Sustainability and water resources

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ABSTRACT

This paper explores the water resource situation in various world settings. The analysis follows the rubric of sustainability evaluation. The temporal aspect is for contemporary views but with an eye to the future. The triple bottom line approach will assess findings in terms of economic, environmental, and social implications from the use and shortages of water. In developing countries water shortages are related to disease, hunger and poverty. In the developed world water shortages and poor quality has serious economic and quality of life implications. Water is a finite resource.

Key Words: Water, sustainability, triple bottom line, scarcity, drought.

INTRODUCTION

"While Americans fret about rising gas prices, many experts have argued that the major conflicts of the 21st century will be fought over water, not oil" (CLP Mag, 2011).

Sustainability on a business level is focused on what organizations have done, continue to do, and can do better with respect to people, living things, and the environment. Many Americans with a typical understanding of sustainability will likely utter the words "green products." Green products are essentially the output of business-wide efforts to minimize the negative impacts from choices made by the organization. The common belief is that sustainability covers only environmental dimensions, but what many people don't realize is that social and economic dimensions are a part of sustainable development as well. The more common acknowledgements of sustainability include carbon emissions, resource usage, sewage runoff, and waste disposal. Some areas of concern that may not come first to mind include water usage, packaging materials, regulatory compliance, liability, audits, costs, training, company performance, community support, workplace safety and health, employee compensation, employee development and well-being, business ethics, diversity and discrimination, soil contamination, biodiversity, natural habitat protection, natural resource use, and clean, safe water.

A business should always do more good than harm. The value created from an organization's existence must exceed its overall impact to society. Our existence on Earth must not be taken for granted and we shouldn't sacrifice the longevity of our lives and world for the sake of conducting business today. This is where the influence of the triple bottom line comes in. Sustainability efforts can be measured based on the three pillars: people, profit, and the planet. At a minimum, every business decision should consider its impact to them.

You have likely heard about sustainability efforts in the form of corporate social responsibility, organizational social responsibility, corporate social investment, corporate citizenship, or sustainable growth. These terms are often used interchangeably as they have similar meanings in terms of balancing out the concerns of the environment and economics. The terms sustainability and sustainable development are most appropriate for this paper and best infer the topic in a larger societal focus (Blackburn, 2007).

Sustainability concerns must cross international waters and not be thought of as only a domestic issue. Many global companies today are trying to find ways to reduce costs, sustain people, conserve resources, and reduce negative environmental impact. What about foreign countries that have very little in the way of basic necessities? This includes safe drinking water, shelter, clothing, and basic health services.

A major focus of this work is on safe drinking water that remains inaccessible to 884 million people across the globe (Web of Creation, 2010). Water sources often come from unprotected wells, springs, canals, lakes or rivers. Despite some states in the U.S. vying for a reliable source of safe drinking water, many developing nations struggle to attain this necessity on a daily basis.

Efforts are being made in the realm of sustainability. But every single one of them covers the topic of sustainability as a business initiative within the limits of an organization's impact to stakeholders, including shareholders, employees, customers, NGO's, government bodies, and surrounding communities. What about the water scarcities that exist in many parts of Africa and Asia?

How can the U.S. be proud of its sustainability efforts thus far when in retrospect we ignore the most prominent sources of hardship that deem our stateside efforts so minuscule? This is the question that will be at the center of discussion as a stimulant for united efforts in achieving great strides towards sustainability around the world.

WHY WATER

"One of the most urgent challenges facing the world today is ensuring an adequate supply and quality of water in light of both burgeoning human needs and climate variability and change" (NSF, 2011).

Having read several sustainability reports from the likes of Wal-Mart, Starbucks, Target, Weyerhaeuser, Buckeye Technologies, Domtar, Sonoco, and more, one is intrigued by how little interest was granted to water conservation. But concerns don't stop here. One learns about sustainability initiatives being the advantage that companies needed to boost sales, enhance an image, and please stakeholders. However, after reading an article that "being green isn't such a unique thing anymore" and "at the end of the day, sustainability is just one of many things big companies evaluate when choosing suppliers, and it's not usually at the top of the list" (Small Biz Trends, 2011). Does this mean that most companies feel they have climaxed in sustainability efforts because the attention it has gained is supposedly dying down? If that's the case, then there is a new recommendation that arches over individual organization sustainability efforts, and that is creating access to safe, clean water in less developed third world countries.

