Introduction

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To analyze civilization means discussing waters and rivers. Since water flows across diverse terrains and social settlements, many uses are possible. However, the resource – water – remains the same. It connects us. Poets from across millennium talk of how water carries humanity's collective memory. Liturgies and rituals in all the major faith traditions of humans embed water's healing and cleansing powers in their rituals.

Cultural anthropologists have long documented how water relates to social development and the rise of civilizations in fertile valleys such as the Nile, the Euphrates, the Tigress, the Indus, the Yangtze, the Mississippi, the Colorado, the Missouri, the Danube, the Rhone, the Volga and many others. Throughout history tribal hunters have moved to arid valleys where farming began and irrigation development increased water supply. Canals then increased trade while agricultural productivity also increased. Trade increased and population moved from uncluttered settlements to urbanized settlements.

Just as water is life and we are predominately water, water infrastructure is the precondition for civilization. Space scientists in scanning the universe for other civilizations now say, 'operationally, the search for life elsewhere is a search for liquid water'. How we have organized to supply water, dispose of waste and safeguard our public health is the story of how we have learned to work together. While the story contains ups and downs, it does leave a sense of progression and improvement in the human condition. It leaves the impression of movement toward some grand sense of integration. It is a story far more of cooperation, than the well-reported story of conflict. It is humanity's story. And, our beliefs, values, ethics are always just underneath our decisions driving our ongoing story.

The pattern is familiar and so are the conflicts. How much withdrawal is allowed for agricultural productivity without jeopardizing navigation? How much water goes to sustain the urban areas? How much and what type of soil treatment is allowed in farm areas? How do we define fair access to water? What about other forms of life and the life of our ecological life support system? Managing such conflicts drives much of what we call evolutionary progress of humans. Whether they are secular, religious or personal; whether they are conscious or unconscious; it is our values, faiths, beliefs, and ethics that ultimately drive our management solutions.

Clearly there is a balance between sanctity and utilitarian aspects of water. But this balance point will differ throughout the world. If left unexamined, value assumptions embedded in models of water

institutions of one area could be disruptive for other areas. The utilitarian ethic, supporting the rational-analytical, and the notion of sanctity of water profoundly intersect. The sacred refers to those aspects of water through which mysterious and unknown, some would say irrational, elements become present to our awareness (Haught, 1996). Talking of such a balance does not mean returning to a neo-paganism nor to pantheism, nor that water should be made a religion, but to appreciate the intrinsic and broad value of water that is not captured in traditional utilitarian calculus of transactions. It is to recognize that water is more than a means to other goals, it can also be important as an end in itself. Rappaport has argued that religion has served as a 'carrier wave' for ecological knowledge (Rappaport, 1979).

Much of the history of water management has centered on periods of too much (floods) or periods of too little (drought). Dealing with this uncertainty has been a continuing dialogue between humanity and nature, geography and human jurisdictions. This dialogue has taken us from the sacred to secular and scientific as ways to deal with uncertainty. The root of classical man's respect for water lay in his sense of its sanctity. Ancient men found mystery in the origins of springs. Hippocratic studies of the medicinal properties of waters and Thales' notions of water as the basic substance and source of life reflect this sense of sanctity of water. Tertullian, one of the fathers of the early Christian church, in *De Baptismo*, says that 'water was the first seat of the divine spirit, who then preferred it to all other elements … It was water that was first commanded to produce living creatures … It was water which, first of all, produced that which is life' (Eliade, 1991).

These and other such notions supported a value system underlying Roman supply practice that tried to provide a free flowing supply of water to its citizens (Tanner, 1987). Herodotus notes the origins of geometry in attempting to predict flooding on the Nile. Myths, rituals and symbols evolved around these situations. The priestly caste which manipulated these symbols was powerful and central to society. In the Mayan state, priests presumably determined annual planting schedules, receiving a customary tribute from the harvest (Gyuk, 1977). In the Khmer empire, temples were associated with reservoirs. Links from early priestly castes to modern Western civilization can be found in ancient Rome. In a direct reference to Osiris, Vitruvius notes, in *De Architectura* of 27 BC:

> *'Hence also those who fill priesthoods of the Egyptian tradition show that all things arise from the principle of water … therefore, in as much as physicists, philosophers and the clergy judge that everything consists of the principle of water, I thought fit that … I should write … about … water'* (Vitruvius, 1985)

Since its inception almost 15 years ago, *Water Policy* has sought to be a venue for divergent perspectives and disciplines where their common concerns for water management could meet. Typical of our times and culture this has been predominantly analytical or scientific. But we know there is more. Around the world numerous dialogs, meetings and conferences are being called on religion, ethics, faith spirituality and water. Frequently that dialog appears to seek religious support for specific policies or philosophies of water management – or as it were to get God or the 'right' on one side or the other. This is the nature of politics and policy formulation in water. This special issue delves deeper. It is a modest attempt to open windows into how underlying ethics, spirituality, faith and beliefs both inform and are affected by water decisions.

