in Economics Student Publications by an authorized administrator of CORE Scholar. For more information, please contact [corescholar@www.libraries.wright.edu](mailto:corescholar@www.libraries.wright.edu), [library-corescholar@wright.edu](mailto:library-corescholar@wright.edu).

**Water Resource Distribution:  
Neoliberal Versus A Social Provisioning Approach**

Laura Dotson

**Capstone Report Series 2010-2011  
Department of Economics**

**RAJ SOIN**  

---

**College of Business**  

---

**WRIGHT STATE**  
*UNIVERSITY*

**WATER RESOURCE DISTRIBUTION:  
NEOLIBERAL VERSUS A SOCIAL PROVISIONING APPROACH**

A capstone project submitted in partial fulfillment of  
the requirements for the degree of  
Master of Science in Social and Applied Economics

By

LAURA DOTSON  
B.S. Business Economics, Wright State University, 2009

2011  
Wright State University

**WRIGHT STATE UNIVERSITY**  
**SCHOOL OF GRADUATE STUDIES**

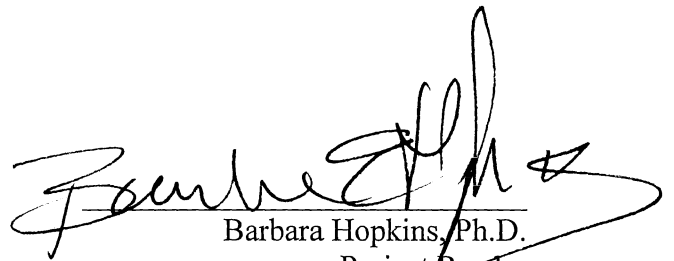
September 13, 2011

I HEREBY RECOMMEND THAT THE CAPSTONE REPORT PREPARED UNDER THE SUPERVISION BY Zdravka Todorova ENTITLED Water Resource Distribution: Neoliberal Versus A Social Provisioning Approach BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF Master of Science in Social and Applied Economics.

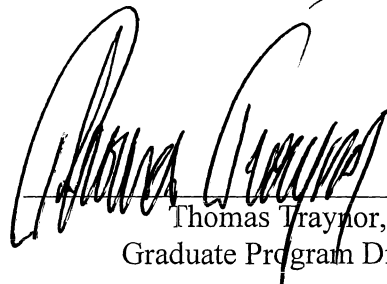
Committee on  
Final Examination



Zdravka Todorova, Ph.D.  
Project Advisor



Barbara Hopkins, Ph.D.  
Project Reader



Thomas Traynor, Ph.D.  
Graduate Program Director

## ABSTRACT

Dotson, Laura. M.S. Social and Applied Economics, Department of Economics, Wright State University, 2011. Water Resource Distribution: Neoliberal Versus A Social Provisioning Approach.

The purpose of this research is to examine how privatization of water resources has created social inequalities and environmental degradation on an international scale by understanding the ways in which water has become a market commodity, and how water resources are managed within a private framework versus a public framework. Two frameworks will be compared: neoliberal policy and the social provisioning approach to managing water resources. It is argued that social provisioning ought to be the focus of policy formulation so as to diminish the degree in which social inequalities and environmental degradation are generated by privatization. As a result, the thesis insists upon policy changes that would enact stricter regulation of natural resources in order to obtain greater levels of ecological sustainability and a more equitable distribution of water resources. These changes are based on changes of economic analysis and policy formulation, and provide the basis of ecological democracy.

## TABLE OF CONTENTS

	Page
ABSTRACT.....	iii
LIST OF TABLES.....	v
ACKNOWLEDGEMENT.....	vi
I. INTRODUCTION.....	1
II. SOCIAL COSTS.....	3
III. NEOLIBERAL POLICY.....	5
1. Misconception of Tragedy of the Commons.....	10
2. Privatization of Water.....	13
3. Commercialization of Water.....	19
4. Growth and the Environmental Kuznets Curve.....	25
IV. SOCIAL PROVISIONING APPROACH.....	34
1. Nonwage and Caring Labor.....	35
2. Measure of Success.....	36
3. Emphasis on Process.....	38
4. Ethical Judgments.....	41
5. Inequality Impact.....	42
V. CONCLUSION AND POLICY IMPLICATIONS.....	46
APPENDIX.....	50
REFERENCES.....	56

## LIST OF TABLES

	Page
1. Table 1. Prices and investment in installations from fully private to fully public operations in Grenoble from 1990 to 2002.....	50
2. Table 2. Annual increase of bottled water consumption 1999-2001 per region.....	51
3. Table 3. Proportion of the population spending half an hour or less or more than half an hour to collect water from an improved source, or using water from an improved source in Sub-Saharan Africa.....	52
4. Table 4. Regional distribution of the 884 million people not using improved drinking water sources in 2008, population (million).....	53
5. Table 5. Urban and rural population without improved sources of drinking water worldwide, 2008.....	54
6. Table 6. Proportion of the population using drinking water piped on premises, other improved drinking water source or an unimproved source, by wealth quintile, Sub-Saharan Africa.....	55

## ACKNOWLEDGMENT

*I would like to thank Dr. Zdravka Todorova for her instruction, insight, and guidance in the creation of this capstone project. I would also like to extend my appreciation to Dr. Barbara Hopkins for her insight and assistance as a reader as well.*



## I. INTRODUCTION

Water is the essential necessity for the continuation of life. This elementary assertion is not a new or radical perception, and has been the strategic argument for environmental activists and communities alike that have participated in the struggle for equitable and sustainable water resource rights. The intent to dominate water resources can be dated back to the beginning of early civilization and is still a causative factor in many international disputes around the world today (Shiva, 2002, p. 69) as water resources are becoming more scarce in many regions. Water is not only seen as essential for sustaining life, it is also seen as a means of generating profit. At the turn of the current century, the World Bank estimated the potential water market at one trillion dollars, and water was expected to be one of the most profitable industry for investors; this is in juxtaposition to water historically being considered a public good and given away free to citizens in various countries (Shiva, 2002, p. 101). Privatization of water resources can be directly linked to globalization and the rise of neoliberalism (Nadal, 2011). Resources that were once managed by communities through a commons system are now owned by global corporations operating under the flag of free market ideals.

Such commodification and privatization of water resources, along with the degradation of other natural resources, has resulted in unprecedented levels of water

scarcity, pollution, destruction of the natural environment, and inequitable distribution of natural water resources. This is in conjunction with increasing levels of international conflicts and hostilities between nations who must share access to scarce water resources. Entire communities have also been displaced from the mining, deforestation, agriculture activities, and dam building projects of private firms that reroute, use up, or damage natural water sources such as rivers, streams, lakes, and underground aquifers (Shiva, 2002, p. 63).

This research will review a diverse collection of scientific analyses and case studies in order to convey the necessity of directing attention towards the ecological issue of water shortages and the inequitable allocation of water resources resulting from privatization. Increasing water degradation resulting from mining, deforestation, dam building, and agricultural activities are discussed as they pertain to social cost shifting, along with raising awareness as to the impure practices and excessive pollution generated from bottled water. First, however, it will be necessary to clarify the history of treating water as a commodity for profit motives, versus water as a human right, which is understood in terms of the right to life and therefore a right to access given the nature of water as an essential need for subsistence (Anand, 2007, p. 512). Such a historical view enables an explanation of neoliberal policy and the privatization of natural resources, specifically the introduction of water as a commodity. Secondly, the thesis delineates the framework of social provisioning and demonstrates how this approach can benefit social equality and ecological sustainability of water resources with the support of various case studies. The thesis concludes with a discussion of the need for change in the ways in which water resources should be managed.

## II. SOCIAL COSTS

It is essential to understand how social costs interlink with the theories of neoliberalism and social provisioning. Often the term social cost is used interchangeably with the term externality. An externality is defined as a consequence suffered by a third party from the actions generated by another party, and the focus is on a particular incident. Social costs are more than incidents, however, and are not exceptional; instead they are pervasive and systematic (Swaney & Evers, 1989, p. 8). Social costs, therefore, are understood to be much more detrimental to over-all social well-being. The concept of social cost and cost shifting is employed by K. William Kapp in his effort to understand how private firms externalize their costs onto society outside of the standard production and distribution activities. “To Kapp, ‘social costs’ refer to much more than third-party spill-over effects in an institution-static, partial equilibrium setting. Social costs result directly and systematically from the market system” (Swaney & Evers, 1989, p. 9). While the concept of an externality suggests that business enterprises may incidentally generate negative effects, social costs unveil deeper problems that are not only more widespread and persistent, but also bring potentially irreversible consequences, such as ecological disruptions.

Kapp also suggests that social costs arise from within the incentive structure of the economic system, and that private firms may use cost shifting in their pursuit of

profits. The neoliberal explanation based on neoclassical theory is that greater profits will lead to socially beneficial outcomes such as higher employment, lower prices, and greater levels of innovation. However, social costs are the direct effect of cost shifting by the firm onto citizens and consumers, and do not typically generate the socially beneficial outcomes assumed by neoliberal expectations. Instead, society pays directly and indirectly for damages generated by the cost shifting activities. Cost shifting generated by the firm can result in pollution and irreparable destruction to the environment, and can create greater inequality among citizens and a loss to society. Consequently, in order to portray the negative effects that privatization and neoliberal policies can have on societies, it is much more accurate to use the term social costs in order to expose the extent to which neoliberal policies can harm social well-being.

### **III. NEOLIBERAL POLICY**

Neoliberalism is grounded in a specific body of economic theory- neoclassical economics, and supports a laissez-fairé ideology. The ideals of neoliberalism have been implemented globally through the structural adjustment policies (SAP) instituted by international financial institutions such as the International Monetary Fund (IMF) and the World Bank (WB), as well as by global trade agreements established by the World Trade Organization (WTO). Structural adjustment policy conditions instituted by the IMF and the World Bank require that a developing nation must adhere to certain guidelines in order to receive funding for emergency economic development support. The policy requirements sanctioned for these programs include an extensive list of macroeconomic changes that are designed to create a stable economy. These policies can include balancing the federal budget, eliminating price controls and subsidies for industries and social welfare programs, selling natural resources to private investors, increasing exports through trade liberalization, devaluation of the currency to attract new investment, and implementing a stable form of governance (Reed, 1992, pp. 26-27). Unfortunately, this is at the cost of increasing socio-economic and ecological fragility.

