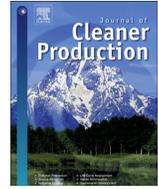




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A review of progress in empowerment of women in rural water management decision-making processes



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ABSTRACT

The authors of this paper explore the links between water infrastructure, water policies, processes and protections, along with mechanisms for women's leadership and decision-making for contributing to rural well-being. The broad-brush strokes approach is our attempt to reveal the breadth and complexity of the interdisciplinary nature of problems, which can only be solved via interdisciplinary and collaborative approaches. Poor, rural women are disproportionately and adversely impacted by domestic and public gendered roles in relation to water accessibility, system design and management, as well as by the high costs of water distribution. The inadequacy of fair water distribution channels is compounded by the growing influence of water privatization advocates. The significant changes in climate and global warming also threaten accessibility to safe water and add levels of competitiveness and vulnerability for people in many regions of the world. The recommendations proposed in this paper underscore the need for proper management of water resources to prevent and to reduce water conflicts and to increase all dimensions of well-being. This paper builds upon literature from four interconnected strategies: 1) investing in water infrastructure to increase well-being; 2) establishing policies and legislation to protect the global commons, human rights and enhance economic well-being; 3) embedding gender equality and women's leadership in water management; and 4) developing strategic interventions to reduce and mitigate adverse global effects by educating for sustainable development, preventing and planning around climate change and enhancing local water management through resisting global privatization approaches.

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1. Introduction

Water is often considered to be the nectar and joy of life, which is essential for all life. Numerous poems, books, articles, movies, plays, poems, songs, paintings, tapestries and dances have been devoted to celebrating water. Water unifies life. Yet pressures are mounting regarding water accessibility. "By 2020, 70 percent of the human population is expected to be living within fifty kilometers (km) of the sea. As a result, water will be considered a problem in terms of source and of waste" (France, 2006). Issues that will be faced by locations experiencing water inaccessibility are not uniform. Poverty and the inability to access water affect a growing

portion of the world's population, particularly women and children who are adversely affected.

Challenges in accessing water are complex and intertwined. Key problems with water inaccessibility may be distilled into the following issues: the obstructions to accessible, safe water supplies; local and global practices that undermine distribution and erode rights and access to water; dysfunctional, patriarchal and disjointed water management systems; and changes in climate and concentrated populations that over-tax water systems. Growing human populations are increasingly challenging the economic opportunities of some regions. Municipalities have not expanded their water management infrastructures rapidly enough to keep up with the growth of their populations. In the place of publicly supported water systems, powerful lobbies are promoting privatization and commercialization of water systems. Challenges due to climate change and global warming are adding to concerns with rising sea levels, water salination and adverse agricultural and industrial practices may threaten water quality through unmonitored/unregulated practices in wastewater management.

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Inadequate water quality and quantity claim millions of human lives annually, destroy livelihoods, compromise dignity and diminish prospects for sustainable economic growth in numerous regions of the world. The strain from inaccessible water is intense. “One fifth of the world’s population, or 1.2 billion people live in areas of water scarcity; this number of people at risk is projected to increase to 3 billion by 2025 as water stresses and populations increase” (Corcoran et al., 2010). The authors of the 2006 UNDP water report and the 2012 UN World Water Report stated that unsafe water and inadequate sanitation cause poor people, especially poor women and children, to bear the brunt of the economic, social, and physical burdens. In spite of focused efforts such as gender mainstreaming, numerous situations of inequality and inaccessibility exist throughout many parts of the world. Various scholars have argued that gender ideology of sex roles enables the maintenance and tenacity of an “enduring, eternal social order” (Singh, 2006) consequently, “androcentrism and male biases continue to remain intact” (Panda, 2007).

Gender inequality and regional hostilities are exacerbated by unjust and imbalanced, inefficient and ineffective approaches to water management and distribution. With predictions of one in four people becoming affected by chronic or recurring shortages of freshwater, the impacts could lead to starvation, mass human migration and conflicts over resources (Cifal Scotland, 2012; UNDP, 2006). Such pressures demand critical review and action. Policies and practices in water system development and distribution that are just, efficient and effective will garner greater attention. Maganda and Petit (2011) along with Solomon (2010) predict that these trying times will arouse innovations that could more equitably, effectively and productively address the supply and, more importantly, the distribution of the world’s water. Solutions are considered that strengthen well-being as framed through spiritual, social, and cultural perspectives as well as based upon the physical, economic and political requirements for human and planetary well-being. In this context, including the leadership of rural and indigenous women is essential in addressing water systems, quality and security (Anderson et al., 2011). In the following paragraphs, the authors of this paper provide an overview of the approach to this study and reveal challenges articulated and corroborated in disparate parts of the world. Efforts are made to offer a new distillation of issues involving water and women along with recommended practical and philosophical solutions.

2. Methodology

This paper is a synthesis of a review of disparate but related bodies of literature revealing some of the confluences of water and women. Although desirable, it was not achievable in the scope of this study, to undertake a comprehensive review of all relevant bodies of literature. This review was designed to investigate obstacles and challenges and to reveal innovations and directions that draw water and women together. Recommendations proposed are based on successes from empirical studies and documented in the findings in the literature that blend intuitive, theoretical and practical ways of knowing.

2.1. Challenges

Challenges with water – too much or too little or too dirty or too costly – are often contentious and destructive, but they can also lead to the demise of communities, and to death. Issues with water are mounting in many regions in Asia, Africa, the Middle-East, southern Europe, the American southwest, Mexico, the Andean region and Brazil (WEF, 2011). More and more people are living at least 0.6 mile away from the nearest water source, some being

unsafe drainage channels, trenches or streams.² Concerns with accessible and safe water impose several problems and threaten poor women’s well-being. See Table 1 for a listing of issues that become more severe for women when they are confronted with water insecurities.

The following is a list of seven pressing issues that emerged from the literature:

- 1 Water insecurity contributes to poor mental well-being;
- 2 Spiritual and physical well-being being undermined by eco-disequilibrium and disrespect;
- 3 Gender violence is associated with unsafe and inaccessible water;
- 4 Climate change, inconsistencies in rainfall, harvests, community income, and global pressures in commodity trading have dramatic impacts on rural well-being and gender equality;
- 5 Legislation that prohibits women’s entitlement to resources and land creates numerous problems;
- 6 Gender inequality is maintained by political philosophies, policies and practices;
- 7 Strategies to privatize and commercialize water are rapidly expanding.

In the following paragraphs, the authors elaborate on those seven pressing issues.