The sustainable enterprise has potential to increase the standard of living, health, productivity and quality of life to underserved countries in need of some of the survival ingredients we relied on in the U.S. There's a saying that goes "seek opportunities at the bottom of the wealth pyramid (Bid Network, 2011)." Unprotected wells, springs, canals, lakes and rivers are the only sources of water for many of these poor countries and opportunities to extract clean water sources exist all over less developed nations just below the surface, some just a few feet down. Keep in mind, these holes in the ground supply dirty, contaminated water likely accompanied by waterborne diseases. To the locals it may be their everyday water, but here in the U.S. it's considered sewage.

Diseases and water-borne illnesses thrive in these dirty waters, lowering the life expectancy significantly. Nearly the entire Middle Eastern region experiences physical water shortages while the majority of Africa is home to economic water scarcity as well. Yemen and Jordan have the most severe water shortages in the Middle East and North Africa. Governments and policy makers in these countries are starting to realize the costs of water scarcity, which explains 20-30% of the budget being spent on water in Algeria, Egypt and Morocco. Water scarcity leads to inefficient land use, overuse of nonrenewable water resources, pollution, ecological damage, and poorly maintained infrastructure. Some reports indicate water-related environmental problems to cost countries between .5 and 2.5% of their annual GDP (World Bank, 2007). Three quarters of the deaths from poor health in the developing world come from water-borne disease.

THE RAINFALL CYCLE AND SHORTAGES AROUND THE WORLD

As a finite resource, the world's fresh water supply does not increase (Web of Creation, 2011). Reliance is on precipitation from clouds in the form of rain, freezing rain, sleet, snow or

hail to provide for atmospheric water to Earth (Perlman, 2011). The hydrologic cycle begins with "precipitation as evaporation from land and the oceans. Soil moisture is used by plants, which return more moisture to the atmosphere, which then returns to Earth as rain or snow". Not only is fresh water for human needs, but it is relied on by wildlife as well. In fact, 25 biodiversity hotspots, designated by Conservation International, claims that ten of them are located in water-short regions.

The majority of Northern Africa and most parts of Asia struggle with constant droughts. Every part of the Earth experiences different levels of rainfall, even if little distance separates certain areas of varying precipitation amounts. Arica, Chile experienced 14 years of no rain, while Mt. Waialeale, Hawaii is home to an average of 450 inches of rain per year (Perlman, 2011).

Africa, Asia, and the Pacific hold the top three positions for lowest water availability in the world, respectively (VOA News, 2010). "700,000 people in Asia and the Pacific lack safe drinking water" A U.N. Report clarifies that the countries that use the most water for agriculture are the most poor (VOA News, 2011). Some 80% of the water in the Asian-Pacific realm goes towards agricultural purposes. On the other hand, China holds one-quarter of the world's population but contains only 6 percent of the world's supply of fresh water (Web of Creation, 2011).

Two observable indicators tell us that the demand for fresh water is greater than the supply. Major rivers, such as the Colorado, Ganges, Rio Grande, and Yellow are running dry for part of the year, and water tables are dropping everywhere. Rivers stay dryer for longer durations each year, and over-pumping of groundwater is occurring at "twice the rate of natural recharge" in China, India, Mexico, the Middle East, the U.S. and other locations as well. The electronically-powered pumps used to over-pump groundwater are an attempt at keeping up with the growing population in the world. Freshwater wetlands worldwide have been cut in half, and there is no telling how soon they will all be gone (Web of Creation, 2011).

IRRIGATION PRACTICES

Irrigation is the supplying of water to dry lands "by means of ditches, pipes, or streams" to supply water requirements not satisfied by rainfall. It is essentially the artificial application of water to assist in the production of crops and other forms of agriculture. Some 69-70% of water use worldwide is for irrigation, or agricultural, purposes, while 15-35% of irrigation withdrawals are unsustainable, or non-renewable (Web of Creation, 2010). With 40% of the world's grain harvesting produced on irrigated land, the recognized water shortage will soon turn into a food shortage. This presents a critical problem in the world's efforts in becoming more sustainable. Irrigation water from rivers, lakes, reservoirs, and wells is necessary in order to provide food for the world's growing population. Water irrigation is an indispensible asset to the 7 billion lives on planet Earth. Without it, there will not be the fruits, vegetables, and grains to feed everyone (Perlman, 2011).