In a neoliberal framework, private property rights are a crucial form of regulation that contributes to market efficiency and social stability. “According to theory, the

neoliberal state should favor strong individual property rights, the rule of law, and the institutions of freely functioning markets and free trade” (Harvey, 2005, p. 64). Freely functioning markets and privatization of state owned assets have become a prominent issue for economists, social activists, and politicians alike and not all agree with the assertion that private firms always create markets that are more efficient. While privatizing resources can bring financial relief for nations trying to balance their budgets, it has been documented that privatization of state assets has created greater inequality among citizens and induced higher levels of poverty (Stiglitz, 2003, p. 97). There has also been documentation of cases in which such privatization has been the direct cause of environmental degradation resulting from commercial activity, and subsequently created less efficient and sustainable methods of extracting, distributing and maintaining long-run use of natural resources (Reed, 1992, p. 142).

A particular concern is the selling of state owned resources to private investors. This is done on the insistence for fiscal austerity; cutting back on government expenditures and subsidy programs for the purpose of balanced budgets. Such fiscal austerity is anticipated to be a display of financial stability that will increasingly attract foreign investment. A problem with this austerity, however, is the negative effect it has on programs dealing with social and environmental fragility, as provisions that deal with these issues are assumed to stifle economic growth and are therefore discounted. Because of this, environmental regulations are relaxed in anticipation of faster economic growth, and natural resources are sold to private investors for the purpose of generating reserves and obtaining a balanced budget. Granting private access to a lake or river and allowing corporations to use land for mining, agriculture, or other forms of development is

consequently conducted in the absence of regulation, and without long-term considerations of ecological sustainability. This has led to the degradation of environmental resources such as streams, lakes and underground aquifers, as well as result in social disruption to local communities (Shiva, 2002, p. 61). While environmental degradation is perceived as necessary for increasing economic growth, most if not all of the benefits derived from the growth typically benefit the corporations, while surrounding local communities absorb the long-run costs resulting from the ecological degradation. Although commercial activity is the cause of the ecological destruction, corporations are not always held responsible for restoring the damages that they create. This results in the cost shifting to local communities who depend on the natural resources for their livelihood and for subsistence needs, as they must travel farther to access water sources for drinking or have to rely on more expensive irrigation techniques for farming once the commercial activity has degraded the local water sources.

Under public ownership, access to water is considered a basic human right and the goal of the state should be to ensure that all citizens have sufficient access. Neoliberalism however, has created an atmosphere of intense competition among nations for exporting resources and attracting private investment, a race to the bottom driven entirely by considerations for maximizing profits, and without concerns for the social costs that it generates. This has led to the commodification of water, which is justified by the assumption that resources will be managed more efficiently by private firms subject to profit motive, disregarding any social costs. Privatization is expected to allocate water resources to its most productive uses, and private corporations are assumed much more efficient than government entities at assessing an accurate market value for natural

resources. Privatization is also expected to maintain investment in infrastructure more so than under government management. Unfortunately, privatization- especially in water resources- typically conforms into a monopoly instead of a competitive system, which results in price gouging and therefore limiting distribution to people with lower incomes, and does not guarantee better maintenance of infrastructure. Part of the neoliberal justification for privatization is to create economic growth that will eventually allow for the replacement of industries that were once under government subsidy programs or were publicly owned resources. However, the key word within this framework is the term eventually. The focus on export-oriented growth and privatization has eroded and precluded programs that are providers of social safety nets. While arguably growth could eventually create a replacement for government welfare and subsidy programs, it is the lack of immediate availability of these programs that creates growing inequality, poverty, and a downward spiral effect that results in even less stability and growth in the long-run as unemployment and social and environmental fragility rise.

When markets are first liberalized, developing nations typically rely heavily on their natural resources and agricultural industries, and this has been shown to cause irreversible environmental degradation (Reed, 1992, p.142). Such a heavy over-reliance on natural resources does not create an atmosphere conducive to efficient resource use. In the neoliberal framework, liberalization of the markets should also be done quickly and thoroughly in order to attract foreign investment. While many developed countries such as the United States endorse free market capitalism and use their influence at the IMF to promote these ideals, they do not practice what is prescribed. History has shown that dramatic increases in foreign investment may not be the best solution, and countries such



as the United States who have not followed this policy actually experience stronger long-run growth (Stiglitz, 2003, p. 48). While foreign investment policies are enforced as a means of promoting a more stable market, it can actually create greater instability. This is due to globalization and the out-sourcing of jobs, which increases poverty as people are displaced from their jobs and can also no longer rely on a market of heavily subsidized goods. This is in conjunction with the concern of foreign investment as a non-permanent solution, as investors are likely to pull their money out of the country once they have made rapid gains (Stiglitz, 2003, pp. 65).

Globalization, in many cases, has also rendered devastation on smaller, locally established businesses as they cannot compete with the economies of scale or the protection sought by corporations from developed nations. These local business owners are eventually bankrupt from their respective industries and left without any means of supporting themselves or their communities. Increases in poverty levels are actually anticipated at first, and even deemed necessary, according to policy makers at the IMF as a short run cost of transitioning towards a free market system. This is presumed as a logical progression by trick-down economics, assuming benefits from growth will eventually trick-down to the poor, and justifies policies that benefit economic growth but not necessarily social welfare (Stiglitz, 2003, p. 78).

When such foreign investment policies are sought, it is likely that the state will be forced to sell-off its natural resources at “fire-sale” prices in order to entice international investors. This under-valuation of the assets, however, can leave a state hardly better off financially than its current condition. It can also open up a market to speculation and “hot money”, which will move quickly into a struggling economy and then extract funds just

as quickly out by selling the asset back to the state once its value has appreciated (Stiglitz, 2003, pp. 65-66). This arrangement of foreign investment can actually generate greater instability within a developing nation and further push its economy into a downward spiral of debt and a stagnation of growth. When this happens, infrastructure within the state is usually left to degrade and citizens are left without access to many goods and services, such as adequate water quality management, as is the case in India (Shiva, 2002); Belize (Mustafa & Reeder, 2009); and various regions in Latin America (Nadal, 2011). Thus, neoliberal policies have shown to be destructive to already struggling economics, and can also cause devastation to the social well-being of local communities as the costs associated with environmental destruction is shifted onto society as access to natural resources become more difficult.

### **1. Misconception of Tragedy of the Commons**

There are four basic types of property regimes; private property, public property, common property, and open access. It is important to understand the fundamental differences between these types of property regimes. While common property is co-owned by a group of persons, public property is owned by a government entity for public use, private property is owned by an individual, and open access is not considered as property and is not owned or managed by any force at all (Vatn, 2005, p. 256). Even before ownership rights were assigned, local communities commonly managed resources such as land and water under a common property regime. Note the term used is managed as opposed to owned. Public or private ownership of natural resources was not typically

practiced by indigenous people in places such as India, for example, rather whole communities managed the use, quality, and distribution of their resources. Common property practices, however, have been under scrutiny by critics who believe such management is detrimental to the environment.

The concept of the tragedy of the commons is brought to attention by Garrett Hardin (1968) in his analysis of population growth and the finite supply of natural resources. His theory that humans will logically act in ways that will maximize their own utility will be the reason for their demise. His example was that of a common grazing area, shared by several herdsman and their cattle. Problems do not arise at first in the sharing of this resource because of disease, poaching, and tribal wars. However once a state of social stability is reached and there are no natural threats to the population, the herdsman attempting to maximize their individual utility by adding one or more head of cattle will ultimately lead to overgrazing and the degradation of the land. Hardin's argument is that the "freedom" in which the commons area promoted was not sustainable in a world of finite resources (Hardin, 1968, p. 1244).

However, what Hardin may have been referring to was actually the tragedy of open access; a resource that is not considered as property and does not have the management to discourage the freedoms that Hardin implied. Common property regimes, alternatively, are widely practiced in developing nations, and do not operate within a lawless, self-maximizing system as has been alleged. Instead, local communities are able to manage their resources in ways that are conducive to long-run environmental sustainability and equitable access, as they are not solely motivated by profit maximizing (Shiva, 2002, p. 30). This is made possible because common property regimes do in fact

regulate the use and distribution of resource rights as the collective action of a group instead of the individual. Therefore, while the tragedy of the commons is the result of unmanaged resources, common property regimes are not the unmanaged resources they are assumed to be.

Concerning democracy and common property, James Swaney (2003) discussed the effects of such enclosure of common areas; “The destruction of common-property regimes is part of the capitalist development process. Especially in North America, capitalism’s success is to a significant degree attributable to the conversion of common property into open access so that resources could be overexploited and degraded without holding anyone accountable for the costs” (Swaney, 2003, p. 285). The promotion of free market capitalism, unregulated, was therefore seen as detrimental to the environment as private commercial activities were not held accountable for the destruction that was caused to environmental resources. Therefore, citizens within the surrounding areas had to absorb the long-run costs associated with the degradation as private corporations were not held accountable. Thus, given that the nature of water is necessary for life and involves costly investment in infrastructure for distribution, it is understandable that public or common ownership may be better suited than private ownership in order to ensure equitable distribution and better control over potential exploitation of the resource. It is also probable that those whose lives depend most heavily on their access to water resources are likely to have a superior understanding of the most sustainable methods of maintaining such a resource (Shiva, 2002, p. 108). In theory, public-private partnerships may also be a solution to ensure adequate regulation and distribution control of water. However, there is evidence to support this will not always ensure optimal social

outcomes, such as in the case of Grenoble, France where a private corporation shifted its costs of operating the water utility system onto citizens with unethical practices, higher prices, and by allowing the infrastructure to degrade (Weizsacker, Young, Finger, & Beisheim, 2005, p. 23). Water management under public-private partnerships will need well-enforced regulation to accompany such management to ensure ethical practices, and prevent unnecessary costs subsequently being shifted onto citizens and the state.

## **2. Privatization of Water**

As discussed, there is an increasing movement towards the privatization of water resources in both developed and developing nations across the world. This movement can be attributed to several factors including the concern for fiscal austerity; the initiative to enforce laissez-fairé capitalism by the IMF, WB, and WTO with the use of structural adjustment policies; and the global drive towards commercialization of natural resources. It is essential, in this time of transition, to understand the social costs of privatization in terms of social well-being and environmental degradation.

During the 1990s, the World Bank and the IMF supported the conversion of publicly owned water resources towards private ownership and management due to an interpretation in the definition of water as a commodity. Multinational corporations took advantage of the fresh water crisis in the 1990s as a means of accumulating water resources from nations that could no longer afford to manage the operation of the distribution of their water resources (Robbins, 2003, p. 1073). However, between the years 2000 to 2003, an unexpected and significant drop in private ownership of water

resources resulted due to “national economic crises, social protest, and the difficulties of extracting profit delivering water to indigent consumers” (Robbins, 2003, p.1073).