2.1.1. Water insecurity contributes to poor mental well-being

With women having to assess and decide which water source they access, they often struggle with making a choice between providing water for the family or putting the family’s health at risk (Sultana, 2011). It is not hard to fathom how painful it would be for any parent to cope with the challenge of finding that many of the water sources were unsafe and could potentially contain arsenic. Despite such threats to life and well-being, the central role of women in water governance is inconsistent and is often absent. Singh (2006) described the token involvement of women in water management. In a study of 121 rural water projects, about 17 percent had high levels of women’s involvement and a decade later the participation had not increased significantly in number or in meaning. Singh found that women were often discouraged by and disinterested in the decision-making processes. This may have been fueled by low confidence levels in the efficacy of the systems to include their inputs as well as lacking confidence in themselves. Studies also indicate little support from their husbands who regarded outside activities as impeding their fulfillment of their domestic responsibilities (Singh, 2006; Ivens, 2008; Harris, 2006).

2.1.2. Spiritual and physical well-being are undermined by eco-disequilibrium and disrespect

Poor, largely rural women, contend with multiple issues that threaten themselves and their families when they are forced to fetch water over long distances and to consume unreliable water (Sultana, 2011). Women suffer spiritual and physical strain when family members are at risk or become ill from water borne diseases from contaminated water. Water is the calibrator of life; the state of health of the planet’s water correlates with the health of its peoples. The degrees to which people collectively respect, care for and steward their water supplies, affects individual spiritual and community well-being (Anderson et al., 2011). When the integrity of eco-systems and watersheds are undermined, people’s spiritual and physical health becomes compromised. Such deficits in responsible stewardship influence and place strains on other

² hdr.undp.org/en/media/HDR_2006_FR_Chapter1.pdf.

Table 1

Issues, which become more severe for women when they are confronted with water insecurities.

Water issues for poor rural women	Description	Authors
1 Water insecurity and poor mental health	Water insecurity, like food insecurity, pressures women to worry and be stressed about unsafe and unreliable sources and fear of water-borne illnesses such as typhoid. Accessing water demands time and can involve sleep deprivation, and imposes time pressures and tensions in families. Children may miss school to help with water collection. Issues with water access may include arguing with neighbors as well as with strangers. Some social interactions associated with water collecting cause a considerable amount of anxiety from being belittled or bullied by more powerful community members when accessing water or emotional pain when having to seize water from non-sanctioned locations. Burdens of poor mental health may include shame and embarrassment over soiled clothing or the inability to offer guests water.	Stevenson et al. (2012) as well as Sultana (2011) concluded that there is a positive correlation between stress and water insecurity; women who experienced greater water insecurity experienced more symptoms associated with poor mental health. Wutich and Ragsdale (2008) and Wutich (2009) further support the negative psychosocial impacts of water insecurity and water-related stress. Wutich (2009) additionally pointed out that women and young girls are also susceptible to self-esteem issues when they are unable to conform to social norms of hygiene and beauty. Singh (2006) and Panda (2007) argued that women are forced to contend with additional challenges and burdens when they are forced to endure the ubiquitous and tenacious social order of androcentrism and male bias
2 Gender violence	Women experience domestic pressures for performance around securing and ensuring the availability of water in the household. Shortages of water are causing adverse impacts on marriages and increasing violence towards women. Women are subjected to domestic violence if they are delayed in collecting sufficient water. There are public threats of sexual violence when women and girls seek water and latrine facilities	Stevenson et al. (2012) studies in Ethiopia as well as Karim et al. (2012) research in Bangladesh found women were vulnerable to abuse by husbands due to the women's inability to complete housekeeping tasks such as washing clothing, cooking, etc. Tandon (2007) and Reddy & Snehathatha (2011) found that women who had to travel long distances to collect water as well as those who had to seek privacy due to lack of latrine access, were subjected to rape and violent attacks by men. UNDP (2006) and UNEP, 2010 addressed the crisis in water as one prompted by inequality, poverty, power and abuse not as a simple issue of availability
3 Physical and spiritual health implications	Poor women endure the pain of hauling water. There are also threats of physical illness from water borne diseases. In addition to numerous gastrointestinal illnesses resulting from bacterial and fecal contamination, illness or death as the result of heavy metal or chemical contamination are constant concerns for poor mothers and caregivers of others. Any disrespect for and carelessness with water and its life sustaining properties erodes spiritual well-being and the important role of stewarding resources prudently and passionately.	Sultana (2011) found that women were confronted with multiple issues that impacted the physical health for themselves, their children and partners due to fetching and consuming unreliable water. Fecal contamination is often a source of water-borne pathogens transmitted through drinking water (Ashbolt, 2004). Anderson et al., 2011 stressed the relationships and impacts pertaining to water in spiritual and community well-being as well as in physical health, for good or for ill.
4 Political obstacles and gender inequality	With a lack of support from husbands and the perpetuation of gender biases, there is less female leadership and thus they fail to engage in outside activities. Political activities can be seen as distractions from domestic responsibilities and their gendered roles.	Panda (2007) and Singh (2006) found women are limited by existing gender biases in development and management of water distribution. Women have had limited participation in community efforts to distribute and manage water equitably (UN World Water Report, 2012; Harris, 2006). Iven (2008) undertook extensive studies of water projects in various locations. The research revealed that gendered efforts are achieving much less impact than designed or desired.
5 Legislation: limiting entitlement to water and land	Changes in land use, or appropriation of water sources by state and industry for development needs or urban water supply have led to the disappearance of water sources commonly accessed by women through informal mechanisms. Pre-existing gender roles hinder women's abilities to participate in water policy development even at the most basic levels. In many jurisdictions women are afforded very limited rights to water and use of river systems thus reducing access for irrigation, business needs or domestic use.	Marra (2008); UN World Water Report (2012) and Delgado and Zwarteveen (2007) found that it is often very time consuming and unpopular in communities for women to be involved in policy decisions regarding water. Legislation dictating land and property rights excluding women in decision making and simultaneously eradicating the informal methods of acquiring water are prevalent (Panda, 2007; Harris, 2009). Deere and Doss (2006) found impediments for women ownership in legislative codes. Additionally, in countries such as Bolivia, women control on average 30% of the water rights, and control approximately 20% of the use of river systems (Saldias et al., 2011)
6 Impact of climate change on gender equity and Well-being	Climate change exacerbates the pre-existing struggles poor women face in regard to access, collection, and distribution of water resources. Climate change, causing fluctuations in water levels globally, has also been responsible for the development of mutations and adaptations of water-borne pathogens (Ashbolt, 2004).	Chant (2003) provided frameworks for gender and poverty and Bradshaw, (2004) offers gender and disaster studies and Angula (2010) and Otzelberger (2011) furnished insights on climate and gender studies in Namibia (See Angula references for other gender and climate change studies in differing countries). Novo (2012) wrote about the 'moral drought' around equitable water practices while Alston (2011) and Anneck (2002) provided insights on implications for women from increasing threats of physical droughts. Women from the north and south are adversely affected by droughts. With the onset of severe droughts, women have to travel further to gain access to water, they face increased hostility from family and neighbors due to limited water, and are spending more time involved in both collection of water and farm labor, leaving little time for household duties let alone participation in activities outside of the home (Tandon, 2007; Angula, 2010).
7 Actions to privatize,	Often, improper sewage treatment, industrial/agricultural runoff or the breakdown of piping systems (Khan et al., 2012), result in	Supporters of market environmentalism suggest that if natural resources are treated as economic goods, environmental goods will be more