A popular mechanized method for water irrigation is the "center-pivot irrigation system, which uses moving spray guns or dripping faucet heads on wheeled tubes that pivot around a central source of water." Although considered efficient, only 50% of water used for irrigation is reusable with most being lost by evaporation. On the other hand, the low-tech traditional method of water irrigation, or flood (furrow) irrigation, wastes one-half of the water it attempts to

transfer over to crops. This method, which is the simple pumping of water flow along the ground of the crops, is often found in less developed countries since it is cheaper (Perlman, 2011).

The use of drip sprinklers and other micro-irrigation systems produce more efficient results that can reduce the amount of water necessary to produce crops. Drip sprinklers "can reduce water use by 30-70%, reduce risks of increased soil salinity, and increase agricultural yields" (Gleick, 2007, p.162). Sustainable development should begin here, not in the industry where only 20% of fresh water is used. The other 10% goes to residential purposes despite 4.8 billion gallons of water being flushed down toilets in the U.S. every day (Web of Creation, 2011). However, 90% of the residential water consumed by humans is eventually returned to the environment, ultimately replenishing water sources for future purposes (Perlman, 2011).

Reducing water irrigation in developing countries has presented a challenge since drip irrigation is too expensive. Low-cost drip systems are just not widely available in these parts of the world. With the establishment of water-reducing technologies for irrigation purposes in developing countries, there exists potential for market expansion and more water available for human consumption. Companies behind the water-efficiency technology should be sought out by non-profit organizations, such as The Water Projet and Global Water, in helping address the water supply crises around the world (Gleick, 207, p. 162). The purpose of sustainability initiatives is to sustain the lives of the people on Earth, and achieving more efficient means of water irrigation, where more than 2/3rd of the world's water usage goes to produce food, is a grand step on a global scale in sustaining the world's water supply.

DESALINIZATION

The process of water desalination is one of the earliest forms of water treatment that has remained popular still to this day. Desalination is the extraction of dissolved salts from saline water, or ocean/sea water. Solar desalination is its natural form, which produces rain as the "main source of fresh water on Earth." Water Treatment plants exist in some dry parts of the country to provide a man-made replica of the natural desalination process to transform ocean water to fresh, drinking water

As of 2002, there were 12,500 desalination plants in 120 countries with 70% of the worldwide capacity going to the Middle East and 6% to North Africa. Saudi Arabia, Kuwait, and the United Arab Emirates rely on desalination due to the disturbing amounts of natural and unnatural contaminants. Despite the large presence of fresh water in the U.S., it is one of the top users of desalinated water (6.5%) among all industrialized countries in the world. Although desalination plants are on the rise, the population is growing faster than the U.S. can keep up. In addition to the situation on land, one can find desalination plants on cruise ships(Perlman, 2011).

EFFECTS OF GLOBAL WARMING ON WATER SHORTAGES

It's widely believed that global warming is the number one cause of the shortage of fresh water (Web of Creation, 2011). During the dry seasons around the world, water held as snow and ice in the mountains such as the Himalayas, are melting faster. There's no telling how quickly there will be very little water available during the dryer times of the year. By 2080, half of the world's population may face a shortage of clean water (Ng, 2008). By 2050, the U.N. Intergovernmental Panel on Climate Change estimates that 2 billion people will lack a sufficient supply of clean water, which is doubled the number of people that already lack consistent access

to safe, clean water. More flooding and runoff from disruptive water flow as a result of global warming reduces the availability of drinking water. Asia, especially India and China, is the most susceptible to risk of water scarcity due to the thriving populations, according to the U.N. Panel (Ng, 2008).

Global warming takes many forms of direct impact to the clean water supply in different parts of the world, including the U.S. and abroad. The effects of global warming can come in the form of droughts, which obviously reduce the supply of water. Other areas will experience greater flooding which can damage the water quality, and fluctuations to rainfall patterns will become more common (Ng, 2008). In the U.S., climate change from global warming will change when and where we get snow and rain, particularly we will experience more flooding during the winter with less rainfall in the summer (Pac Inst., 2008). We can also see a gradual increase in rising sea levels, increasing water temperatures in streams and lakes, reducing water clarity and harm to wetlands.