Robbins found that privatizing the water resources in the effort to obtain efficiency and relieve the burden of cost on public expenditure resulted in degradation of the infrastructure, poor distribution and allocation to those in the middle and lower classes, and a quick retreat from the market once the private firms did not find water utility management profitable. Since then, an effort has been made to officially define water as a human right foremost above water as a commodity. However, despite past failures, private ownership of public utility systems and public-private partnership are still dominant. Arguments have been made against public ownership of resources utilizing the “principle-agent problem”. Namely, politicians who oversee regulation and enact policies in which to manage resources are “not personally invested in the resources under their control [...] if they manage resources poorly, they do not bear the economic losses” (Cole, 2002, p. 88). The argument against public ownership is not inequitable allocation, but inefficient use of the resource. This, along with austerity expectations, has led to increased privatization of water resources.

Water resource management, however, is plagued by a deficiency in adequate environmental regulation and enforcement, not necessarily by either private or public ownership. One example of this issue is the current dilemma in China. Over-use, drought, and insufficient regulation and oversight have caused a severe need to re-route water resources from the Yangtze River in the south through three artificial canals to the north in order to provide citizens of the north with an adequate water supply. Many argue that proper empirical evidence has not been conducted to support the claim that the plan of

building artificial canals would work, and approximately 350,000 people will be relocated in order to build the canals (Wong, 2011). The new canals will not only be expensive and destructive to the towns surrounding the area, but it does not solve the underlying problem within China. Misuse of their water resources has led to ecological degradation and water shortages; neither of which the re-routing can promise to permanently repair. In the past, the Chinese government permitted the ill management of water resources by allowing development to over-take environmental concerns, and allow citizens and private industries alike to pollute their existing water resources. Had the Chinese officials been more concerned about long-run sustainability of their environment, they would not be inflicted now with the burden of building new canals. By allowing environmental standards to degrade in order for new development to prosper, China's water resources have been contaminated with pollutants and they are now faced with the issue of water scarcity. While this illustrates the arguments for the principle-agent problem, such ill management has also been documented in the case of private management. Regardless of whether resources are managed by public or private entities, the cost is eventually shifted onto society once the natural resource has been degraded beyond repair. Government intervention with adequate regulation is the key element in the cause for ensuring long-term sustainability of fresh water resources.

Another example is Argentina, a country that has a history of ill managing their natural resources under both public and private ownership. Argentina has converted back and forth on the issue of privatizing its resources; however, each change in ownership did not bring better allocation, infrastructure investment, or efficiency. Argentina's downfall in managing its resources was a failure to implement a regulatory structure that would

require adequate investment towards infrastructure, and it also did not give the private corporation the proper incentives to conduct business more efficiently (Baer & Montes-Rojas, 2008, p. 335). Subsequently, Argentina failed to privatize its resource as “the government was more preoccupied with alleviating the fiscal situation than in creating an adequate regulatory framework” (Baer & Montes-Rojas, 2008, p. 334). Given Argentina’s financial status, the government was desperate to bring in private investment in order to control for a growing budget deficit, and it did not take into full consideration the qualifications of the private firms buying the resources. The corporations that took over the management of Argentina’s water utility system depended on the state for its own survival, as the private corporations needed favorable regulatory rules and tariffs to offset for their operating inefficiencies. Even though consumers saw an increase in prices, they did not benefit from any infrastructure development, as there was little to be had (Baer & Montes-Rojas, 2008, p. 333). The private corporations were also unwilling to operate in Argentina with reduced profit margins when citizen revolt caused the Argentinean government to lowered water tariffs, which resulted in price decreases. Essentially, privatization in Argentina failed due to inefficient private management and poor government regulation of the industry.

This type of inefficiency does not seem to be an exception, but rather a pervasive reoccurrence. Grenoble, France in the 1980s also experienced a shift from public ownership and management of their water resources to a dominantly privatized water sector. The city of Grenoble did not have previous problems in managing their water utility service; financially sound, the city was able to allocate water at a low price and still manage to be profitable (Weizsacker, Young, Finger, & Beisheim, 2005, p. 22). In



1989, however, Mayor Alain Carignon awarded a twenty-five year contract to COGESE, a subsidiary of the private corporation Suez, for the privatization of the city's water services. This reign of private ownership lasted until approximately 1993, when Carignon was investigated and convicted of exchanging privatization rights with the COGESE for campaign funding. The courts also ruled that the COGESE's contract was not advantageous to consumers; "The company had used a number of techniques, including fictitious accounting and manipulated indexation, in order to inflate prices (see Table 1). The regional audit office estimated in 1995 that the total cost of these practices to the citizens of Grenoble, over the 25-year life of the COGESE contract, was approximately €180 million" (Weizsacker, Young, Finger, & Beisheim, 2005, p. 23). COGESE not only shifted fictional costs onto consumers by charging significantly higher prices, but they also failed to invest their excess profits into much need infrastructure repair.

Since 1996, Grenoble has utilized a public-private partnership in the ownership and management of Grenoble's water resources. While this agreement has led to a significant increase in the investment of infrastructure and a slight decline in average prices, the overall average water prices in Grenoble remained significantly higher in comparison to prices of the early 1990s. The social costs generated by privatization are noteworthy, as citizens of Grenoble are now forced to pay higher prices for access to water under a contract that allows for increases in water prices when consumption falls below 12.8 million cubic meters per year, which was already the case throughout most of the city (Weizsacker, Young, Finger, & Beisheim, 2005, p. 24). This means that as water consumption falls, prices will continue to increase which will only create greater hardship and a deficiency of access to lower income households who cannot afford the rising cost

of water. The privatization of Grenoble's water resources created great inefficiencies, and resulted in an inequality of access that had not previously been a concern in the region.

Yet another example of a failed attempt at privatizing their water resources was the state of Belize. The desire for globalization and a free market economy gave Belize the incentive to begin the privatization of its resources. However, privatization did not bring about the expected efficiency or allocation of the resources that Belize had anticipated. Quantity, quality, and distribution were greatly affected by this privatization and created a disservice to the citizens of Belize, especially to those who no longer had access to water resources for even subsistence needs as an increase in price and a lack of much need infrastructure development caused distribution problems (Mustafa & Reeder, 2009, p. 805). It is also relevant to note that the privatization of publicly owned resources created resentment among citizens of Belize whose culture supports a strong sense of nationality and a dislike for global intervention of its resources (Mustafa & Reeder, 2009, p. 792). This is understandable as the cost of operating the water utility system under private management was shifted onto citizens through price increases, and the citizens of Belize were initially powerless to change their situation. In this case, the private corporations did not have the right internal incentives in place to provide re-investment in the country's infrastructure once excess profits were achieved, nor were they willing to reinvest profits so that the cost savings were passed onto consumers, which would have made the resource affordable to everyone.

While privatization may seem like the best solution for a nation facing financial instability, the effects of implementing the policy have the potential to produce significant ecological degradation that is unsustainable, and generate negative benefits for

overall social welfare. It is important to note that in the cases of China, Argentina, Grenoble, and Belize that ill-suited regulation of private investment within the industry resulted in welfare loss and shifted the costs onto the citizens as they were forced to pay the cost of rising water prices or were left without access to water utilities altogether. Had neoliberal policies been less influential and appropriate regulation been implemented, China may not have the unsustainable levels of pollution and water shortages that they are now facing. Likewise, Argentina, Belize, and Grenoble would have been able to provide their citizens with access to clean water at an affordable price without having to accrue the extra costs shifted onto them by the private corporations.

### **3. Commercialization of Water**

In conjunction with the increasing issues resulting from the privatization of water utilities and natural water resources, water as a commodity appears to be gaining dominance over the concern for water as a human right. Unfortunately, such commodification of water has become the norm as nations are forced to compete within the global economy and deal with rising budget deficits by selling-off their state owned resources. India, for example, was a country once rich in water resources, but within the last century has fought a losing battle against problems of water shortages. There are many reasons for this change in India's ecosystem, including the use of monoculture agriculture of crops that are not native to the area, widespread mining, deforestation, and the use of electricity-run wells that extract water at a much faster rate than the earth can

naturally replenish. These changes have all stemmed from the “informal privatization of groundwater” (Shiva, 2002, p. 10) that typically result from commercial activity.

The argument essential to neoliberal policy is that technological developments allow for greater increases in the capacity for production and consumption, and create greater efficiencies in resource management. Specifically, technological innovations of the past have allowed for increased production in agriculture and irrigation systems, along with other activities such as mining and well drilling, all of which are directly linked to the provision of the surrounding water resources. It is important to note, however, that while increased productivity in these industries has allowed for greater consumption, it has also taken a great toll on the ecological habitats where these industries conduct their trade. Stripping the land of native trees with mountain top mining for example, causes soil erosion and flooding. This practice not only contributes to the removal of entire habitats, but also destroys lower level water catchments as the excess debris that is pushed over the side of the mountain contaminates the catchments. This is detrimental for indigenous communities as they rely heavily on access to natural resources such as water catchments for their basic subsistence needs (Shiva, 2002, p. 2).

In many countries, use of the land and natural resources for agriculture purposes is common. What may not be well known, however, is the environmental degradation and exhaustion of water systems that stems from specific agriculture practices and what is called tube wells. Agricultural practices have shifted dramatically all over the world in recent decades, especially driven by globalization and an increased dependence on exports. The growing use of monoculture agriculture is to rely heavily on one specific crop, which is a practice that is not conducive for allowing proper soil mineral

replenishment, and eventually creates inadequate soil. This practice becomes much more severe, however, when it is combined with a crop that is not native to the land. In India, the use of eucalyptus monocultures has grown rapidly as the plant can be used for the paper and pulp industry (Shiva, 2002, p. 4). This plant, however, requires vast amounts of water to maintain, and when grown in an area that is less abundant in water resources can actually deplete entire water systems and cause drought and severe water shortages; a reality that India now experiences.

The use of monoculture agriculture has become possible because of increased use of tube wells and electrically generated well pumps. In the past, communities relied on water attainment from wells in which water had to be drawn by hand. This practice survived for thousands of years because the extraction of water did not exceed the earth's natural ability to replenish the water source. Privatization of land for large-scale agriculture has led to the use of electrically generated wells, which allow for increased irrigation demanded by water intensive crops. Unfortunately, this practice is not concentrated to only a few communities:

“In the village of Belawati, 500 tube wells were created over the past decade and only five still work. The rest have run dry. In Guraiya village, only 10 of the 100 tube wells built have water. In Ismailkhada village, the 1,000 tube wells drilled over a span of seven years dried up the 12 ponds that served the community for centuries. Residents now travel two kilometers for water. Of the 200 tube wells dug in Sadipura, only four are working” (Shiva, 2002, p. 11).