(continued on next page)

Table 1 (continued)

Water issues for poor rural women	Description	Authors
commercialize and profit from water	low-income areas of the world being vulnerable. Bangladesh and Pakistan, for example, documented sulphates, nitrates, arsenic and mercury contamination in unprotected water sources accessed by many poor women (Sultana, 2011; Khan et al., 2012). Non-profitable operations are often abandoned by MNCs with the public sector then required to ensure water provision. Well-organized, politically led, public sector provision of water services is the most enduring.	efficiently allocated and more prudently used (Bakker, 2007; Cashmore et al., 2006). Multinational corporations' (MNCs) attempts to privatize water have resulted in water being less accessible to women, blocking them from a vital resource while perpetuating development inequalities (Maganda and Petit, 2011; Harris, 2006, 2009; Shiva, 1998; Panda, 2007; Van Houweling et al., 2012). Industrial control of water (Nikiforuk, 2010; Barlow and Clarke, 2002) and national and regional water damming and diversion, are subjecting many communities to misery inflicted by floods or droughts (Jorns, 2007). WEF (2011) and de Villiers (1999/2003) also reveal the detrimental impacts of taking a purely economic standpoint on the rural poor, highlighting multiple roles water plays in the rural economy. Studies in Africa and South America found that far reaching, innovative approaches to increasing community and household access to water come from communities, public authorities and political activities more than is being initiated by multi-national corporations (Hall & Lobina, 2007; Banerjee, 2008). Aviso et al. (2011) offer models for industrial waste management and measuring and mitigating water footprint

relationships as well. The following sections address diverse considerations of violence and gender associated with water inaccessibility and mismanagement.

2.1.3. Gender violence is associated with unsafe and inaccessible water

Research findings have documented direct links between global climate change and civil conflicts (Corcoran et al., 2010; Banerjee, 2008; Faeth and Weinthal, 2012; Solow, 2011; WEF, 2011). Violence can be found in relationships to women and water in cross-border, regional, communal, and domestic scenarios. Dirty water is an abomination and violent. Irresponsible and indifferent wastewater management also can be seen as forms of violence against people, particularly poor women. This issue is growing in severity with 80 percent of wastewater being discharged untreated into water bodies. Contaminated and polluted water kills more people than all forms of violence including wars (UNEP, 2010). Irresponsible water and waste management are responsible for illness, misery and death. Such violence generates incalculable costs through epidemic deaths, particularly in children and leads to devastation of livelihoods and ecosystems. "Although people differ a great deal in their values across cultures, everyone, everywhere is concerned about their children, and when children are sick and dying, people are always deeply upset" (Homer-Dixon, 2001). Is it not the human condition to want to, to need to, do everything possible to avert pain and suffering and death of family members?

2.1.4. Climate change, inconsistencies in rainfall, failed harvests, poor community income, and global pressures in commodity trading have dramatic impacts on rural well-being and gender equality

In explaining why climate change and global warming feed conflicts, Hsiang stated that such conflicts are worsened by social inequality, poverty, and underlying tensions. With climate change impacts, crops fail, work is disrupted, and taking up arms can be a way to earn an income (Hsiang as cited by Solow, 2011). Climate change is ushering in numerous changes in regional water supply and variability, which are resulting in uncertainty and strain (WEF, 2011; UNDP, 2006) "[C]limate change is perceived to be the most significant problem facing the world today. It is expected to affect global freshwater resources as precipitation patterns change, glaciers melt and sea levels rise" (Aviso et al., 2011). Novo (2012) wrote about the 'moral drought' around less availability of safe water through complications from climate change. Alston (2011) and

Annecke (2002) wrote about their research on increasing threats of physical droughts and their impacts upon women. Women from the north and south are adversely affected by droughts. With the onset of severe droughts, women have to travel further to gain access to water, they face increased hostility from family and neighbors due to limited water, and are spending more time involved in both collection of water and in farm labor, leaving little time for household duties or for participation in activities outside of the home (Tandon, 2007; Angula, 2010).

Changes from climate and global warming are increasing threats to livelihoods, sanitation, as well as community health of some residents of the global South. Multi-year droughts as well as devastating losses of wetlands, serious reductions in food production are causing declines in food and water supplies that are resulting in skyrocketing food prices and pressures in food commodity trading. Such food crises compounded by further scarcity of clean, accessible water contribute to insecurity, instability and dangerous tensions (Langton and Prasai, 2012; Roche, 2003). Schindler and Adamowicz (2007) found that between 1980 and 2005, 16 out of 21 civil conflicts involved water. Many countries need the waters flowing from the same source. For example, Ethiopia, Sudan, and Uganda are developing designs and working to build new dams on the Nile that will divert water from other communities and countries downstream (Jorns, 2007). The ongoing wars between Israelis and Palestinians are, to a large extent, due to inequitable access to the limited water resources; this situation will intensify as climate changes become more severe and as the human populations continue to increase. The conflicts about Turkey's plans to build 22 dams on the Euphrates will fuel hostilities between Iraq and Turkey (Shiva, 2002). Anwar Sadat, former president of Egypt, warned that any upstream actions that would endanger "the waters of the Blue Nile...will lead to war" (as cited in Jorns, 2007). Water shortages within communities and countries often prompt demonstrations and clashes with authorities. Many cities and farm communities are finding it difficult to "mobilize enough water to satisfy the food, industrial, and domestic needs of their citizens" (Postel and Wolf, 2001).

Changes in climate and global warming also are implicated in water contamination and reduced availability of safe water. This leads to pressures on poor women to locate additional sources of water for household and business use. Domestic violence has been found to increase in such circumstances. Stevenson et al. (2012) conducted studies in Ethiopia and Karim et al. (2012) made

inquiries in Bangladesh and found women were vulnerable to abuse by husbands due to the women's inability to complete housekeeping tasks such as washing clothing, cooking, and family care. Tandon (2007) and Reddy and Snehalatha (2011) found that women who had to travel further to collect water due to droughts were vulnerable to rape and violent attacks by men.

2.1.5. Legislation that prohibits women's entitlement to resources and land creates numerous problems

Several issues of power and politics are emerging. "Rural women often rely upon common water resources such as small water bodies, ponds and streams to meet their water needs, but in many regions these sources have been eroded or have disappeared due to changes in land use, or have been appropriated by the state or industry for development needs or to supply water to urban areas" (UN-WWRD4 2012). Such political practices impose suffering on the most vulnerable through the misdirection of their water sources and undermining their rights to water. Troubles also surface when water systems are mismanaged and mistreated. If the responsibility for drinking water is managed by one agency, and irrigation water is stewarded by another and the water supplies for energy and mining industries are managed under a different authority, then inevitably uncoordinated water resource development and management result (UN WWRD4, 2012).