As mentioned above, Asia will likely be a prime victim of global warming in the near future. "Every major river in Asia originates in the snow/ice mass" that exists during the dry months, which could pose a bigger water scarcity issue than the one that exists today (Web of Creation, 2011). In addition, "Rising sea levels, for instance, increase the salt content at the mouths of many rivers, from which many Asians draw their drinking water" (Ng, 2008).

Several different global efforts have been established to prolong the harmful changes to the environment, but there exists additional opportunities to combat global warming. The Kyoto Protocol of 1997 (was really in effect in 2005) was supported by many parts of the world to curb rising temperatures, except for the U.S. It has been met with skepticism and less than 100% support, but there continues to be frequent updates to the protocol anyway. The Climate Stewardship and Innovation Act was established in 2003 and then strengthened in 2005 and 2007 to reduce greenhouse gas emissions. The U.N.'s Framework on Climate Change is similar to the Kyoto Protocol and offers a framework and general agreement to reduce greenhouse gas emissions. Although not directly related to water conversation, these efforts are stepping stones in achieving global support for environment protection and scarce resources conservation.

WHAT DOES UNSAFE WATER DO FOR YOUR COUNTRY

It's rather obvious of the health benefits from clean, safe water in the United States. In developing countries, however, water is sometimes only provided for a few hours every day or a few days a week. Half of the population in developing countries receives water on an intermittent basis. In some poorer underdeveloped countries, public utilities are only available in wealthier parts of major cities, and many areas, such as Afghanistan, have had their water supply damaged or destroyed from years of warfare. Take Rwanda for example, around 6.9 million in a population of 9.5 million Rwandans had access to safe water in 2008. Although a goal of 2015 is set to achieve 85% water supply coverage, it is a challenging goal and one that requires extensive funding and support that is hard to find. Rather than U.S. communities being the recipients of funding and donations, these underserved societies in African countries like Rwanda ought to be. Other surrounding countries suffer just as much, if not more, such as Burundi, Zambia, Zimbabwe, Botswana, Somalia, Tanzania, Democratic Republic of the Congo, and Uganda (World Bank, 2011). The overall life expectancy at birth (beginning with Rwanda) for these countries are 46.2, 52.09, 38.63, 43.5, 61.85, 49.63, 52.5, 46.5, and 51.5 years of age, respectively. This compares to the much higher life expectancy of the United States of 78.3 years

of age. Some countries, such as Japan, Hong Kong and Iceland go as high as 82.6, 82.2, and 81.8 years of age, respectively. Life expectancy is a relevant determinant of well-being with respect to clean, safe water access since a clean water supply is the single most important determinant of public health.

"U.S. tap water is some of the cleanest on Earth, generally safe from the microbes and chemicals that have plagued humans' water supply for millennia. While much of the planet relies on paltry, polluted drinking water, Americans can fill a glass without fear of cryptosporidium, chromium or chlordane" (McLendon, 2011). A 2009 report warned that threats to drinking water are increasing and it ought to not take it for granted. In developing countries, waterborne illnesses account for four-fifths of all illnesses. The World Health Organization estimates that over two billion people worldwide are infected from schistosomes, which are often found in contaminated water in developing countries, particularly Africa. The majority of the one million deaths caused by Malaria each year occur in Africa. In fact, at least 396.8 million illnesses are caused by Malaria each year. More importantly, Malaria is claimed to reduce economic growth in African countries by 1.3% each year over the past thirty years. Elsewhere, 35 million are exposed on a daily basis to elevated levels of arsenic in their drinking water in Bangladesh, resulting in health deterioration and shortened life expectancy (Lenn Tech, 2011).

Despite 70% of the Earth's surface being covered by water, only 2.5% is freshwater and only 0.007% of that is accessible for direct human consumption. Agriculture is responsible for 87% of the total water used globally. If this is so, why is pressure on American businesses not operating in the agricultural industry? The sustainability of people relies heavily on the presence of a safe water source, and that is where the problem lies on a global scale (UMich, 2006).

If it hasn't already been implied above, Asia carries the greatest risk to its water supply in the near future. Its per capita availability of water between 1955 and 1990 has declined by 40-60%. Projections indicate a severe water problem in Asian countries by 2025. These are the type of problems we face in the world. It's hard to imagine that the developed rich countries in the world, including the United States, China and Japan, don't have the resources, knowledge and funding capabilities to make a difference to the foreseeable water problem in developing nations around the globe (UMich, 2006).

