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Briefing Note

A Multiple Situational Approach to Water Supply and Demand

Introduction

Dr. Michael 'Aquadoc' Campana of Oregon State University discusses water issues around the world in this Briefing Note. Dr. Campana who specializes in hydrogeology, hydrophilanthropy, and water resources has multiple areas of research interest including transboundary ground water resources, water resources management, and water resources in developing regions with Central America, the South Caucasus, and Central Asia of special interest.

Dr. Campana also performs research in dynamic simulation modeling in water resources and regional hydrology. Dr. Campana received his B.S. in Geology from William and Mary, a M. S. in Hydrology from the University of Arizona and his Ph.D. from the University of Arizona. (OSU) Dr. Campana is a member of the Steering Committee for the Global Water Partnership and has consulted and advised on water management and policy around the world.

Purpose

This briefing note will discuss desalination, the reuse of treated sewer water, conflict, negotiations, and some of Dr. Campana's thoughts on what the water community as a whole can do for sustainability. Speculation and recommendations are added in addition to Dr. Campana's comments and are not be construed as Dr. Campana's views.

Esfahan, Iran and a growing need for water

- Dr. Campana recently visited Esfahan, Iran, by request to attend a meeting organized by the city that is outgrowing the available water supply and the agrarian and ecological interest of the area are experiencing the effects of the water-starved system.
- The potential for recycling sewer water, and the countries that might considered this against cultural beliefs.
    - *Most cultures are hesitant and some may have cultural reasons against utilizing the resource.*
    - *Involve local people and build community trust if it does not exist.*
    - *Explain to the community why the water needs to be recycled.*
    - *Explain how pathogenic organisms are dispensed with and toxic substances are not present in the water.*
- The technical people at the meeting in Esfahan, stated one possible remedy to expand their drinking water supply, was essentially using sewage treated to drinking-water standards and Dr. Campana sees recycling as an option. If there were any local cultural or religious reason for not reusing the sewer water the engineers would probably not have suggested it as an alternative.
- The proposal of a tunnel to bring water from outside of the Esfahan area may have some western influence in the training of the engineers outside of Iran. Dr. Campana stated that in general if involved with a traditional program that examines engineering approaches to solutions, the individuals would in fact look for engineering solutions.
- When Central Asia was suggested as a possible source of water for the tunnel, Dr. Campana had this reflection.
    - *There are not any water sources in central Asia that are available.*
    - All the rivers in Central Asia are utilized by other countries.
    - *Large-scale pumping of groundwater from the region may be possible.*
    - *The cost and limited supply make the area unfavorable.*
    - *Lake Baikal in Russia may be a possibility but doubtful.*
- Dr. Campana emphasized Esfahan chooses a proposal the citizens and public would support and would solve the problem in a sustainable way. A starting point would be determining the available water and allocating cuts judiciously.

Alternative Methods of Recycling

- One method of recycling sewer water that is more acceptable is aquifer recharge.
  - *The sewage is treated to drinking-water standards, then instead of putting directly back into the potable water pipeline the water is allowed to seep into the ground and recharge the aquifers.*
  - *The treated sewer sewer water mixes in the aquifer.*
  - *The aquifer acts as a natural filtration system.*
  - *The method is more palatable with the public.*
- Several factors should be considered in the proposal to recycle sewer water.
  - *Often the wastewater and supply water are governed by two separate entities that may not always be able to transfer water back and forth.*
  - *The system of governance requires the water return to a river or stream preventing recycling.*
  - *Is it environmentally just to recycle the water or does the environment need the water in the stream or river system.*
  - *The major cost in recycling is the additional piping networks, chemicals, and electricity.*