A significant impediment often faced by women is the historical barrier to their owning and using their wealth. Various civil codes and legislation have set limits on women's property rights. "Legal or formal water rights (to control water) are typically vested in farmers (landowners) or household heads, the man" (Roy and Crow as cited by Panda (2007)). In countries such as Turkey, Syria, Somalia, Namibia women's ownership rights are contested with direct implications on economic power and influence in the family and community. "Following from the formalization of privatized land and water rights instituted with legal reforms of the early 1990s (including the 1992 Water Law), informal mechanisms through which women had previously accessed water were effectively overridden, resulting in a dismantling of community organizations and the effective disenfranchisement of women from land and water resources" (Harris, 2009). According to Deere and Doss (2006), these restrictive legislative codes are influenced by the state, the family, the community, and by the market. "Water depletion takes place due to this 'patriarchal water order', which devalues it as a resource as well as those who provide water to society – the women," (Panda, 2007). This brings us to issues of gender inequality.

2.1.6. Gender inequality is maintained by political philosophies, policies and practices

Gender inequality is actively maintained or mediated by political philosophies, policies and practices. Yet while greater attention is being focused on water issues from a gender-differentiated perspective, Ivens (2008) found that gendered efforts have had limited impact and lenient practices around resource management, access, and governance of water resources often destabilize public water systems and erode public trust. Strategies for water management without embedded gender equality and adequate community engagement and confidence building are ineffectual (Ivens, 2008; Panda, 2007). Gender differentiation and inaccessibility to resources and rights continue to be prevalent in regard to land tenure and other resources, including water. "The scarcity at the heart of the global water crisis is rooted in power, poverty and inequality, not in physical availability" (UNDP, 2006). Without attention to the root causes and the impacts from neoliberal practices, efforts to mainstream gender become ceremonial and dysfunctional (Maganda and Petit, 2011). Harris (2009) referred to

the literature study by Williams entitled "Globalization, privatization, and a feminist public", that indicates that privatization trends and neoliberal practices are "likely to be harmful to women. Her conclusions were reinforced by work on gender and water from Latin America and from other contexts" (Harris, 2009).

2.1.7. Strategies to privatize and commercialize water are rapidly expanding

For businesses to be viable, profits are essential. One important path for corporate profitability is to have secure access to resources, like water, at *reasonable or ideally, reduced rates* and to be able to sell the water at higher rates. The path to privatize water, it is argued, is to have it interpreted as an "economic good." This would subject water to market forces where consumers who value it will be willing to pay for it. Early in the 1990s this commodification of water became almost ubiquitous; this was aided by agreements carved out at international forums that steered the focus to efficient and equitable use of water and enabled the designation of water as an *economic good over a public good*. Those with vested interests, governments, civil society, scientists and academics, along with transnational and multinational corporations (MNC) integrated themselves into such international events. Whether these international forums afford equitable access to power and decision makers is a matter of debate. But what is evident is the "water politics" that has and continues to unfold.

Contrasting viewpoints are at the core of the arguments for the privatization of water resources. While water and human rights advocates argue for the recognition of water as a public good and a human right, other voices, increasingly sophisticated and often surreptitious lobbies for neo-liberalization or market environmentalism, have fought for and won numerous expansions in the commercialization of water (Bakker, 2007; Harris, 2009; Nikiforuk, 2010; Heynen et al., 2007). Clearly there is not a shared agreement on rights to water. Cashmore and colleagues (2006) suggest that privatization processes produce positive as well as negative affects, both financially and politically. Governments are prepared to go to great extents to ensure their countries and resources are attractive to business and development opportunities. "A 1975 Philippine government advertisement placed in *Fortune* magazine declared: 'To attract companies like yours ... we have felled mountains, razed jungles, filled swamps, moved rivers, relocated towns ... all to make it easier for you and your business to do business here'" (Korten as cited by Banerjee (2008)). MNCs have seized the opportunities afforded by pro-market, neoliberal policies. "[S]omewhat distinct from forestry, mining or other sectors, the water industrial sector is dominated by several large private firms that have become particularly influential in furthering these shifts in international agreements and water policy circles" (Harris, 2009). Transnational and multi-national corporations like Coca Cola, Pepsi, Nestle and Danone have been instrumental in scripting and using language in neoliberal international trade agreements to secure rights to extract and sell national water as bottled water. Suez and Veolia have negotiated control of about 70% of the world's water privatization systems (Harris, 2006, 2009; Banerjee, 2008).

International trade agreements involving water fail to incorporate true cost accounting of the social, political, environmental, physiological and communal implications of extraction practices. "Economists have also expressed pro-privatization bias, without a full accounting of health benefits of water and of the microeconomic pricing conditions that warrant public supplies of free 'life-line' water allocations" (Bond, 2010). In several extraction industries, including the extraction of water, responsibilities for the care of the water resources are not covered by the private sector and consequently damages, social and environmental costs are being "externalized". These costs become the burden of

communities in which resources are extracted and are not internalized by the MNCs.

The dysfunction of this system and the grievances against water harvesting are many; the processes of commercialization and privatization are usurping human rights and undermining well-being (Shiva, 1998; Panda, 2007). In diverse empirical studies, neo-liberalization forces have been criticized for generating inequitable and destructive results (Maganda and Petit, 2011; Barlow and Clarke, 2002; Harris, 2006, 2009; Banerjee, 2008). Shiva argued that patriarchal control of water is increasingly being manifested as water is becoming 'commodified' and the rights to water are being determined through capital and political powers. Others argue that the pursuit of profits should not be allowed to adversely impact water quality and accessibility (Barlow and Clarke, 2002; Bakker, 2007; Beltrán, 2004).

In her research, Harris (2009) found a significant body of research papers on gender and water but very little work on the consequences of the recently evolving neo-liberalization shifts. While many corporate and governmental leaders may adhere to principles and practices of cleaner production and some have become advocates for corporate social responsibility (CSR) (Lambooy, 2011), the growing industrial control of many resources, without adequate protections for human rights and social and ecological consequences, undermine well-being. Some have succeeded in dismantling the resource regulatory structures and/or in reconfiguring state support for market operations (Harris, 2009). In a study of women's roles in water management in Bolivia, Beltrán found that corporations were "taking over the neighborhood water networks and were not investing in them. They were, however, charging for installing meters, and charging significant rate hikes for users connected to the system. In all of these measures the company completely lacked transparency" (2010). Marq de Villiers, who has widely researched the declining state of the world's water stated, "Without any exaggeration, the Aral Sea has become the greatest man-caused ecological catastrophe our benighted planet has yet seen, an awful warning of the consequences of hubris, greed, and the politics of ignorance" (de Villiers, 1999/2003). Production practices that exceed the eco-system's natural cleansing capacity are resulting in contamination of the surface and ground water through high levels of pesticide, fertilizer, and manure use. How agricultural production and profits are managed are of central concern to water stewardship since agricultural industries are the greatest consumers of water.³

With neoliberal policies in place in many developing economies, significant transitioning to irrigation-based and mechanized agricultural production are underway. Work burdens are not equally distributed across gender. Research revealed that women and children experience increasing work demands in a variety of work arrangements, particularly in agriculture and that these imbalances across gender are present in many regions (Harris, 2006; Klawitter and Qazzaz, 2005; Stevenson et al., 2012; Sultana, 2011). Ahlers (2005) (as cited by Harris, 2009) found that emphasizing market mechanisms and particularly efficiencies in industries had the effect of overshadowing the central role women play in the provision, management, and safeguarding of water.