WATER BRINGS CHANGE BRINGS LIGHT

With all of the incredible technology and resources that exist today, it's a shame that "a large part of humanity around the world still lives without access to basic necessities" (Shah, 2011). There are two very dedicated organizations that are committed to this cause, Global Water and The Water Project. These non-profit organizations recognize the 1 billion people that suffer without access to safe water. It's these types of causes that big businesses in the U.S. and other developed countries need to contribute towards rather than local communities that are more than well-off compared to the villages in North Africa. The Water Project believes that a child in Sierra Leone should not be spending her day fetching dirty, diseased water from a pit, but rather in school. By connecting donors to proven partners, the non-profit organization initiates drilling for fresh water wells, sanitation and hygiene training and constructing other sustainable water projects (The Water Project).

Global Water (2010) is another non-profit humanitarian organization focused on the development of safe water supplies in rural areas of developing countries. The world's focus needs to be on providing permanent solutions to a region's water needs including sources of

water for domestic uses (drinking, hygiene) and agricultural purposes. There is a strong believer in Global Water's conviction that a lack of access to safe water is the root cause of disease, hunger and poverty in the developing world today. Isn't this one of the root causes to sustainability initiatives by big businesses? Global Water knows that there is enough water to save thousands of lives just 100 to 300 feet away right underground. Global Water has partnered with water supply projects all around the world since 1982 with technical assistance, water supply equipment, on-site volunteers, and financial aid. Many domestic water supply companies have clear opportunities to make a difference overseas just like Global Water. Another example is San Antonio, Texas where their water treatment plant has turned into a gold mine with their cutting edge operation (Fishman, 2012).

By voluntarily dedicating time and resources to such a wonderful cause, a series of wells can be drilled to supply safe drinking water to thousands of people. The new water sources can also be used for irrigation or agricultural purposes, which can benefit both locals and foreign companies seeking business opportunities in these countries. Polluted waters, contaminated waters (from usage by both humans and animals), and virulent diseases that thrive in water are the root causes of 80% of the health problems throughout the world (Global Water, 2010). This statistic cannot be compared to any other and the number of countries without clean water access simply astonishes one. Rather than tending to our constant supply of clean water, a domestic water supply company should donate time to efforts overseas in helping achieve permanent water sources for suffering people in need. Financial aid going directly to African countries often occurs mostly during emergencies for the short-term while longer-term aid often goes awry and misappropriated for personal wealth by corrupt officials or for military spending (World-Poverty, 2010). Loans are supplied to African countries but are often accompanied by high interest rates that make the loan useless. Microloans can be provided from elsewhere in the world on an individual basis to help with small business and water ventures to locals in Africa. One such organization that allows persons to provide a loan to an aspiring entrepreneur across the globe is Kiva (www.Kiva.org).

Issue can be taken with the notion believed by many corporate executives in America that sustainability initiatives are merely signs of kindness to the world. As Nelson Mandela once said, overcoming poverty is not a gesture of charity, but an act of justice (World-Poverty, 2010). Such acts as achieving safe water sources in developing nations are a means to helping overcome poverty. If the world is considered united as one, everyone must work together and bring basic necessities to those in need. It all comes down to sustaining life on Earth, and it goes beyond pressures on businesses to conserve water.

One may wonder why there isn't more pressure on water supply companies to utilize their resources for global sustainability efforts. This brings one back to a topic about whether sustainability reports about the extent of sustainability practices should be uniform and follow the same format. The standardized thinking associated with this prevents prospective outside-the-box sustainability initiatives. Rather than focusing sustainability efforts and the corresponding report on conserving water and reducing waste just within the confines of the company's operations, water supply companies should exploit its technology, capabilities and resources.

Its time our country cut the selfishness and realizes our economic recession is no hardship when compared to the living conditions endured in many African countries. It's clear a large part of Africa, South America and Asia already have water insufficiencies.

WHAT DOES THE FUTURE HOLD?