Privatization and increased commercial activity have resulted in the steady depletion of a once abundant and renewable natural resource in India. Technological innovations such as monoculture agriculture and tube wells have enabled the growth of mass production and consumption. However, short-term gains in growth are realized at the expense of the environment, and long-run sustainability of both the environment and economic growth will come at a much higher social cost in the future. While economic growth is the focus now for institutions such as the IMF and the World Bank, eventually over-whelming concerns for water scarcity, pollution, and environmental degradation will need to dominate their focus, as technological innovations will not be able to substitute for natural resources.

Another aspect of the commercialization of water is the increasing occurrence of bottled water. The manifestation of bottled water arises from private firms procuring public or community water resources and then redistributing the water in bottles. Bottled water is quickly replacing the use of public water resources, with widespread assumption that bottled water is cleaner and safer to drink than water supplied by public utilities. However, this is in many instances a myth that has been generated by the private bottling companies through the promotion and marketing of their products. The city of Cleveland, Ohio is one example in which a private firm marketed false claims against a city's tap water source. In 2006, the high end bottled water brand Fiji ran an advertisement stating, "The label says Fiji because it's not bottled in Cleveland." Outraged, Cleveland public officials had both the public tap water and Fiji water tested, and found the tap water from Cleveland to be cleaner and contain less of the allotted amount of the harmful chemical arsenic than the more expensive brand Fiji (Leo, 2006). Another marketing scheme used

is bottle labeling, such as Aquafina- the PepsiCo brand of bottled water- with a label suggesting their water source comes from a mountaintop when in reality comes from municipal tap water sources (Ferrier, 2001, p. 11). Deceitful advertising is just one method that has allowed the bottled water industry to grow exponentially each year and has moved the majority of the population away from tap water, which is a water source that is actually safer to consume and creates considerably less ecological degradation or means for over-use. As a critic of bottled water, Menno Liauw- founder of the Neau Foundation, which collects money for drinking-water projects in developing countries, has stated, “More than any other product, the buying and selling of water is an industry based on nothing. Two thousand liters of tap water cost less than one liter of Spa” [a Dutch mineral water] (Leo, 2006). Such conclusions however, have not diminished significantly the enthusiasm for bottled water or the fears associated with tap water.

There are several categories of bottled water. Natural mineral water that comes from a source protected from pollutants and goes untreated, and is extracted from underground springs or by aerated water; spring water which is almost the same as mineral water with the exception of the absence of a constant level of mineral elements; and purified water which can be extracted above or below ground and has to be treated before distribution. What is most surprising is that in many instances, bottled water can even come from tap water sources, and there are bottled water products produced entirely by public water distributors (Ferrier, 2001). The dominant distributors of bottled water, however, are private corporations in the soft drink and food industry, which already claim a majority shareholding of the bottled beverage market. Nestlé, Danone,

Coca-Cola, and PepsiCo are four of the top ten leading bottled water distributors of the twenty-first century (Ferrier, 2001, p. 11).

Not to dismiss the use of bottled water completely, there are situations in which bottled water can increase social welfare, such as allowing for easy distribution to areas that are facing droughts, poor sanitation, or more permanent water shortage issues. However, there are also some extreme consequences. For example, within the United States, bottled water is regulated by the Food and Drugs Administration (FDA); this is in comparison to tap water, which is regulated by the Environmental Protection Agency (EPA). Under the FDA, regulations for water standards are not as extensive as compared to EPA standards, and regulations for bottled water do not include the banning of faecal coliform (Ferrier, 2001, p. 17). Faecal coliform is a bacterium that contains genera, which originates in feces, specifically *E. coli*. “In a test it conducted over 1000 bottles of 103 brands, the Natural Resources Defense Council (NRDC) found that most of [the bottled waters] were of good quality although levels of chemical or bacterial contaminants exceeded those allowed in about one third of the bottled waters tested” (Ferrier, 2001, p. 20). Faecal coliform, along with arsenic, are just a few of the chemicals that are permitted by the FDA to have trace amounts found in bottled water, and this can be detrimental to the long-run health of society.

Another concern with bottled water is the high levels of consumption throughout the world. Just within a three year period between 1999 and 2001, the increase in consumption of bottled water in the Pacific region alone increased by 15 percent, with the Asian region close behind at 14 percent (see Table 2) (Ferrier, 2001, p. 13). This trend will not only potentially lead to issues of water shortages as easy access allows for over-



consumption, but will also increase pollution levels exponentially because of the nature of the plastic bottle; bottled water creates pollution within every step of its process, from extraction to production, distribution and even the disposal of the more widely used plastic bottles. While the plastic used in the bottles can be recycled, in many instances they are not and can generate enough waste to circle the globe repeatedly. Aquafina water, for example, boasts on its Eco-Fina bottle that its recycled plastic bottle saves up to seventy-five million pounds of plastic each year. If this is how much plastic can be saved by cutting down a small percentage of the plastic production in which the bottles use, the amount of plastic that is not being recycled is inconceivable. The commodification of water has created a growing market demand for bottled water; however, this market is considered unsustainable and produces significant social and ecological costs which are shifted onto citizens by increasing exposure to harmful chemicals that are found in the bottled water, the filling up of landfills with plastic waste, and allowing wasteful overconsumption of a natural resource that is not always guaranteed to be renewable.

#### **4. Growth and the Environmental Kuznets Curve**

In the neoliberal framework, the solution to environmental degradation is higher income and growth. This is supported by the construct of the environmental Kuznets curve (EKC), which presents a relationship between environmental conditions and per capita income – an inverted “U” relationship between environmental damage and income. The argument is that as technology advances and income increases, damage to the

environment will also increase; however, at higher and higher levels of income, an economy becomes concerned about the environment, as well as has the capability to improve the environment, and environmental degradation will eventually decline. The Kuznets curve is based on the work of Simon Kuznets, who hypothesized that a nation's income will determine its level of economic inequality. At low levels of income, everyone is poor and there is little income inequality. As income and technology grow, inequality becomes more pronounced. In the last stages of a Kuznets curve people can produce enough income to eliminate poverty, and thus income inequality would be reduced (Dugger & Peach, 2009, p.73). The EKC is structured in this fashion; when a nation is at a lower level of development, over-dependence on natural resources will be necessary in order to achieve adequate economic growth until an equilibrium point can be reached. Once this optimal growth has been achieved, there will not be the need for such severe dependence on the extraction of natural resources (Reed, 1992, p. 147).

While the EKC hypothesis may seem like a useful way for understanding the trade-off between growth and environmental degradation, it is also problematic. One uncertainty is whether sufficient economic growth is going to be reached before the ecological degradation is irreversible. Structural adjustment policies that promote foreign investment and the privatization of resources have been known to create increases in unemployment and a decline of per capita income levels. This leads to continued economic stagnation of growth unless private firms replace the industries once publicly owned, and bring income and employment to the country. If following the hypothesis of the EKC that environmental degradation is necessary for economic growth, it can be argued that "structural adjustment would simply prolong the time the country had to

absorb environmentally damaging development” (Reed, 1992, p. 146). Thus, as developing countries are forced to adhere to structural adjustment policies and are likely to depend heavily on natural resources for economic growth, the SAP will cause prolonged dependence on natural resources because of short-term expectations of stagnating growth, and this can cause an over-reliance on natural resources to a point of irreversible damage of the natural environment.

This leads into the second problem with the EKC in its assumption that degradation of the environment is always reversible. The fallacy of such an assumption, for example, is evident in the case of depleted water catchments found in India. “It should be recognized, for example, that the restoration option will not be available if prior damage is irreversible and substitution possibilities are severely limited or nonexistent, as is characteristic of much environmental capital” (Reed, 1992, p. 147). In a study conducted by Reed (1992), the countries of Mexico, Thailand, and Côte d’Ivoire each provide their own example of how over-use of their resources for temporary economic gains have created even greater obstacles for future economic development and caused irreversible damage to their natural resources. In India, draining underground aquifers for increased irrigation of mono-crops and mining activities that bury natural streams under debris are prime examples of the trade-off between increases in private firm development for short-term economic gains, and the resulting irreversible environmental destruction.

The EKC also does not take into consideration that the environment is multidimensional and cannot be treated as one item. The depletion of one resource can lead to the gradual depletion of other resources, as natural resources are inherently dependent on one another for existence. For example, deforestation can cause severe

flooding, which can contaminate sources of clean water aquifers. Every time a water source is depleted there is increased pressure put on remaining water systems, which can create increased water shortages and social conflict. Exploiting natural resources for growth is not contained within certain resources, and the exhaustion of one resource within the environment can cause continued effects in the future throughout many other natural resources (Nadal, 2011, p. 27).

A final issue stemming from the EKC approach is the way in which countries are treated as environmental units, focusing on GDP and policies of only one economy. However, the benefits resulting from environmental degradation enjoyed by one country can generate a detrimental loss to another country (Nadal, 2011, p. 27). This can be witnessed in neighboring countries that must share access to water resources such as rivers, as in the case of Syria and Turkey, Egypt and Ethiopia, and even between communities within the same country as seen in India (Shiva, 2002, p. xi). When one country exploits a water resource, to build a dam for example, neighboring countries who depend on the same water source can suffer from water shortages and drought. In addition, while those living in developed countries may see a relief of environmental degradation thought to stem from increased economic growth, what they are really experiencing is a shifting of their environmental costs onto developing countries such as Mexico and India.

The above critiques of the EKC are relative to the neoliberal focus on GDP and economic growth, which does not allow for a focus on long-term sustainability of resource use. A study by Frank Ackerman (2008) finds that there can be a trade-off between economic growth and social well-being, and that economic growth does not

guarantee optimal outcomes for society. His study also disputes the assumption that environmental regulation always stifles economic growth<sup>1</sup>. While it is necessary for developing countries to obtain short run growth in order to supplement long-run economic sustainability, there is concern as to the effects of focusing too heavily on short run successes at the expense of natural resources. Developing nations are more likely to over-extend their natural resources in an attempt to obtain short run growth too quickly. This results in the degradation of natural resources that may not be replaceable, such as soil erosion or depletion of a water system, and the subsequent effects of starvation and poverty as local communities who solely rely on their environment for their livelihood are left with barren land.