The Special Edition includes 11 articles by 12 authors; 11 are water policy experts and one is a theologian. Primarily the articles represent views of water policy experts on how ethics, faith, religion and spirituality intersect with water management decisions. The authors are from Islamic, Christian and

Jewish traditions and for the most part the articles focus on these three faith traditions. However, as discussion progressed it was clear that some of the fundamental differing human perceptions will only emerge with inclusion of Buddhist, Hindu, Confucian, Taoist, Shinto and other eastern traditions. This is probably most true as one looks at how faith, ethics and spirituality underpin views of nature and humans interactions.

The articles are grouped into three categories: frameworks for integrating ethics, faith, religion, spirituality and water policy; applications of ethics and spritituality to water dialogs and issues; and food security, agriculture vs. environment and groundwater policy their moral, ethical and religious implications.

Professor Chuvieco begins the integrative articles by offering a clear framework which relates concepts of dominion, stewardship, empathy, God worshipper, cosmic humility, natural mysticism and worship across Buddhism, Hinduism, Judaism, Islam, and Christianity (Chuvieco, 2012). How the concept of nature is used in each tradition is at the heart of the framework. As such, the article is useful for much of what follows in the special edition and indeed in what drives primary values in the human, nature, ecology dialogs of today. He also explores the degrees to which the traditions do and do not impact today's ecological decision making. The article also sets a framework for the concepts of co-design of humans, nature and God that follows in the Delli Priscoli and Gavan articles in this section.

Dr Delli Priscoli starts by describing decision needs that transpire in selected areas of water resources decision making and then quotes Christian religious leaders and theologians to suggest how these needs might relate to ethics, religion, faith and spirituality in the Christian tradition (Delli Priscoli, 2012). He looks at: climate change, risk and uncertainty in water resources, the water policy dialog between rich and the poor dialog, the rhetorical uses of sustainable development, precautionary principle, stationarity versus non-stationarity, nature, symbolism of the sacred and utilitarian, and governance. He concludes with five suggestions for water-ethics-faith.

Professor Galván outlines five basic principles of a Christian anthropology (Galván, 2012). He then looks at practical applications of these principles to the water question. Our technology is seen as human work and water as material dimensions of gifts of creation; something to be used wisely which adds value to human kind and makes possible further creation. These analyses blur the distinction between natural and artificial water and bring to light an ethical notion of techno-ethics that blends the two. However, water decision making involves more than simple quantity and rational analytical calculations. It involves fundamental rights to human dignity and life.

Professor García Novo (García Novo, 2012) begins the articles on applying ethics to water decision making with an article on what he calls a 'moral drought' or scarcity of eithical concerns regarding water. He focuses on two ethical issues; ameliorating local population for health and safety and commitments to give access to information: both frequent concerns in water decision making. These concerns lead to broader water resources concerns. He finds a need to change lifestyles and to achieve a personal responsibility toward uses of the water resources which could be extrapolated to other areas of resources uses.

Professor Feitelson echoes some of the notions for personal responsibilities but suggests a new normative paradigm is needed to assess water resources (Feitelson, 2012). He notes that water should go beyond a view that it is a single substance due to its chemical composition. Water should be discussed in plural terms of water(s). They are composed of multiple needs or uses with normative rationales and uses which are desires that should be seen as economic demands. Among other issues this approach brings up the question, how do we see water for humans and water for nature? This of course begs

the question, how do you discern the wants and desires of nature; can we define these or a pristine state? Like much in our history, he looks at how water in human spirituality is a factor in maintaining communities. Perhaps the most controversial aspect of the article is the discussion of how to price water according to the suggested new ethically driven paradigm. Water as a need should be supplied regardless of ability to pay; water for spiritual needs should be priced modestly and water as commodity should be priced at full cost recovery.

Instead of looking at the substantive aspects of water decisions, Professor Wolf looks at the process of deciding and negotiating over water conflicts, especially shared water resources (Wolf, 2012). The approach opens significantly new windows into how spirituality may underlay our decisions. It also shines light into an area where there may be the most agreement across faith traditions when it comes to water. That is water as a common bound. Professor Wolf is concerned that while we all know that water decisions contain significant value, belief faith and spiritual concerns we seem only to look at the rational analytical of making them – and this includes many of the main line 'process' mediators and negotiators.

Professor Wolf discovers universality in four worlds across faith traditions which are applicable to even the conflict management tools and practices. He looks at various secular paradigms such as body, heart, mind, spirit; or Malsow's physiological, safety/love/belonging, esteem and self actualization. These are then related to four worlds found in faith traditions such as in Judaism, Buddhism, native American spirituality, as well as paradigms of Alternative Dispute Resolution (ADR) and Smith's four levels of reality. He calls for a reconnection with spirit to embrace what he sees already is reality; and to move from conflict to cooperation. In a sense spirit is process for Wolf. This perspective allows us to focus on the transformation in negotiations over water and its critical junctures which he also sees as four worlds: rights based, needs based, interest based and, equity based. Wolf synthesizes his concepts into a four part recommendation of how to approach water management conflicts.