2.2. Co-creating sustainable solutions

Through this review of the literature, multiple issues have been identified that could be addressed through strategic coordination and commitment. The complexity of the interrelated issues of

water access, management, and protection necessitate interconnected, systemic solutions. Faeth and Weinthal (2012) suggested that systematic strategies should be developed and implemented, which engage women in resource management plans, strengthen regional institutions, promote scientific dialogue, and capitalize on and build local resiliency, problem solving, and comradery. In a critique of numerous water projects, Ivens (2008) summarized commonalities amongst successful interventions. These included: encouraging the participation of women in decision-making, having additional programming that focuses on alternative income-generating activities, and developing and using a deliberate plan to address publicly and privately the existing gender imbalances within the community. Various international forums on water, such as those emerging through The Dublin Principles,⁴ the Global Water Partnership, Gender and Water Alliance along with many other bodies are promoting improved, integrated water resource management (IWRM). They recommended the strengthening of regional institutions, promoting scientific dialogue, and harnessing social capital as pathways to increase the representation and rights of women through equal participation, leading to more sustainable water sector strategies. The Dublin Principles are focused upon increasing women's opportunities and responsibilities in water management with commitments from all levels of government including the smallest communities. Through them community leaders and developers are being encouraged to become engaged in implementing the key steps articulated at the forum in Dublin, which were designed to:

- 1 alleviate poverty and disease;
- 2 protect against natural disasters;
- 3 conserve and reuse water;
- 4 pursue sustainable urban development;
- 5 wisely steward agricultural production and rural water supply;
- 6 protect aquatic ecosystems;
- 7 resolve water conflicts;
- 8 ensure that all are collaborating in an enabling environment and operating from a knowledge base and with an approach to capacity building.

The solutions developed to make progress on these eight steps are summarized in the form of the following four interventions:

- 1) Invest in water infrastructure to increase physical, social, economic, and community well-being;
- 2) Harness policy and legislative tools informed by scientific inquiry and collaboration to protect the global commons and human rights and to enhance the well-being of the poor;
- 3) Deliberately embed women's leadership and equality in community planning, design, and decision-making processes that bolster social, psychological, and spiritual well-being;
- 4) Increase local well-being through recalibrating global effects through reducing climate change, educating for sustainability, and resisting water privatization and commercialization efforts Fig. 1.

These four strategies to catalyze implementation of the Dublin Principles are addressed in the following paragraphs:

2.2.1. Invest in water infrastructure

Many benefits accrue from investments in water infrastructure, such as piped water systems and masonry and rainwater tank

³ See the special issue on: Sustainable agriculture, *Journal of Cleaner Production*, volume 12, issue 5, pages 457–543 (June 2004).

⁴ <http://www.wmo.int/pages/prog/hwrrp/documents/english/icwedece.html>.

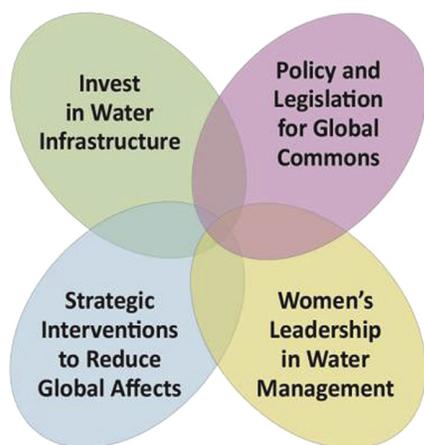


Fig. 1. A diagram of the inter-connections among these four interdependent strategies to help to catalyze implementation of the Dublin principles.

development and maintenance (Houweling, 2012; Aladuwaka and Momsen, 2010; Payne, 2008). “Appropriate investments in water use, sanitation, and conservation are essential for reducing vulnerability among the poor, for ensuring sustainable development, and for promoting security in a period of climate change” (Faeth and Weinthal, 2012). Collaborative, adaptive and practical solutions are needed for questions like, “How should our water best be stored, and which types of storage facilities should be used to minimize risks due to long-term climate variability and change?” (WEF, 2011). Maganda and Petit ask, “How can we achieve sustainability without sharing access, costs, benefits, and of course governance of ENR [environmental and natural resources] needed for all human activities?” (Maganda and Petit, 2011). The first of the Dublin Principles states, “[S]ince water sustains life, effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems. Effective management must link land and water uses across the whole of a catchment area or groundwater aquifer” (1992).

In a joint report in 2010 from UNEP and UN-Habitat, they found that investing in clean water would pay multiple dividends from overcoming poverty and in assisting in meeting the other Millennium Development Goals. It also makes economic sense. According to a recent report from the Green Economy Initiative, every dollar invested in safe water and sanitation has a payback of US\$3 to US\$34 depending on the region and the technology deployed (UNEP, UN-Habitat).

2.2.2. Harness policy and legislative tools informed by scientific inquiry and collaboration

Legislative tools can be employed to protect the commons and human rights. As fundamental to all life, water should be protected as a common resource, treated as a public good, and honored as a human right. No. 2 of the Dublin Principles emphasizes the importance of power being shared and tools of policy and legislation being employed. “Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.” Governments, policy makers, scientists, and activists have, at their disposal, many tools to enhance community well-being through ensuring safe and accessible water. One example is aligning forces in designing and supporting income generation strategies in poor communities such diversification of income, can reduce vulnerability and increase adaptability to changing circumstances (Houweling, 2012).

Additional strategies for sustainable solutions of water management challenges are arising from effective water agreements and monitoring bodies that reduce natural, economic, technical and social uncertainties through defining who can use what water, how much, when and for what purposes. Lam and Ostrom (2010) found in analyzing communities, which prioritize, plan for, and invest in water systems, that they experience greater sanitation success and fewer waterborne illnesses. Such proactive, scientific approaches serve to enhance all dimensions of well-being and to mitigate problems. Technical and scientific cooperation contribute significant functions in reducing regional hostilities over water allocations, sustaining peace and depoliticizing relations and building trust and confidence (Faeth and Weinthal, 2012). Postel and Wolf found that in examining 1831 international water-related agreements that two thirds were of a ‘cooperative nature’ and observed many nations increasingly working jointly on scientific and technological strategies (2001). In this context, forming multi-sector and trans-disciplinary scientific and technical mechanisms for cooperation is very likely to aid in preventing hostilities and in managing post-conflict resolutions (Sarkar et al., 2007; Ostrom, 1998, 2007; UN WWRD4, 2012).