There is also the implication that generating short run growth will not result in greater long-run stability, and the trade-off between destroying the local ecosystems and economic growth do not always result in positive sum gains. Under the assumptions of the environmental Kuznets curve, environmental degradation will be greatest at lower levels of growth and eventually decrease back to sustainable levels once the necessary income level has been achieved. Case studies which focused on the countries Mexico, Thailand, and Côte d'Ivoire (Reed, 1992, p.141) were used to study the connections and outcomes of trade-offs of economic development and how the countries used their natural

---

<sup>1</sup> The assessment that economic growth will lead to socially beneficial outcomes is not always the case; "Finally, even if growth were to occur as a result of deregulation, it is not certain that it would lead to anticipated beneficial consequences" (Ackerman, 2008, p.82). In the case study of mortality rates and economic growth, Ackerman found that during the twentieth century, the United States saw an increase in growth along with an increase in mortality rates, and during recessionary periods saw a decrease in mortality rates. While this does not assume direct causation of mortality rates and economic growth, it is one example to demonstrate that growth does not always create a socially optimal environment. Ackerman also finds that the burden of regulatory costs are exaggerated, and that "environmental policies impose little or no net costs on the economy" and "even when regulatory costs appear to be substantial, this may not matter: there may be no short-run opportunity to exchange those costs for additional economic growth" (Ackerman, 2008, p. 81).

resources. These countries, like many other developing countries, used their natural resources as a means to increase exports and generate increases in economic activity. In each case, significant measures of ecological destruction were generated as the result of their increased activity. The study also revealed a pattern of market forces failing to protect the nations' natural resources, especially in the absence of government oversight. The result of extensive over-use of the natural resources in each of the three countries is the economic constraints in the future as the resource endowments that the countries once relied upon are no longer there (Reed, 1992, p.142).

Such conclusions also bring to question whether or not there is an optimal level of trade-off between economic development and environmental degradation, and how much benefit society will receive from this trade-off. The conclusion of the studies from Mexico, Thailand, and Côte d'Ivoire suggest that there is a pace and scale in which depletion of natural resources must be realized in order to avoid broaching the point in which the resources cannot be renewed. "All three studies revealed the fact that prevailing patterns of resource use entail considerable waste and loss of national wealth. Moreover, arguments about necessary trade-offs are hardly credible unless revenues derived from resource depletion are invested in ways that ensure long-term sustainable improvements in human welfare" (Reed, 1992, p.141). Other research suggests that there is no need for continuous economic growth within developed nations, and social well-being and ecological sustainability are better maintained without such growth (Victor & Rosenbluth, 2007).

There is dispute to the limits-to-growth argument and de-growth arguments, pointing to the endogenous forces in capitalist economies: accumulation. These authors

doubt the possibility of de-growth under capitalism (Nadal, 2011). Furthermore, studies conducted by Gene Grossman and Alan Krueger (1995) conclude that growth is not necessarily a black and white case and there are separate associations of growth and environmental degradation within certain levels of income:

“Instead we find that while increases in GDP may be associated with worsening environmental conditions in very poor countries, air and water quality appear to benefit from economic growth once some critical level of income has been reached. The turning points in these inverted U-shaped relationships vary for the different pollutants, but in almost every case they occur at an income of less than \$8000 (1985 dollars). For a country with an income of \$10,000, the hypothesis that further growth will be associated with deterioration of environmental conditions can be rejected at the 5 percent level of significance for many of our pollution measures” (Grossman & Krueger, 1995, p. 371).

Conclusions drawn from this analysis suggest that nations with higher per capita income are less likely to over-exploit their natural resources- confirming the argument against de-growth, while developing nations with lower per capita income may be more dependent on their natural resources for growth opportunities. This will lead to exploiting their natural resources to obtain growth in much greater terms than countries that have developed economies. It would be the likely event that privatizing resources in order to gain economic growth would only encourage further environmental degradation of natural resources, especially in developing countries, as regulation of the private

industries would be seen as a hindrance to the development of economic growth according to the ideology of the international financial institutions.

The approach of the EKC in explaining the trade-off of growth and environmental degradation leaves out significant factors such as structural adjustment policies, levels of degradation and the inherent connection of ecological systems, and the deadweight loss and future economic constraints generated by previous degradation. According to the Declaration on the Right to Development established in 1986:

“States should undertake, at the national level, all necessary measures for the realization of the right to development and shall ensure, inter alia, equality of opportunity for all in their access to basic resources, education, health services, food, housing, employment, and the fair distribution of income. Effective measures should be undertaken to ensure that women have an active role in the development process. Appropriate economic and social reforms should be carried out with a view to eradicating all social injustices” (Anand, 2007, p. 512).

Although this recognizes the right for development, it also recognizes the role of the state to safeguard against social injustices resulting from the selling of natural resources for private ownership. Furthermore, implications of the EKC also result in the unfounded expectations that the cost of growth must be environmental degradation, and such degradation can always be reversed in the future. However, the assumption that degradation to the environment is always reversible or even replaceable is inaccurate, and the EKC does not take into consideration the long run costs such as environmental



degradation will place onto society. Environmental degradation caused by commercial activities can result in the loss of small scale, subsistence farming from soil erosion, or access to water sources for drinking or irrigation are diminished by either drought or pollution. As private corporations are not held responsible for the degradation in which they create, the consequences are thus shifted onto local citizens. This can be witnessed in the cases of Mexico, Thailand, and Côte d'Ivoire (Reed, 1992, p. 141), as the countries can no longer be over-dependent on their once abundant natural resource base for exports, and future growth will come at a much higher price as they also can no longer extort the full capacity of their natural resources for economic growth.

#### **IV. SOCIAL PROVISIONING APPROACH**

As discussed above, neoliberalism is the framework under which policies are sanctioned by institutions such as the IMF, the World Bank, and the World Trade Organization, promoting on a global scale capitalist relation through free trade, privatization, fiscal austerity, and a focus on market oriented growth and development. The severity of applying neoliberal policies have resulted in a lack of foresight to sanction regulations and programs that ensure ecological sustainability, and alleviate socio-economic vulnerabilities generated by the instability and uncertainty associated with foreign investment and privatization of public assets. There is an acute conflict between profit motive and sustainable management of water resources. The increasing level of water shortage around the world is generated by the growth of commercial activity. Communities who have used methods of extraction that do not exceed nature's ability to regenerate water resources and do not cause degradation to the natural environment have been able to manage their resources in a sustainable practice without welfare loss to the community. This is in juxtaposition to promoting full privatization of assets for the purpose of increased financial gains. Economist Marilyn Power delineates five interconnected elements of analysis and policy formulation based on social provisioning (Power, 2009, p. 48):

1. Incorporation of nonwage and caring labor from the inception of the analysis.

2. Use of well-being as a measure of success for economic policy.
3. Emphasis on process as well as outcomes in evaluation of economic policy.
4. Inclusion of ethical judgments as intrinsic part of the analysis.
5. Recognition of the differential impact of economic events by gender, race-ethnicity, class, and other factors.

These five elements shift the focus from neoliberal economic analysis and place value on non-market activities such as environmental sustainability, cultural differences, and ethical judgments in place of profits maximizing. Power also emphasizes the struggle for ecological sustainability as a “recognition of power and differences” (Power, 2009, p. 49) and recognizes the struggle between the desire for economic growth and more emphasis on social well-being and quality of life. Furthermore, unlike the neoliberal framework, social provisioning accounts for the impact of cost shifting on social well-being.

### **1. Nonwage and Caring Labor**

Incorporating the value generated from unpaid labor within the home for subsistence purposes will illustrate the true social costs associated with the degradation of water resources by commercial activity, as degradation of natural resource will make household activities much more difficult, especially for women (Power, 2009, p. 55). One of the most demanding labor activities within the household for those living in Africa, for example, is the procurement of clean water. This job is placed dominantly on women and more than a quarter of the population in multiple countries within Africa has to travel

longer than thirty minutes for access to clean drinking water (UNICEF, 2010, p. 28). “Research has shown that those spending more than half an hour per round trip progressively collect less water, and eventually fail to meet their families’ minimum daily drinking-water needs. Additionally, the economic costs of having to make multiple trips per day to collect drinking-water are enormous” (UNICEF, 2010, p. 28). Even when access to clean water sources are made available, approximately one third of those resources are more than thirty minutes travel away from local communities (see Table 3) (UNICEF, 2010, p. 28).

Such inequitable means of water access causes considerable social costs to communities and individuals. Including nonwage activities such as water procurement in economic analysis will create a much more accurate perception of the costs in which water shortages affect local communities, instead of just focusing on economic growth measures alone. It is also necessary to include nonwage and caring labor into economic analysis when determining the costs shifted onto society that are associated with commercial activity, and the effects it has on indigenous communities. This will also allow greater value to be placed on the methods of sustainable resource extraction used by indigenous communities, and how direct access to clean water and sanitation resources are essential for future social and ecological well-being.

## **2. Measures of Success**

Power also discusses the attempts to calculate the costs of the impact that current development will have on future generations and their productive capacity, noting that

the measured assumption of sustainable capital, natural resource capital, and labor is problematic (Power, 2009, p. 57). These neoliberal assumptions hold that as long as there is economic growth and low unemployment, social well-being is therefore contented. There is also the assumption that environmental resources can be replaced by increased levels of growth and technological development. However, once natural resource capital is lost, it typically cannot be replaced by technological improvements, and as shown in the case studies of Mexico, Thailand, and Côte d'Ivoire (Reed, 1992, p.141), and can be detrimental to future economic development and growth – contrary to what is suggested by the EKC. Consequently, more technology, production, and consumption cannot be the solution to environmental degradation or used as a measure of social well-being, as one cannot replace losses in another category and typically results in welfare loss to society, as production methods that generate pollution or cause irreversible environmental damage shift the long run costs of these activities onto society. “Ecological economists have long challenged this assumption...noting that natural capital provides ecological services that are complex, crucial, and not easily replaceable by manufactured capital. In addition, many environmentalists argue that the natural environment is intrinsically valuable. They reject utilitarian calculations of values, which reduce all types of valuation to preferences, and all preferences to monetary values” (Power, 2009, p. 58). Consequently, the measures of success assumed by neoliberal policy ought to be reconsidered to include measures of ecological sustainability and other definitions of social well-being, such as having access to clean drinking water and sanitation systems.

