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Water: The Foundation of Peaceful Crisis Intervention in Times of Social and Environmental Disaster

by

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I am grateful to have this opportunity to participate in this WAFUNIF symposium on peace building mechanisms for the 21st Century. I have been working in water matters as a scientist and businessman since 1960, or nearly 50 years. I started out as a naturalist and geologist for a watershed protection association and today my work is focused on water resource management, the application of advanced water technologies and global allocations, as well as emergency water supply systems. In addition, much of our research today is in an effort to develop efficacious nutritional programs and formulas to be delivered by packaged water for those regions where malnutrition is endemic. I am a geologist, practicing in the field of hydrogeology, and I am an economist working in the area of water valuation and water technology through my firm, Hidell-Eyster International, a global technical and management consultancy.

I will take a moment and describe the water world I see and how it is changing. I travel some 400,000 miles per year in all regions of the world. My assessment of the water resources available for human endeavor is that many regions are at a very high level of risk of inadequate water supplies through intense contamination levels with direct impact on human health, the natural expansion of desert prone regions, and simply the lack of adequate water resources as climate change occurs such as we are beginning to see in mid-temperate zones. Access to water resources is going to become the key economic driver of the 21st Century. Although oil is an important resource, water has the ability to drive both power and life, while oil only drives power. Thus, I see water as a renewable resource being able to sustain major social and political activity.

As many of us who work in water management as scientists and economists observe these changes, we are also acutely aware of the social and political institutions of societies failing to grasp in their basic tenants the need for a new set of principles of global water management. Our governments are seeking to protect their assumed rights to their water resources, recognizing that their very security as discrete political, social and economic entities could well be challenged in times of water shortages. This is becoming very evident in the area of the world's boundary waters. The recent ratification of the Great Lakes Basin Initiative by those US states and Canadian provinces along these waters is only the beginning of the changes that will be required. The Great Lakes Basin Initiative represents a structure developed between only two nations with similar history, culture and social institutions - a commonality. In many regions of boundary waters the civil structure has not been developed adequately to address this emerging crisis. The Danube River flowing through Western and Central Europe represents a much more complex set of boundaries and cultural interests. Here the river has been the defining boundary of disparate social, economic and political institutions built not on a foundation of commonality, but on the principles of the "spoils of war" dividing the natural geography of commonality of culture and society through political interests. The challenge of water allocation will be far more arduous in this setting.

Without a clear understanding of the physical environment of water resources and clear appreciation of the absolute need for social institutions to modify their assumptions of rights of ownership, the civil order of human endeavor is absolutely at risk on the issue of water accessibility. We must have the wisdom and patience to live a century into the future.

How will the role of advanced technology emerge to assist in guiding the political process of global water resource management and the emergence of social convention and institutions to allocate such resources?

I would like you to observe this first slide. It is a global view of internet connectivity for the period October 2 -15, 2000. It is a fascinating picture representing some of the most advanced technology that

can be applied today in communications. Around the outside of the circle is the earth's surface with key cities being shown. The intensity of the lines from the center of the circle reflects the amount of internet traffic between those cities. The center of the graphic is not the center of the earth but the center of the communications universe of satellites. It illustrates some 626,773 IP addresses and 1,007,723 links of skitter data from 16 monitors probing 400,000 destinations across 48,302 global routable network prefixes or about 52% of the routable links. The map was compiled by the supper - computer center at the University of California, San Diego. Today, these numbers would be multiplied perhaps 100% from the numbers noted in 2000. As you can see, there are regions of the earth that have very high internet traffic and some with very little. This graphic represents the movement of information between each identified point. Those regions and cities where there appears to be little to no internet connectivity may be considered at risk as nations, cities or social and economic entities as we lurch toward the fullness of the 21st Century. Through the Internet we have merged technology into the ultimate transboundary technology capable of moving knowledge and value in nano seconds. The regions you see here with high values of connectivity represent the areas of potential conflict in resource allocation and therefore require constant monitoring.