The final five papers shift focus to major policy arenas associated with food security, the tradeoffs between agriculture (the largest user of water) and environment, and groundwater use. Dr. Lopez-Gunn *et al*. open a series of papers that link water ethics and food security (Lopez-Gunn *et al*., 2012). They observe that the world has experienced deep changes and that the changes have deep implications for global water and food security and make the discussion on ethical values – often implicit in global debates – more pertinent. They feel that the understanding of ethical issues underlying water and food security is key to formulate solutions that truly contribute to their achievement. Lopez-Gunn *et al*. argue that solving water and food problems is not only a technical challenge, but rather a problem of fundamental ethical values and political will. They examine three technological advances (desalination, information technology and modern groundwater abstraction technology) and one concept (virtual water) that could contribute to secure water and food for a growing population. They examine how these advances are interconnected with decision making and ethics of water related decisions as the world responds to the major drivers of global change. They note that trade has the potential to help countries manage water security in a globalized world, provided that global trade is revisited and undergoes a process of deep reform in light of ethical considerations. In short, water, as well as food, is not isolated from general socioeconomic and political trends.

Professor Haddad describes how Islamic methods, if used properly, would result in food security (Haddad, 2012). He outlines those prior Islamic institutional arrangements and calls for a harmonization of Allah's orders and Moslem behavior. He outlines a comprehensive list of scriptural based support for

food security issues in the Qura'n for this view. These are summarized as 11 areas of scriptural edicts that outline how institutions and behavior should be conducted to produce food security. Professor Haddad looks at scripture and then shows how following scripture would create the policy goals of food security that most say they desire.

Dr Hefny picks up on the theme of changing behavior as the route to finding food security (Hefny, 2012). He feels, similarly to Professor García Novo, that we must change the way we think. He outlines the water-food security debates and their root causes for conflict such as population growth, climate change, world trade rules, land tenure and gender, biofuels, food aid and biotechnology and summarizes them into 14 factors causing the water–food conflicts. He then looks at eight categories of how to change personal behaviors to reduce this conflict. Establishing ethical frameworks is central to achieving this behavior change and the reduction of water–food conflict.

Professor Vaux carries this conflict a step further and looks at one of its most critical aspects; how water is allocated between agriculture and environment (Vaux, 2012). He faces the reader with the challenge of feeding a growing population and, at the same time, avoiding the progressive degradation of ecosystems, which eventually leads to loss of environmental services that for millennia have sustained human livelihood. He points to the need of reallocating water from agriculture to the environment, thus reversing the historic trends of subtracting water from nature to increase crop productivity. He notes that ethical and religious considerations will play a key role in how to achieve needed reallocations. He argues that there is an urge to face this reallocation because the stakes on both sides of the issue are enormous. Efforts in increasing food productivity and increasing the capability of the poor to engage in trade for food surely are part of the solution. However, Vaux considers that there is a need for individuals and nations to reconsider their role in the use of the global commons.

The same theme of individual behavior versus collective action is brought up by Dr De Stefano and Dr Lopez-Gunn (De Stefano & Lopez-Gunn, 2012). They do it concerning groundwater, another critical area of water use worldwide, and explore the complexity of factors that determine the ethical behavior of the individual users when facing the decision of accessing groundwater outside the 'boundaries' established by the law. They note how non-authorized groundwater abstractions ultimately erode the security access of users with existing formal water property rights thus raising fundamental ethical issues to deal with. They remark that social norms often accept non-authorization of groundwater abstraction because there is no strong social stigma attached to unlicensed groundwater uses. One of the most important ethical aspects is that this individual behavior may have devastating collective impacts and deny user with rights and others by destroying the resources base itself. They conclude that the command and control system for groundwater abstraction is simplistic and that water users' self-organization, which is positive because it engages individuals in decisions that affect their community, still needs to pass the litmus test of being economically self-sufficient while being compatible with formal rules (especially related to environmental protection). There must be alignment of formal norms and underlying social norms. Individual choice and incentives must be seen as a primary target for policy design.

Building what we often call the physical water resources infrastructure has been and continues to be a key to how we build our civic infrastructure. It is a testimony to our collective effort to survive, overcome hardship and deal with uncertainty. But it is more. It is testimony to our human spirit which pushes us to grow, prosper and create. This is why virtually all cultures, including our current scientific culture, have symbolically encoded their wisdom and intuitions for birth, creativity, prosperity, reconciliation, and cooperation in, secular as well as religious, water centered rituals and liturgies.

This is worth reflection. We hope this special edition of *Water Policy* usefully contributes to such reflection.

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