2.2.3. Women’s leadership in water management

Water and gender have been the focus of many international forums. Principle No. 3 of the Dublin Principles, suggests the pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements. Acceptance and implementation of this principle requires positive policies to address women’s specific needs. This may include equipping and empowering women to participate, at all levels, in water resources programmes, including decision-making and implementation, in ways defined by them.

Clearly women do not constitute a homogenous group as they hail from and are impacted differently by experiences in caste, ethnicity, religion, and positions in the community. Empowering participatory community approaches, appear to help build trust, cultivate skills in collaborative decision-making and problem solving and in so doing, contribute to resilient water systems and communities (Anderson et al., 2011; Reddy, 2011; Iven, 2008; Ostrom, 2007, 2011). Direct and deliberate strategies to achieve gender balance in homes and communities are necessary to achieve greater advancement of community well-being, including equity and justice. When governments, civil society, businesses and individuals proactively establish principles and practices of including women’s leadership and community engagement in water sector management these efforts are having positive influence in achieving more just, sustainable, and efficient use of water (Panda, 2007; Singh, 2006; Shiva, 2002). Shah (2002) provided examples of participatory irrigation management from Gambia where women were involved in the constructing and maintaining of field channels. This engagement strengthened their leadership skills and their abilities to orchestrate needed changes, which included demanding fair compensation for their contributions. In the Philippines, the role of women in management of cash flow and pricing policies also brought them into direct roles as collectors of water fees and as more powerful agents in the water system (Shah, 2002). In rural Gujarat, India, community members observed positive changes in women’s conditions and positions through a ‘Women, Water and Work campaign.’ This collective action by diverse women has been maintained through strong grassroots institutions, the availability of technically skilled women, and the demonstrated capacity of women’s groups to work through social barriers and continue dialogue with the state.

Women’s active leadership is needed to a) design input for effective solutions; b) avoid costly mistakes through poor, ill-

conceived designs; c) ensure greater sustainability of projects; d) achieve maximum social, environmental, and economic returns; e) and advance the Millennium Development Goals, particularly for addressing gender equality, child mortality and hunger (Dublin Statement, 1992; GWP, 2006; Panda, 2007). While not emphasizing women distinctly, Cornwall and Gaventa, argued that the status of citizens can be aided through shifting the focus from ‘users and choosers’ to ‘makers and shapers’ (2001). Additional arguments were presented for increasing women’s equality by protecting the commons (Bakker, 2007; Shiva, 2002) and opening up “new political, ecological and socio-natural relationships through which an ethic of care – for non-humans as well as humans” is used (Bakker, 2007, 448). In stories from various regions in the world, women are central figures needed in decision-making, protecting, collecting and cleaning, storing, regulating, and distributing water.

Any initiative designed to facilitate achieving better gender balance can monitor progress by analyzing three main processes. The first would necessitate a systematic identification of differences in roles, status, positions and privileges of women and men and the arising community patterns in making decisions and achieving results. Secondly, the role of women would become more central in water sector management, at all stages. And thirdly, appropriate tools would be used to identify gender-disaggregated indicators for monitoring and evaluation of results (GWP, 2006). Such critical reflection and scientific analyses would uproot ‘token’ changes to be replaced by integrated and substantial practices of gender equality.

2.2.4. Mitigate negative global affects

Initiatives are needed to reduce adverse global affects and increase local well-being. Supporting collective strategies to resist water privatization and commercialization are building in pockets of the world and with some success. As well, building capacity through empowerment and education for sustainability, not merely in poor countries but particularly in the developed world, are essential if human rights and public resources are to be protected and climate change is to be mitigated. Dublin Principle No. 4, recommends that it is vital to recognize the basic rights of all human beings to have access to clean water and sanitation at an affordable price. It also proposes to manage water as an ‘economic good’ as a path to increase conservation and achieve efficient and equitable use. Many advocates for the common good, caution against utilizing the framing of water as an economic good to prevent it from becoming commodified, commercialized and privatized. A fuller description of this combination of strategies is presented in the following paragraphs.

2.2.4.1. Resistance to privatization of water. Many modern industrialization processes accentuate the fresh water crisis when preventative actions are not taken, like the irresponsible dumping of contaminated wastewaters. Several prominent voices argued for political strategies that protect the common goods, like water. The coordination of many voices arguing against the privatization of water is beginning to erode the assumptive and aggressive lobby that promotes the *inevitability or naturalness* of water needing to be privatized (Harris, 2009; Barlow and Clarke, 2002; de Villier, 1999/2003). They argue that enabling a small elite to run and harvest water for profit, erodes citizen rights and citizen engagement. The empirical studies of Ostrom and Gardner (1993) revealed that efforts to devise water appropriation and provision rules and practices must be safe from undercutting by external authorities. Private ownership contradicts the principles of the common good and the principles of the marketplace can undermine accessible and safe public utilization (Barlow and Clarke, 2002; de Villier, 1999/2003). Communities, governments and industries should

collectively manage water. Because water is irreplaceable, it should be viewed as a basic need, human right and social asset that ought not be privately controlled by multinational corporations. Various international consortia are collaborating to develop binding political instruments that would enshrine water as a public trust while also ensuring the rights of women to liberty and self-directedness (World Water Council, UNDP, 2006; Lambooy, 2011). While the UN World Water Development Report 4 does not call for binding agreements on water as a common good, it does stress that access to safe drinking water and water resources is imperative and it rises above other internationally agreed development objectives. The report underscores that by improving access to water, such efforts improve health and educational outcomes, enhance agricultural productivity and are the critical path and important force for gender equality and women’s empowerment (UNESCO, 2012).

Building in structures for safeguarding, monitoring and reporting are also proposed. Shah’s proposal was to have irrigation officers address the needs of the ‘deprived’ and by so doing, to significantly reform the entire system (2002). In *Water Consciousness* (Lohan, 2008), Snitow and Kaufman documented the experiences of a grassroots movement in California to block privatization of water. A public education campaign designed to raise awareness about the implications of moves toward privatization was used effectively. The water privatization vote was defeated in Rialto, California in 2011 because Councilors heeded the concerns and consequences of privatization. “It would have increased water rates in the City by more than 84 percent in only two years. The defeated proposal would also have required the City to pay the American Water Company, more than \$23 million every year in service fees and capital charges” (Public Values, 2011).

2.2.4.2. Strategies that reduce and mitigate climate change. Preventative approaches become increasingly essential to avoid accentuating the destruction and violence that climate change and contamination bring. As Vlavianos-Arvanitis (1998) argued, most solutions will only be tinkering at the edges unless governments, industry, most notably agriculture, revise their orientation and actions towards sustainability. This requires developing a full costing and transparent analysis of the major industrial sectors, documenting the key environmental problems and thoroughly evaluating governmental environmental policies and industrial practices and their impacts upon water quality, quantity and price.