In my opinion **information sharing technology** is the first of the **peace building mechanisms** that must be advanced if we are to avoid a calamitous situation over the allocation of global water resources. We must bring together those of us who live, breathe and study water and those who are the stakeholders. We must have a *foundation of knowledge* that is shared at the highest social and political levels of nations. It must be accurate and scientifically principled. It must be driven by global agendas and not by special interests or by nationalized interests alone. A foundation of commonality of cause must be the priority of the mechanism.

The transboundary phenomenon is not only evident in internet connectivity but is physical manifestation as exhibited by urban sprawl and the human migration from rural areas to megalopolitan regions. However, the intrusion of the internet communication matrix frees all boundaries of human activity from being local. Knowledge is the greatest transboundary commodity and with it comes the unsettlement of traditional and national behavior. One of my graduate school advisors and teachers was Jean Gottmann, the author of Megalopolis, published by the Twentieth Century Fund in 1961. He was concerned about evolving urbanization and its impact on human endeavor. It is from this book that the commonly used term *megalopolis* is derived to describe the massive urban regions expanding beyond city, state and national boundaries. During the three years that I studied under him, he would constantly say that the new world order will be defined in economic regions, not within conventional political boundaries. I believed him then and I think he has been proven correct. I doubt either of us saw the future transboundary impact of the internet in 1963. At the same time, I studied under R. Buckminster Fuller, a 20th Century futurist who was compiling the "World Inventory of Resources" based on his geodesic dome. Here he divided the earth's surface into geodesic triangles and then inventoried the resources in each triangle. These two men began a trip together in the 20th Century of world conflict over the need for and limitation of resources that will drive social and economic convention in the 21st Century.

Today, the Danube Valley has become a region of serious potential conflict whose social and economic dependence, character and value are tied to the regional watershed and the allocation of that water to the entire socioeconomic matrix, rather than the political institutions through which it flows. This may well be a future region of conflict

The next slide is a Landsat image of the Danube Valley as it flows through Austria, Hungary and Romania. Here we are seeing the absolute blurring of political and cultural boundaries as economic globalization transcends traditional separation barriers of peoples. Romania and Hungary are emerging as manufacturing centers with economic growth driving the urbanization. The demand for water will continue. Also, as urbanization increases, more and more water will have to be withdrawn from the river basin and more and more waste will be disposed of in that very same basin. The potential for conflict is clearly visible and I do not believe that the social, cultural and economic architecture is in place today to resolve this emerging crisis of allocation. Nationalizing the resource will not be successful.

The Danube River Watershed is a predicament forecast by the Gottmann/Fuller theses. There have been significant deliberation, studies and international forums on the potential for conflict resolution in the Danube region, which is the reason I cite this particular region. The landsat image with political boundary overlays shows the some 18 countries directly involved in its allocation of resources process. Much of the Danube Basin research has been completed in the conventional forum of history and law. International law is a view of the past. I hold that past convention is not adequate for the nature of future intervention that will be required to address a nation's boundaries and economic regions. National boundaries can no longer be the foundation of applicable resource law. In addition, much of the existing law was developed before the real specter of climate change intervened. My view is that as we witness more and more dramatic climate change affecting flows and economic activity, the intensity of conflict will abrogate the existing cooperation agreements among stakeholders and outright conflict and warfare will be the likely result. We are only beginning to see the migrations of people that will be taking place more intensely as the effects of climate change take hold. We have nations setting up conflict management programs through their military agencies to address such conflict and threats to their resources. It appears that "containment of conflict" will be the short term goal of resource protection. This approach will not work where the sanctity of human life remains one of the cornerstones of law and civil order. It is the human life that will be sacrificed.

In 1970 the UN sought clarity on transboundary waters and requested the intervention of the International Law Commission (ILC) to develop rules of convention for addressing such issues. The UN Watercourse Convention adopted in May of 1997 and ratified by six parties in November 1999, was the result. This is an attempt at a global architecture for sustainable utilization of international watercourses. History indicates that water use is not easily resolved by such treaties and cooperative agreements. It took three decades just to achieve the Watercourses Convention. It did not take into account global climate change.