Of course, predicting the future is always a challenge, and foreseeing where the world's efforts will take us is uncertain. What is known is that water scarcity issues will continue to get more serious as the supply of water is knowingly finite. We can also say that global warming will continue to become a problem and put a strain on our water supply. The Millennium Development Goals holds a crucial target of a 50% decrease in the number of people without access to safe drinking water and basic sanitation by 2015 (VOA News, 2010). Although some endeavors by non-profit organizations have helped raise funds to initiate extraction of underground water and other means, the water supply in North Africa and Asia continues to diminish at an alarming rate. India's significantly growing population only spells trouble for its finite water resources as well.

As it has been learned, climate change is a significant factor on the sustainability of the world's water resources, no matter where one lives. Regardless of whether one lives in America with a steady supply of clean water or Africa with an intermittent supply of clean water, global warming will strain the resource everywhere. Some areas of the world will experience sooner physical and economic water scarcity than others. With life expectancies and populations climbing everywhere, water will become a more sought after resource than ever before. As mentioned above, there are estimates that more than two billion people will most likely lack sufficient access to drinking water by 2050. Let's hope one can attract more support to conserve our water usage, reuse it wherever possible, and avoid wasted water.

It can be agreed by most that the abundant supply of clean water in developed countries is abused and not recognized as a finite resource. Many people don't realize that it should be considered a privilege to have such a constant source of water when one billion are in need.

Speaking to business executives, there are many opportunities out there to reduce the environmental impact and water usage contributed directly by your company's operations. Small lifestyle changes to your employees can add up to make a positive impact, while new technologies and changes to business processes can surpass the entire company. Encouraging a sustainability plan with employees to gain support, build awareness, and reduce water usage is important. Other potential ideas include: seeking consultations by water management companies to seek water-saving alternatives, inform maintenance of importance to stay on top of leaks, ensure pipes are well insulated, seek opportunities to recycle water where possible, reward staff for finding water-wasting leaks, install low-flush toilets and sensor-activated urinal flushing in office and retail buildings, install push taps and reduced pressure faucets. Other suggestions include a suggestion and incentives system to facilitate water-saving ideas among employees, and initiate a water audit to determine recommended water use for operations and monitor utility bills to evaluate monthly consumption (Water Use It Wisely, 2011). Providing incentives to employees and idea champions can really get the ball rolling on employee support. Not only do these propositions help conserve our diminishing water supply, but they will most certainly help reduce utility costs. According to Wal-Mart's Global Responsibility report, the company is reaping significant cost savings by following through with several of the initiatives mentioned above. Interestingly, in Seattle, Washington, there exists a Water Smart Technology Program (WSTP) that actually pays companies up to 50% of project costs towards cost-effective upgrades to water-efficient technology and equipment (Saving Water, 2011).

In a 2010 survey, "water conservation is set to be a top priority for companies over the next five to ten years." "By fixing leaks and better toilets, let alone rethinking how water is used

in production of goods, major companies are figuring out just how smart water conservation is." A CNET article reports that global giants such as Unilever, Kraft, Coca-Cola and Shell experienced greater water savings than estimates had led them to believe after executing water conservation projects (Heimbuch, 2010).

Other initiatives that encompass many aspects of sustainability, not just water, include: telecommunication from home, becoming paperless, virtual meetings, greater e-marketing, ensuring all office equipment is energy-star certified, recycle everything that can be recycled, cut down on transportation costs with fuel efficient vehicles, green buildings, replace light bulbs with fluorescent bulbs, reduce packaging materials, follow through with all safety regulations and obey all laws.

CONCLUSIONS

Even though an ever-increasing population combined with global warming is inevitable, we must still do our best to prolong the negative impact of these occurrences to come. They may hinder our efforts in trying to become a more sustainable world, but all can use a better understanding the world's problem on water. Our water supply issue is not as apparent a sustainability topic as others, such as carbon emissions and air pollution.

It should be noted that despite the majority of this paper focusing on environmental concerns in regards to sustainability, particularly water, there are other areas or topics that are also in need of attention when talking about sustainability. When referring to the business enterprise, this includes general, economic, and social performance as well. The topic of water usage, availability and conservation falls under the environmental aspect of sustainability. The ultimate concern of a business or organization should be the triple bottom line; people, economic performance and the planet. Water has been described as a critical resource that underpins economic growth, underpins social development, and obviously underpins environmental protection-- present and future (Heimbuch, 2010).

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