Employing such coherent and inclusive strategies that protect water as a common good have greater success when grounded in knowledge gained through localized programs that strive to increase sustainability and prevent or mitigate climate change (Huisingh and Mebratu, 2000; Orr, 1991; Perron et al., 2006). In the Lake Chad basin, for example, learning in groups about climate change, ecosystem services and sustainable management of dams and water reserves are leading to reforms of localized and regionalized self-organization and water governance (UNDP, 2006; WEF, 2011). Re-orienting education, from pre-school to life-long learning, with practices that foster thinking about the interconnectedness of life and that provide paths for sustainable and equitable behaviors may constitute some of what France referred to as “to design minds” (2006). This may entail reorienting to biocentric and biophilia worldviews that normalize sustainability and equality. Such reframing, which demonstrates love for all forms of life and shows a reverence for the sacredness of water and makes it a priority to invest in women and children, has been called for by scientists, theologians, philosophers, economists, and others (Bourne, 2008; Fox, 1979; Kevany, 2007; Theobald, 1997). Redesigns in education that support active learning about innovations for sustainability may help shape individual and community understanding of and greater allegiance to the common good (Huisingh

and Mebratu, 2000; Jansen, 2003). Learning is required that emphasizes values instead of theories, human beings rather than concepts, consciousness and practicality over abstractions, and raises questions and practices critically more than accepting answers, and demanding conscience and compassion rather than ideology, efficiency and neoconservative dogma (Orr, 1991; English and Mayo, 2012).

An important approach to education for sustainable development is the central and meaningful involvement of women, along with men, in designing and implementing appropriate solutions (Panda, 2007; Singh, 2006; Klawitter and Qazzaz, 2005; Anderson et al., 2011; Cornwall and Gaventa, 2001). Creative use of social media technologies may also contribute to harnessing social capital and overcoming geographic and political barriers and increase spaces for effective collaboration and communities of practice (Kevany et al., 2013). Mobilizing public opinion and action for sustainability has become the challenge for the future. Such education can help to build the capacity, courage and empowerment of women to more effect the urgently needed changes in the short-term future.

Faeth and Weinthal (2012) documented several mechanisms that helped people to more effectively manage climate risks through engaging local participants in pertinent community decision-making processes and practices.⁵ An example was documented in the 'WATER FOR ALL' campaign.⁶ Among their strategies was facilitating public engagement in the issues and prompting citizens to guide their elected officials to the right actions to secure water for all. In the 2000 "Cochabamba Water War," in Bolivia through public education and protests, the joint efforts succeeded in requiring the company to pull out and forced the government to reverse privatization. One campaigner had painted graffiti on walls in the city that stated, "I drink water, therefore I exist, then I vote" (Beltrán, 2004). Water is an issue that touches everyone and remains in the collective consciousness. Effective campaigns arouse passion for seizing and protecting the human right and to actively engage organizations, users, cooperatives, neighborhoods and women's organizations along with supporters in government and in business to orchestrate needed improvements, like legislation for enshrining access.

Because it is not solely the government's role to resolve community challenges, collective action is needed to help community members to learn about and to help orchestrate well designed solutions involving diverse specialties. Leaders who are well-informed, compelling, and courageous are needed to form innovative alternatives. Reorienting political, ecological, and socio-natural relationships may include strategies such as, public education, smart technologies, and regulations that force innovation by promoting efficiency, conservation and recycling (Bakker, 2007; Brandes et al., 2005). A low-cost, community-owned infrastructure, such as the Orangi Pilot Project⁷ in Pakistan, is an example of a successful community system designed to care for and to address water management. Government's roles in these efforts should

compliment people's work with larger facilities like trunk sewers and treatment plants, water mains and water, as well as safe solid waste management facilities/sites.

In a Canadian example, members of a community board were taught about the importance of collaboratively and proactively "thinking like a watershed" and emphasizing less the manipulation of the watershed but rather managing human activities within the watershed (Brandes et al., 2005). Within this context, river systems that flow through multiple jurisdictions have been managed by multi-sector participants from Alberta, Saskatchewan, Manitoba and Canada. They have developed a Master Agreement working from a consensus-basis on water quantity, water quality and groundwater while also articulating an effective mechanism for dispute resolution. Other examples include engaging women and men in participatory budgeting as has been successfully done in Porto Alegre, Brazil (Transnational Institute, 2005).

Sustainability requires that challenges be outpaced by solutions and innovations. Morality dictates that lives must be protected against undue harm and anguish. Sustainable solutions to complex and wicked questions on water management require the best in human creativity and compassion of all actors. Table 2 provides a summary of approaches that are proving to increase well-being through rural women's engagement and leadership in water management interventions.

2.3. Further research

Although a complete review of the body of literature on water and women would be laudable, such an endeavor would be too large for being included in this article, which was designed to make important connections across disciplines and to emphasize the need to holistically transcend the independent fields so as to better understand the significant intersections of water and women. Clearly, many other issues are involved and require much deeper examination. Such issues include but are not limited to:

- a **Investigate**, more thoroughly, the roles of pricing and delivery of water as impact upon women's rights for and ease of access to needed water;
- b **Perform** studies that provide empirical evidence at the intersections between water access, gender equity, democratization and sustainability of the global commons to provide timely insights and practical recommendations of better ways forward in improved equity of water resource management;
- c **Document** and publicize more examples of resilience in water management in rural and urban settings based upon building local capacity for problem solving by involving multi-sectoral collaboration and equal engagement of women and men;
- d **Engage** in further theoretical inquiry into "whether the structure of action situations created by governance systems enhance or detract from participants' capacities for building trust," as suggested by Ostrom (2011).
- e **Perform** additional, in-depth impact studies of the value of the use of empowering participatory approaches for improving gender equity in water management, as was suggested by Ivens (2008).
- f **Undertake** holistic analyses of the factors that thwart women's meaningful participation and ensure that they are not merely included in token involvement (Singh, 2006).
- g **Leverage** improvements in water management to usher in more progressive and equitable social and political practices. In this regard, Panda underscored the need for further study of water interventions that include shared gender responsibilities, dialogues, and comprehensive educational

⁵ For further analysis and application of such strategies also see Kennedy, 2010.

⁶ WATER FOR ALL is engaged in a multi-prong strategy for change through social and political actions, which include: Enabling access to, and provision of, potable water through local and global partnerships. • Supporting community-based water projects and building local community, capacity to inform national water and sanitation policies. • Providing a collective ecumenical voice in global public debate on water and sanitation issues. • Advocating for access to, and provision of, water as critical to achieving the Millennium Development Goals. • Building grassroots support for Senate resolutions and House bills that support universal access to water worldwide.

⁷ The Orangi Pilot Project demonstrated that programs at the neighborhood level, can finance, manage and maintain facilities like sewerage, water supply, schools, clinics, solid waste disposal and security.

Table 2

The increasing societal well-being through rural women's involvement with water initiatives is providing positive, water management examples in many parts of the world as is illustrated by the examples presented in this table.