Much of this water rights debate revolves around the concept of the nation state and its presumed right to resources within its boundaries. If we look forward to the allocation of resources based on economic regions, such allocation and cooperation takes on a much less emotional, nationalized demeanor and cooperation extends beyond the national boundary to the economic boundary which will encompass social structure and economic support of jobs and livelihood. Livelihood is the concern of the population. If a population cannot see a future, it is unlikely that a pathway to civil order and resource allocation will ever be achieved. Peace is a result of a promise, not a guarantee. Survival tactics are a result of lost hope. For civil societies to prosper there must be a foundation of hope. Information and the application of knowledge and wisdom to that information create a foundation.

It is my opinion that through the evaluation of satellite imagery, land use requirements of sustainability can be identified and quantified as to comprehensive regional, transboundary allocation of all resources so

that sustainable and beneficial interests can be nurtured and the benefits accrue to all within that economic region. This is a reduction of the threat of loss of livelihood. The nation state is no longer sovereign in the face of regional resource and economic allocation as their urbanized and globalized economies stretch well beyond the nation's boundaries. Therefore, the type of technology and information you see here in the slide before you is another important tool as a peace building mechanism.

In the foreseeable future I predict significant human migration as climate change impacts region after region. These migrations will reflect in some ways what is now taking place with globalized urbanization which is driven more by economic opportunity than climate change. I do not predict an orderly or civil evolution of resource allocation if the nation state remains the sovereign entity of resource management. Therefore, the allocation of water must be viewed in light of regional human need, for it is here alone that the sole loss of hope will occur and the loss of civil order will result. We saw a little of the nature of human need for water in the US during the Katrina event in New Orleans. When humans feel threatened, civil order and treaties will have little meaning. Therefore, it is imperative that the architecture to allocate resources outside of the traditional nation state be undertaken immediately. This will require a reshaping of social and political convention including the definition of ownership and stewardship of resource management. We are a century away from such legislative changes and only decades away from significant human unrest and clashes with existing social convention and protocol.

Therefore, I believe that the most significant peace building mechanisms will be reflected in using advanced information technologies, remote imagery, and efficiency of delivering safe drinking water to support human health and the human sense of hope for a better future. Filling the need for healthy drinking water can be accomplished in several ways. The history of supplying drinking water has largely been through the development of massive urban infrastructure systems. Many of these types of entities have burdened urban regions with high initial investment, high cost of maintenance of the distribution systems, and the necessity to adequately treat increasing amounts of chemical and biological contaminants as populations placed increasing pressure on the limited resources of discrete urbanized areas. One percent of municipal water is actually used for direct human consumption, yet the water infrastructure is designed to treat all water to a drinking water standard. Given the large volumes of water treated within the urban regions, due to cost, most systems are unable to employ the advanced technology capable of treating the more complex toxic chemicals entering the water resources such as the pharmacological compounds now commonly found in surface waters.

To assure safe and healthy water supplies for human ingestion, I would encourage a number of technologies to be reviewed as a long term strategy to preserve human health at reasonable costs. Presently urban forces are placing unmanageable pressure on emerging nations and regions wherein they cannot develop adequate water supplies to assure safe drinking water due to cost alone. Many of these rapidly growing areas are in tropical environments where installation and management costs for these massive treatment and distribution systems exceed the national budget of the nation. In such situations it is necessary to create specific, cost effective technologies that will support the drinking water needs. This would include bottled (packaged) water, point of use technologies, and discrete public treatment technologies which isolate water districts at a manageable level to assure safe quality. Such technological activity will also contribute to a higher level of security from intentional or accidental contamination of water supplies.

In addition, it is vital to point out here that packaged waters can be enhanced to contain nutrients to assist in addressing endemic diseases due to limited diet. Packaged water is easy to access and does not require massive expenditures to create treatment and distribution systems. In the US, many public systems add fluoride to water for bone health. This needs to be done in many other regions as well, and should include key vitamins and micronutrients which allow more nutrition to be efficiently derived from a limited diet. This type of health benefit is very hard to deliver in massive urban water systems.

In summary, the availability of water is probably going to be the ultimate mechanism for peace in the future. The effective application of various technologies not only to treat the water but to evaluate human migrations, regions of demand and transboundary management of water resources will lead to a viable architecture for peaceful negotiation of a new order of water rights.

Thank you very much for your kind attention.