Within the social provision approach, success is measured based on social well-being and quality of life. Access to clean water and proper sanitation should not be taken

for granted, as people in both developed and developing countries do not always have such access<sup>2</sup>. In 2008, 884 million people still relied on water sources that were not within quality expectations (see Table 4) (UNICEF, 2010, p. 7). Instead of focusing on growth expectations for measures of well-being, groups such as the World Health Organization and UNICEF work under the Millennium Development Goal (MDG), which tracks the progress of providing developing countries with access to clean drinking water and sanitation systems as their measure for social well-being (UNICEF, 2010, p. 2). Indigenous groups are much more likely to benefit directly from more efficient water resource allocation than from any economic growth realized by commercial activity. Focusing on social welfare and quality of life will place value on maintaining the sustainability of natural resources for future use. Instead of relying on measures such as GDP to determine economic progress, emphasis placed on sustainable methods of water resource use would provide a more accurate measure of increases in over-all social and economic welfare.

### **3. Emphasis on Process**

The effect of shifting the focus of policy analysis away from market allocation to social provisioning results in a broader analysis of encompassing non-market activities,

---

<sup>2</sup> Currently, the United States is witnessing disparities in access to safe drinking water and proper sanitation affecting “people of colour and Native Americans” (Centre, 2011). “I am concerned that several laws, policies and practices, while appearing neutral at face value, have a disproportionate impact on the enjoyment of human rights by certain groups,” said UN independent expert Catarina de Albuquerque, who is mandated by the UN Human Rights Council to examine human rights obligations for access to safe drinking water and sanitation” (Centre, 2011). Albuquerque found that 13 percent of Native Americans do not have access to safe drinking water and waste disposal, as compared to .6 percent for non- Native Americans, and that in the city of Boston, for “every 1 percent increase in Boston ward’s percentage of people of colour, the number of threatened [water and sewer] cut offs increases by 4 percent” (Centre, 2011).

ecosystems, and an emphasis on process rather than on market outcomes. This necessitates a historical view. History suggests that private ownership of natural resources is not the conventional method in which communities have shared water resources. Riparian rights, a common law system to allocate water resources to those possessing surrounding land, evolved through traditional uses of water systems that determine water to be a natural right. The doctrine ensures communities who are supported by a water system for subsistence living have the right to access that water, and this right is determined through ideals of justice and fulfilling basic needs (Shiva, 2002, p. 20). History also reveals that communities and human settlements are guided by access to water systems all over the world, and even the individual state lines within the United States were divided along the lines of rivers and lakes. Riparian rights were also formed under the basis of common property and open access; water is a natural asset of the environment, not the private property of an individual. “Water rights as natural rights do not originate with the state; they evolve out of a given ecological context of human existence” (Shiva, 2002, p. 20). In her book *Governing the Commons: The Evolution of Institutions for Collective Action*, Ostrom (1990) summarized well the debate of efficiency in that “neither the state nor the market is uniformly successful in enabling individuals to sustain long-term productive use of natural resource systems. Further, communities of individuals have relied on institutions resembling neither the state nor the market to govern some resource systems with reasonable degrees of success over long periods of time” (Ostrom, 1990, p. 1). What Ostrom has described is the process of how resources are managed is the important factor for the sustainability of resource use.

Countries that rely on commercial development for economic growth can be vulnerable to long-term losses due to environmental degradation and increased poverty resulting from local socio-economic displacement, as private activities that result in ecological destruction shift the future costs of such environmental degradation onto local citizens; this can be seen in the form of water shortages. If instead, access to water was defined under riparian rights and allocation was based on community use, especially in developing countries, the social cost shifting generated by commercial activity would likely be reduced. This process of resource allocation would also likely produce methods of resource extraction that would allow for natural regeneration of the resource; such as the case in India where indigenous groups used hand drawn water wells for hundreds of years before the replacement with electrically generated wells depleted the aquifers (Shiva, 2002, p. 112). It also allow local business owners to benefit from increased access to natural resources, which would stimulate local economic activity and benefit national economic growth and citizen welfare.

Water resources were privatized with the understanding that this would create “a way to increase investment in water delivery networks, improve access for all sectors of the population, and reduce the burden of public services on government finances” (United Nations, 2004). However, after a decade of reform, privatization did not provide better efficiency or investment to infrastructure as initially expected. A historical view of water management and a focus on process instead of on narrowly defined outcomes – such as GDP growth and business efficiency in monetary terms, can provide a more equitable distribution of water resources and long-run ecological sustainability.



#### **4. Ethical Judgments**

There is also a question of whether access to water should be provided as a public good or rather as a commodity for sale by private corporations. Currently, there has been a growing movement towards the privatization of state owned natural resources, with either private property holdings by corporations or by contracting out the management of this resource to private firms through the state as public-private partnerships. Once considered a public good, water has become a global commodity for sale. The use of the social provisioning approach would ensure that access to water is considered foremost as a human right rather than as a commodity. Water is a necessity for the provision of life, and access to such a resource should be viewed as an obligatory human right.

This fundamental right, however, has been repeatedly infringed upon throughout history. In July of 2010, the United Nations General Assembly Summit held a meeting to discuss the increasing infringement on the essential human right to have access to clean water and sanitation systems. The Assembly found that it is crucial for countries on an international scale to “provide financial resources, build capacity and transfer technology, particularly to developing countries, in scaling up efforts to provide safe, clean, accessible, and affordable drinking water and sanitation for all” (Department of Public Information, 2010). Such action would be used to reverse the inequality that has resulted from current commercial practices and allow for access to water to be defined as a basic human right.

Unlike the neoliberal framework, the social provision approach allows for such consideration of human rights at the forefront of its policy recommendations. This confronts the issue of the social costs generated by price increases shifted onto consumers for profit maximizing purposes that can cause those in lower income sectors not to have access to water resources. It also considers community judgments and values, such as the case of Belize, in the use of natural resources, which gives power to citizens and can place emphasis on the current methods of managing natural water resources under sustainable practices. This will allow accessible and affordable drinking water to even those living in the poorest of conditions, as judgments for how to distribute water access would be based on ethical judgments rather than purely profit motives. Social provisioning methods also allow into consideration the long run costs society must bear from the ecological destruction generated by private activity. This is drastically different from the framework of the neoliberal approach, which focuses on *laissez-fairé*, free market allocation of resources based on willingness to pay versus need. However, institutions such as the United Nations and UNICEF, which implemented MDG in order to resolve the growing inequality associated with water access, are just two of the many organizations that support such ethical movements.

## **5. Inequality Impact**

While the impact of water scarcity has an effect on the lives of all people, it is documented that water shortages have a much greater impact on the daily lives of people who are living in rural areas and to those who are more susceptible to poverty.

Indigenous communities in developing nations such as Asia and Sub-Saharan Africa, who rely on fresh water sources for their basic subsistence needs, are actually more likely not to have access to acceptable drinking water or sanitation. As of 2008, eighty-four percent of the world's population who do not have direct access to clean drinking water are likely to be living in rural areas (see Table 5) (UNICEF, 2010, p. 18), and women are sixty-four percent more likely to shoulder the burden of procuring drinking water for their families (UNICEF, 2010, p. 29). Given the current approach to water distribution under the neoliberal framework, those living in poverty and especially women are more likely to feel the impact of diminishing access to water resources as private ownership practices increase. In attempts to appropriate better allocation of water resources to those living in Sub-Saharan Africa, the richest quintile were still twice as likely to have access to improved drinking water than those living in the poorest quintile (see Table 6) (UNICEF, 2010, p. 30).

P.B. Anand (2007) studied the capability of people living in poverty to have access to water resources. His study focused on the Water Services Act of 1997 in South Africa, which was passed to provide regulation requiring readily available access to water for those living in poverty. There were two important findings within his study. One of the findings was the positive association between the right to water legislation and the access of water by the poor:

“The conjecture that the poor are more likely to have access to water when there is a formal right to water is examined empirically with data for selected countries for the period 1990–2004... however, while little improvement was noticed in some countries with a right to water, there

were other countries where significant increase in the proportion of population with access to water was made without a formal right to water. A further examination of these countries with regard to some indicators of governance suggests that a right to water may be ineffective in countries with poor governance. Voice and accountability, among other things, seems to be crucial” (Anand, 2007 p. 524).

While the study was not definitively conclusive that the Water Services Act of 1997 was the direct cause of increased access to water resources by the poor, it was a contributing factor in some cases. For those nations whose citizens did not seem to benefit from the right to water legislation, Anand concluded that this might be from a lack of enforcement of the legislation. This leads to his second finding; suitable governance and the voice of the people were significant factors in the capacity for water accessibility. Anand’s study found that there was a positive association between access to water resources for those living in poverty and the ability of citizens to have a voice and accountability within their countries. His study concluded that, “it appears that accountability promoting mechanisms and guarantees related to participatory processes (such as right to information) may have an impact on access to water” (Anand, 2007, p. 522). This suggests that access to resources has a strong correlation to the relationship between citizens and the state.

Despite the tentative findings as to the causation of the legislation to enable greater access to water resources for the poor, it is essential for the over-all cause that such legislation be taken into serious consideration in the future as further attempts to increase access of water resources to all citizens on an international scale becomes more

prevalent. Anand made a significant contribution in his assessment that the extent to which resources are regulated, monitored and managed is crucial. Such regulation will help to dissuade private corporations from shifting the costs of their inefficiencies onto citizens. It is also imperative to note that citizens of a nation are more likely to have access to basic resources, regardless of whether the resources are privatized or publicly owned, when a nation establishes defined rights for its citizens. This would bring to reality the assessment of water as a human right first and foremost above water as a commodity. In a country like the United States where corporations have many of the same personal rights and freedoms as citizens do, it is imperative that the voices of the citizens do not become silenced under the much more powerful, wealthy, and well-connected voices of the corporations. It is also crucial that those living in poverty and in rural communities are not subjected to the disproportionate burden of the social costs shifted onto them by increasing levels of water shortages and contamination of fresh water resources by commercial activity.

## V. CONCLUSION AND POLICY IMPLICATIONS

It is important for the success of further globalization and future privatization of resources that tighter regulation and standards of management be established and enforced in order to protect citizens from the social costs of this economic shift in the market system. Governing institutions such as the IMF, WTO, and World Bank will need to re-evaluate their ideologies of economic theory to account for sustaining social and ecological well-being in the short run, as well as the long run, when they seek to enforce their structural adjustment policies on developing nations. Failing to include environmental regulation on the assumption that this will impede economic activity is not conducive to sustaining current water resources, and will only hurt economic growth opportunities in the future.