Signs of improved well-being	Description	Authors
1 . Enhanced health and physical well-being	Improvements in facilities for sanitation and hygiene help to facilitate greater well-being. The inclusion of household, indoor toilet facilities mitigates potential harm from water-borne illnesses	Improved hygiene and physical well-being are occurring within proactive sanitation projects (Fisher, 2008)
2 Improved livelihoods and economic well-being	Community projects that deliver more water to households means less time fetching water, which leaves more time for income-generating activities. Also, loan initiatives given to women, improved their assets through income-generating activities.	Water access has contributed to doubling of income for poor rural women (Payne, 2008). Van Houweling et al. (2012) found increases in farming and livestock raising coupled with enhanced hygiene and confidence contributed to more profitable business development
3 Demonstrated women's leadership and enriched psychological well-being	There are several examples of water projects designed and implemented by women. Increased water accessibility provided greater flexibility to their day and more authority to decide how they would conduct their activities. In turn these resulted in the women feeling more independent, confident and capable as they did projects without any governmental assistance. Increased family income added to family well-being and enhanced pride for all. It also offered empowering role models for young women who became more inclined to take on leadership roles in the community	The notable increase in women and water centered NGOs, and the participation of women in UNFCCC proceedings, speaks to the growing interest of women to participate in upper level policy making and project development (Hemmati and Rohr, 2009). Anderson (et al., 2011) addressed the importance of women's role in stewarding community resources and well-being. See also Aladuwaka and Momsen, 2010; and Fisher, 2008.
4 Fostering greater gender equity and well-being	When women gain recognition of their hard work from male members of their community, and those outside the community more respect is shared and a greater sense of equality is enjoyed. Positive signs of change, include men asking women to assist them in their endeavors, acknowledging the quality of the women's work and supporting women's drive to succeed. Increased support and pride from husbands are significant contributors to gender well-being.	Barriers to gender inequality are being unraveled. Some examples of progress are illustrated by women in Bolivia are becoming more active at the community level in water-related activities (Laurie, 2011; Rautanen and Baaniya, 2008) and in Mongolia equal levels of men and women are gathering water (Hawkins, 2010). It is crucial to educate adults to challenge capitalist and neoconservative pressures and to aspire to high standards of equalitarianism, criticality, vigilance around retaining rights and freedoms (English and Mayo, 2012).
5 Nurturing social well-being	A key element that arises with increased involvement with rural water management is social well-being. This includes increases in inclusiveness, connectedness and mutual respect. Evidence has been documented of women becoming increasingly engaged in community collaboration and in shared leadership in actively preventing conflict and protecting the common good.	Women in Bolivia took part in the fundraising and hands-on activities tackled by water associations and committees, and took up places in front line positions in protests against water privatization; marching in the streets to protect both irrigation and drinking water rights (Laurie, 2011). Aladuwaka and Momsen (2010) identified community commitment and shared responsibility for water projects as key to success and enhanced social well-being. Valuing and utilizing local knowledge and mutual respect among women and between men and women had the benefits of stabilizing water systems, increasing their reliability and enhancing community health (Payne, 2008).
6 Investing in learning and capacity building	With the extra time saved from not having to collect water, women began to increasingly engage in vocational training. More young girls attend school because time is available for them for educational pursuits.	With enhanced income and independence, women's groups were able to hire community members to teach and assist children with homework and to thereby improve their fuller development (Payne, 2008; Houweling et al., 2012). The empowerment and capacity building of women and communities are essential for stability and safety in water systems and community well-being (UNESCO, 2012; Aladuwaka and Momsen, 2010).

approaches among citizens that foster changes at the household level and which can transform gender relations (2007).

3. Conclusions

The incorporation of sociological, psychological, environmental, political and economic aspects of this paper helped the authors to add some new insights to the assessment of women and water issues. The interdisciplinary nature of both the analysis and the solutions helped the authors to provide a distinct view of the issues and to offer a menu of beneficial yet interrelated solutions. As France stipulated, "Our best chance is not to dominate and control but to reinsert ourselves as individuals, as collectivities, as cities, as civilizations within the structures of the hydrological cycle" (2008).

"In a world increasingly plagued by water shortages, the number of cross border conflicts is bound to rise unless humans realize that the need to address this common threat is greater than any differences among us" (Barlow and Clarke, 2002, 219). Homer-Dixon underscored the importance of reciprocity, as did Ostrom, as a

key factor for solving collective problems and for building trust within and among social groups (2001). Enabling the convening of communities and devising creative means of building more trust are essential for thriving civil societies. "In this new worldview, traditionally, feminine values of cooperation, collaboration, and interrelationships are beginning to supplant older, traditionally, masculine values of competitiveness, dominance, and winning at all costs" (Bourne, 2008). Our water future must encompass radically altered approaches to water management systems based on more sustainable, equitable, and efficient technologies and more earth-friendly agricultural practices (Barlow and Clarke, 2002). Without attention to and analysis of unbridled market forces, widespread destruction and resource extraction is likely to proceed unabated. Central to the water debates is the issue that water is much more than just another economic input to production. "...water forms the ecological foundation of all economic activity" and "without strong regulatory mechanisms, the rural poor and healthy ecosystems would have most to lose from a purely economic approach to allocation" (WEF, 2011).

The voice of women is central to the formulation of appropriate and sustainable water management. Globalization processes along with changes in climate have, in large part, ignored or left the 'bottom billion', in which women and children are disproportionately represented, marginalized and most vulnerable to existing risks of many intersecting and often compounding problems (UN WWDR4 2012). While many women still face daunting obstacles to achieve economic self-sufficiency and self-directedness, many feminists and human rights activists continue to work for and have documented the advancement of the rights of women, particularly the poor. The authors of this paper drew together several themes from the literature to illuminate relevant struggles and strategies. More timely solutions are needed for problems arising from one billion people living without access to clean water and more than two billion living in water stressed regions of the world. It is "...the practice of mutual aid; of the close dependency of every one's happiness upon the happiness of all; and of the sense of justice, or equity, which brings the individual to consider the rights of every other individual as equal to his [or her] own" (Roszak, 1992).

Water communicates across all ecosystems. Human fluency in the languages of water and of justice need enhancement. A new water ethic is being cultivated. It inspires rethinking and reinvesting in water infrastructures and political and scientific collaborations that support communities in their development. This paper calls for commitments by all sectors to harness policy and to leverage legislative tools to protect the commons, which factor in the ability of individuals to develop a profit and enhance their prosperity and increase economic well-being. Additional strategies to bolster social, psychological, and spiritual well-being are many, but at their core is the involvement of women's leadership and decision-making. Adopting innovations in ecosystem, sustainability and equity education will help to galvanize public imagination and engagement to resist water privatization and to enhance approaches to prevent, reduce and adapt to the adverse impacts of climate change. Enshrining and abiding by the human right to water are essential for achieving all other human rights. Ensuring access to safe, clean water enables women to focus on higher order concerns and actions, particularly of fostering holistic family development, community well-being, and sovereignty over public resources and protecting them for the common good of future generations of humans and of all other species on this planet.

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