There is evidence to support that water management can be efficient in the hands of either the private sector or the public sector. It is not that one is more efficient than the other, but rather it is the regulation behind the management that makes the difference. The issue at hand is whether private firms have the internalized incentive structure to regulate their natural resource use in a long-term, sustainable manner, as there is evidence to support that this may not be true, and “the need for some discourse of restraint as a response to mass consumerism, and the discourse of scarcity is a powerful counterpoint

to neoliberal” [ideology] (McCarthy & Prudham, 2004, p. 279). It is essentially the role of the state to provide social provisions to citizens that the free market does not generate, in addition to regulating private industries to maintain social well-being and environmentally sustainable practices when it is not beneficial for private firms to do so. This should also allow for the prevention of persistent cost shifting accompanied by private industries, in which their ecological destructive practices generate long run costs for society. This can be done within a capitalist society without the need for complete governmental control of market activity.

To say that any form of regulation is conducive to environmental sustainability is a fallacy. A prime example of this fallacy is the regulation standards of the United States. In 1972, the passage of the Clean Water Act was able to reduce point source pollution of water resources. However in 1997, the United States changed regulation standards from a control-point discharge method to a water quality standard. Therefore, instead of viewing pollution as a violation, it is instead viewed as subject to a permissible standard (Shiva, 2002, pp. 31-32). Instead of taking a position which views pollution as unacceptable, tradable discharge permits (TDPs) allow for a set level of pollution to be deemed as acceptable. This “market solution” approach to regulation gives firms the incentive to pollute. This is an unacceptable “solution” within the social provisioning approach. “The water crisis is an ecological crisis with commercial causes but no market solutions. Market solutions destroy the earth and aggravate inequality. The solution to an ecological crisis is ecological, and the solution for injustice is democracy. Ending the water crisis requires rejuvenating ecological democracy” (Shiva, 2002, p. 15).

If regulation is to be used to ensure part of such ecological democracy, then the standard with which we value our resources must be held to a higher level. It would be possible to achieve this higher standard with increased use of regulations such as the Clean Water Act that hold any level of pollution as unacceptable. Arguments of stifling economic development resulting from such regulation will be a constant voice, however, and it may not always be possible for industries to immediately transition to pollution free production methods. Such problems, however, could be resolved with the use of a Pigouvian subsidy in place of an environmental tax, and would give corporations an incentive to maintain more strict environmental standards. This would also allow for a time line in which firms could transfer over to production methods that do not destroy or pollute natural resources, along with giving firms the monetary means to act in ways that are more conducive to long-run ecological sustainability. According to Daly and Farley (2004), it could also act as an incentive for ecological restoration; “For example, paying farmers to restore their riparian zones might reduce nutrition run-off and provide a host of other services. In addition, under international law, sovereign nations have the right to do as they choose with their resources, and there is no global government that could impose a Pigouvian tax on the negative environmental costs of deforestation, for example. Under such circumstances, something like a Pigouvian subsidy may be the best option” (Daly & Farley, 2004, p. 432). This would eventually transfer accountability of ecologically sustaining practices to the firm rather than being shifted onto society as a social cost.

Additionally, policies for environmental sustainability should focus on rebuilding public infrastructure for the distribution of potable water, and regaining the trust in tap water quality. This will decrease demand for bottled water, resulting in less pollution, and



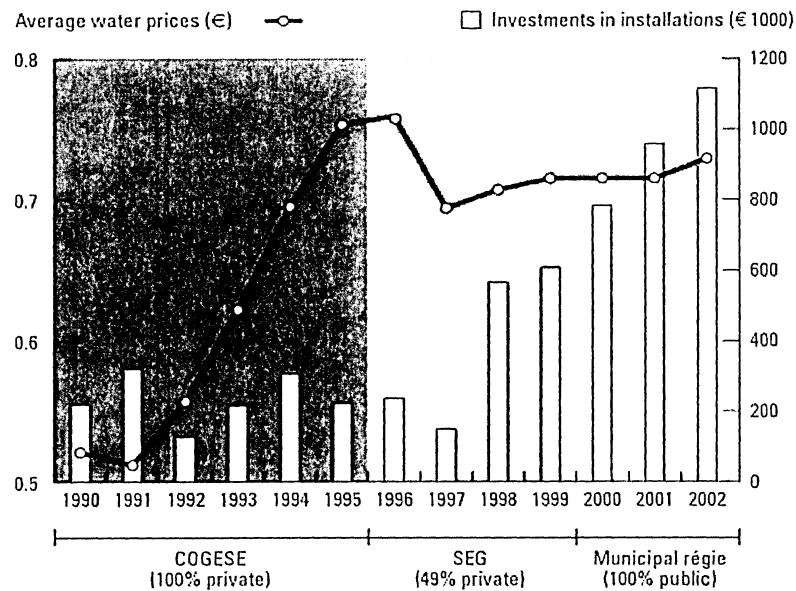
allow for more equitable access to water resources. It is critical that representatives within developed countries, in conjunction with representatives in developing nations, create legislation that is more restrictive towards the production, quality, distribution, and disposal of plastic bottling techniques to decrease the social costs generated by bottled water. In addition, while privatization can be successful in generating revenue for the state, it will need extensive regulation and consideration for social provisioning methods from a federal governing authority in which follows the principles of social provisioning in their policy evaluation. Finally, there is a need for global standards ensuring that allocation and distribution of water is managed as a basic human right instead of as a commodity. This necessitates moving beyond the SAP implemented by the WB and IMF and towards new global financial institutions with new sets of goals such as full employment, equity, and ecological sustainability (Dugger & Peach, 2009, p. 192).

Ecological democracy necessitates a change in economic analysis to include the elements of the social provisioning approach. Water can no longer be treated as an endless renewable resource, as the threat of water shortages has penetrated many nations around the world. It will be imperative that economic success is not measured solely by growth, but also by the manner in which management of water resources secures human rights, equality, and environmental sustainability. Taking into consideration the methodology of social provisioning in domestic and global policy formulation can help to diminish the inequality generated by exhausted water resources, and assist in liberating the burden of cost that has been shifted onto society and the environment by the current practices of commodification of water resources. Such changes in policy formulation must be enforced before irreversible damage to our water resources is realized.

## APPENDIX

**Table 1.**

Prices and investment in installations from fully private to fully public operations in Grenoble from 1990 to 2002.



**Figure 5**

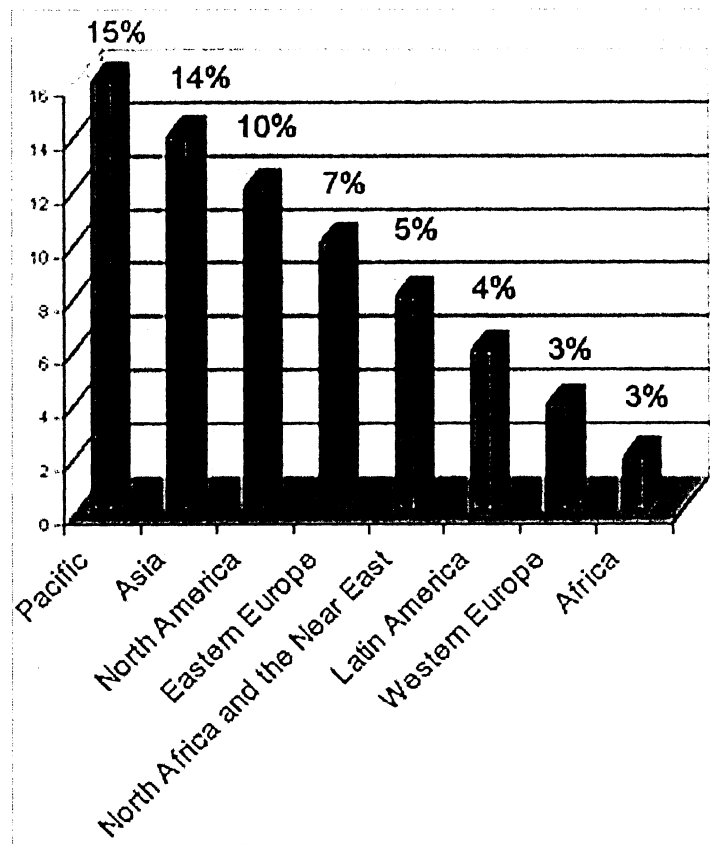
Prices and investments from fully private to fully public operation in Grenoble. Privatization has led to rising prices and lower investments. Following illegal pricing and corruption under privatization, the water service was finally re-municipalized in 2001. This welcome transition resulted in a stabilization of prices and an increase in investment.

Source: data from Raymond Avriillier, vice-president of the metropolitan region of Grenoble, 8 September 2003, based on reports by the Régie des eaux de Grenoble.

Source: Weizsacker, E., Young, O., Finger, M., & Beisheim, M. (2005). *Limits to Privatization: How to Avoid Too Much of a Good Thing*. Earthscan, 23.

**Table 2.**

Annual increase of bottled water consumption 1999-2001 per region.

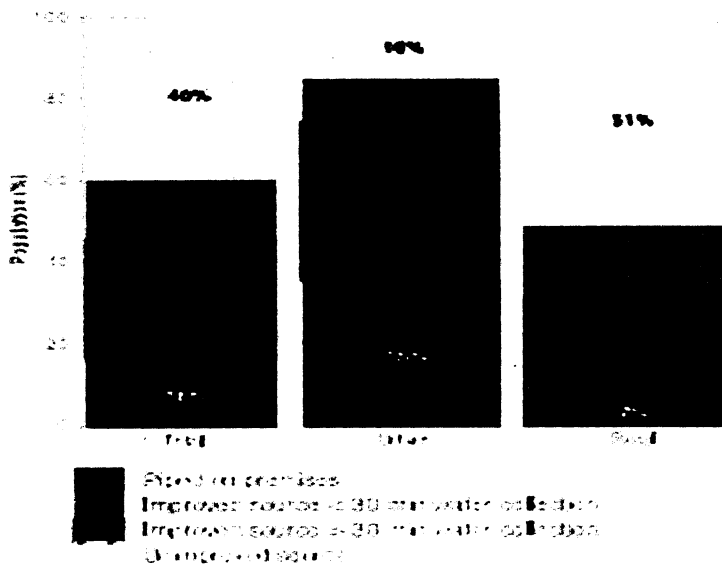


Source: Ferrier, C. (2001). *Bottled Water: Understanding a Social Phenomenon*. WWF Global, 13.

**Table 3.**

Proportion of the population spending half an hour or less or more than half an hour to collect water from an improved source, or using water from an improved source in Sub-Saharan Africa.

**In many African countries, one third of the improved drinking-water sources that are not piped on premises need a collection time of more than 30 minutes.**



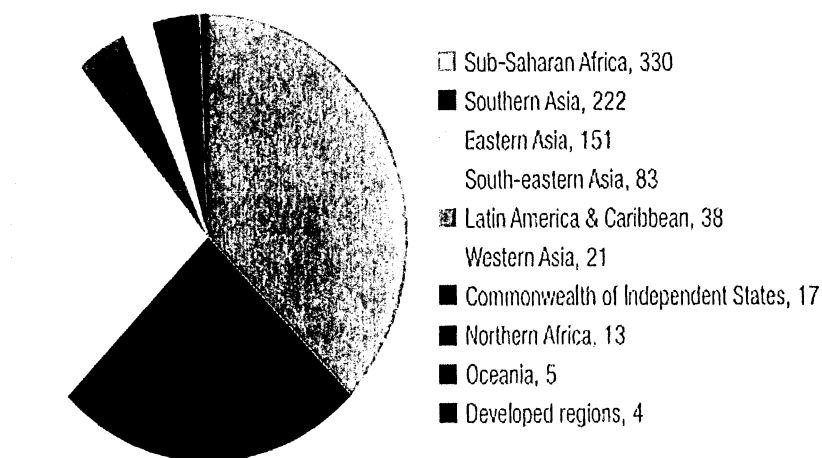
**Figure 3.1** Proportion of the population spending half an hour or less, or more than half an hour, to collect water from an improved source, or using water from an unimproved source, Sub-Saharan Africa

Source: UNICEF. (2010). *Progress on Sanitation and Drinking Water*. Geneva, Switzerland; New York, NY: World Health Organization, 28.

**Table 4.**

Regional distribution of the 884 million people not using improved drinking water sources in 2008, population (million).

**884 million people – 37% of whom live in Sub-Saharan Africa – still use unimproved sources for drinking-water**



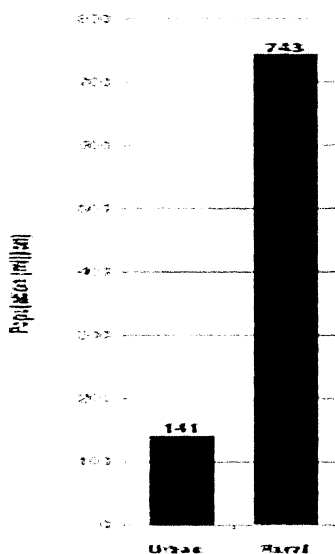
**Figure 0** Regional distribution of the 884 million people not using improved drinking-water sources in 2008, population (million)

Source: UNICEF. (2010). *Progress on Sanitation and Drinking Water*. Geneva, Switzerland; New York, NY: World Health Organization, 7.

**Table 5.**

Urban and rural population without improved sources of drinking water worldwide, 2008.

**84% of the world population without an improved drinking-water source lives in rural areas**

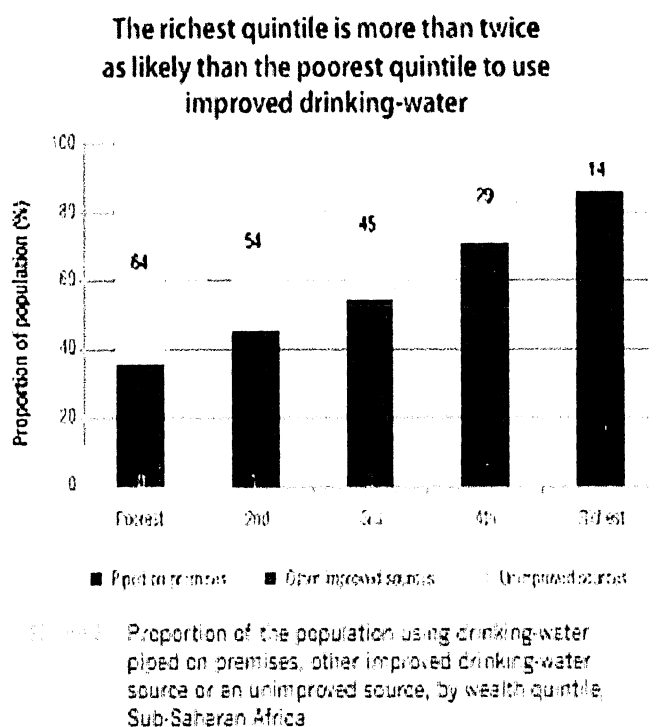


**Urban and rural population without improved sources of drinking water, worldwide, 2008**

Source: UNICEF. (2010). *Progress on Sanitation and Drinking Water*. Geneva, Switzerland; New York, NY: World Health Organization, 18.

**Table 6.**

Proportion of the population using drinking water piped on premises, other improved drinking water source or an unimproved source, by wealth quintile, Sub-Saharan Africa.



## REFERENCES

- Ackerman, F. (2008). *Poisoned for Pennies. The Economics of Toxics and Precaution*. Washington: Island Press, 31-82.
- Anand, P. B. (2007). *Right to Water and Access to Water: An Assessment*. Bradford: Journal of International Development 19, 511-526. Retrieved from EBSCOhost.
- Baer, W., & Montes-Rojas, G. (2008). *From Privatization to Re-nationalization: What Went Wrong with Privatizations in Argentina?* London, UK: Oxford Development Studies Vol. 36, No. 2, 323-337. Retrieved from EBSCOhost.
- Centre, U. N. (2011, March 4). *US discriminates on right to safe water and sanitation, says UN expert*. Retrieved September 2011, from UN News Service:  
<http://www.un.org/apps/news/story.asp?NewsID=37691&Cr=sanitation&Cr1>.
- Cole, D.H. (2002). *Pollution and Property: Comparing Ownership Institutions for Environmental Protection*. Cambridge, MA: Cambridge University Press, 20-66.
- Daly, H., & Farley, J. (2004). *Ecological Economics Principles and Applications*. London, UK: Island Press, 373-387.
- Department of Public Information, News and Media Division, New York. (2010, July). *General Assembly Adopts Resolution Recognizing Access to Clean Water, Sanitation*. Retrieved May 2011, from United Nations:  
<http://www.un.org/News/Press/docs/2010/ga10967.doc.htm>.
- Dugger, W., & Peach. (2009). *Economic Abundance: an Introduction*. Armonk, NY: M. E. Sharpe, 73, 192.
- Ferrier, C. (2001). *Bottled Water: Understanding a Social Phenomenon*. WWF Global, 3-26.
- Grossman, G. M., & Krueger, A. B. (1995). *Economic Growth and the Environment*. The Quarterly Journal of Economics Vol. 110, No. 2, 353-377. Hardin, G. (1968). *The Tragedy of the Commons*. Science Magazine Vol.162.
- Hardin, G. (1968). *The Tragedy of the Commons*. Santa Barbara, CA: Science Magazine Vol.162, 1243-1248.



- Harvey, D. (2005). *A Brief History of Neoliberalism*. New York: Oxford University Press, 64-86.
- Leo, P. (2006, July 20). *Cleveland gets testy over bottled water*. Retrieved August 7, 2011, from Pittsburgh Post-Gazette: <http://www.post-gazette.com/pg/06201/707156-294.stm>.
- McCarthy, J., & Prudham, S. (2004). *Neoliberal Nature and the Nature of Neoliberalism*. University Park, PA: *Geoforum* 35, 275-283.
- Mustafa, D., & Reeder, P. (2009). *People Is All That Is Left to Privatize: Water Supply Privatization, Globalization and Social Justice in Belize City, Belize*. Malden, MA: *International Journal of Urban and Regional Research* Volume 33.3, 789–808. Retrieved from EBSCOhost.
- Nadal, A. (2011). *Rethinking Macroeconomics for Sustainability*. New York: Zed Books, 27.
- Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press, 1-28.
- Power, M. (2009). *Crisis and Regulation: Global Climate Policy and Climate Justice*. Yonkers, NY: *Challenge* Vol. 52, No. 1, 48-49, 57-61.
- Reed, D. (1992). *Structural Adjustment and the Environment*. WWF-International. Boulder, CO: Westview Press, 26-27, 140- 143, 146-48.
- Robbins, P. T. (2003). *Transnational Corporations and the Discourse of Water Privatization*. Bedford, UK: *Journal of International Development* 15, 1073–1082. Retrieved from EBSCOhost.
- Shiva, V. (2002). *Water Wars: Privatization, Pollution, and Profit*. Cambridge, MA: South End Press, xi, 1-136.
- Stiglitz, J. E. (2003). *Globalization and its Discontents*. New York: W.W Norton & Company, 48,65-66, 78, 97.
- Swaney, J. (2003). *Are Democracy and Common Property Possible on Our Small Earth?* Dayton, Oh: *Journal of Economic Issues* Vol. XXXVII No. 2, 261-290.
- Swaney, J. & Evers, M. (1989). *The Social Cost Concepts of K. William Kapp and Karl Polanyi*. Dayton, OH: *Journal of Economic Issues* Vol. XXIII, No. 1, 7-28.
- UNICEF. (2010). *Progress on Sanitation and Drinking Water*. Geneva, Switzerland; New York, NY: World Health Organization, 2,7, 18, 28-30.

- United Nations. (2004). *Commercialization, Privatization and Universal Access to Water*. Retrieved August 2011, from Research Institute for Social Development: [http://www.unrisd.org/unrisd/website/projects.nsf/\(httpProjects\)/E8A27BFBD688C0A0C1256E6D0049D1BA?OpenDocument](http://www.unrisd.org/unrisd/website/projects.nsf/(httpProjects)/E8A27BFBD688C0A0C1256E6D0049D1BA?OpenDocument)
- Vatn, A. (2005). *Institutions and the Environment*. Northampton, MA: Edward Elgar, 252-299.
- Victor, P. A., & Rosenbluth, G. (2007). *Managing without growth*. Toronto, Canada: Ecological Economics 61, 492-504.
- Weizsacker, E., Young, O., Finger, M., & Beisheim, M. (2005). *Limits to Privatization: How to Avoid Too Much of a Good Thing*. Sterling, VA: Earthscan, 21-25.
- Wong, E. (2011, June 1). *Plan for China's Water Crisis Spurs Concern*. Retrieved June 2011, from New York Times: Asia Pacific: [http://www.nytimes.com/2011/06/02/world/asia/02water.html?\\_r=3&adxnnl=1&ref=world&adxnnlx=1307296939-3o2ywQ8UzcerD7Yt3J8O4](http://www.nytimes.com/2011/06/02/world/asia/02water.html?_r=3&adxnnl=1&ref=world&adxnnlx=1307296939-3o2ywQ8UzcerD7Yt3J8O4)



**WRIGHT STATE**  
*UNIVERSITY*