Tajikistan, on the brink of a sustainable power supply or an armed conflict

- Tajikistan has the World Banks authorization to complete a dam at the Rogun site on the Vakhsh River, with funding that is, which will be 335 meters, the tallest in the world. Dr. Campana gave the following comments when asked what he perceived as the major repercussion of this dam project in an already volatile area.
  - *The Vakhsh River is a major tributary of the Amu Darya, which flows into Uzbekistan and Turkmenistan.*
  - *Since the Soviet times the water is for irrigation, primarily cotton.*
  - *The Uzbeks and the Turkmens feel the dam would give the Tajiks too much control over the Vakhsh and Amu Darya Rivers.*
  - *Building the dam will probably add further instability to an already unstable region and could lead to some sort of armed conflict.*
- The Water Conflict Chronology, inserted in portion as Water Brief 4 of the Pacific institutes World's Water Volume 8, has this 2012 entry for Tajikistan, Kyrgyzstan, Uzbekistan, Turkmenistan, and Kazakhstan.

  > "Tensions escalate over two proposed dams in Central Asia: Kambarta-1 in Kyrgyzstan and the Rogun Dam in Tajikistan. These dams would affect water supplies in the downstream nations of Uzbekistan and Kazakhstan. Uzbekistan's president, Islam Karimov, says the dams could cause 'not just serious confrontation, but even wars' (Gleick 2012, 207)."

- Dr. Campana's suggests multiple methods to mitigate the possible impacts of such a dam.
    - *Tajikistan can offer some benefits to the countries affected, mainly Uzbekistan and Turkmenistan.*
    - *Providing inexpensive or free hydroelectricity would be an enticement.*
    - *Uzbekistan and Turkmenistan have large hydrocarbon reserves that may make the electrical proposal insufficient.*
    - *The countries would save the expense of building the electrical generating plants and the future fuel consumption.*
    - *An assurance of irrigation water supplies during the summer growing season would be required of Tajikistan.*
    - *Tajikistan could provide for Uzbekistan and Turkmenistan something that they could not provide easily for themselves.*
    - *The enticement may be a resource unrelated to water or energy.*

Have a drink on me; using cultural norms to broker water negotiations

- Water professionals indicate progress in water negations often requires having a drink to discuss the situation. How is this accomplished in countries where alcohol is not accepted or available? Dr. Campana commented that it is not the drink, but the comfort zone, that aids in successful negotiations for water.
    - *Think about our cultural norms and the things that we accept.*
    - *If the cultural norm is tea or coffee, it serves the same purpose.*
    - *Leave the meeting room environment and go to a place that is culturally comfortable to have a conversation.*
    - *How the local population relaxes, is the important thing.*
- How do members of opposing sides in a water conflict located in Islamic countries have the "away from the cameras" conversation?
    - *One side or the other has to be ready for a compromise.*
    - *Get in a situation where you can relax, suggest meeting somewhere.*
    - *Find somewhere that there is a common goal and use that commonality to create a relationship that allows other points to be resolved.*

Global Water Partnership

- "The Global Water Partnership's vision is for a water secure world. Our mission is to advance governance and management of water resources for sustainable and equitable development." Dr. Campana in your position on the Steering Committee of the Global Water Partnership, what do you see as the "tipping point" to actually achieving water security?
    - *We are experiencing global warming and climate change.*

- *Large-scale, slowly developing incidents in the coming years of serious problems with water supplies may be the tipping point.*
- *The American Southwest might be a good candidate.*
- *Other communities will reevaluate the water supply and water security of the area after they see someone else's catastrophe.*
- *No policy without a calamity is the normal progression.*
- *This may not be a tipping point towards solutions, but conflict.*
- *Solutions need to be fair for everybody involved and make sure that every country has -- insofar as possible, water security.*

We are all in this together

- Dr. Campana stated the one thing about water that he would like to make every person on the planet know, understand, or believe is*, "We are all in this together."*
  - *Water is a common and limited resource; we all use the same supply.*
  - *If country X has water problems, then the repercussions are going to be felt elsewhere.*
  - *Groundwater is often a forgotten source that may be the answer to many communities' problems with water supply if utilized judiciously.*
  - *It is often cost effective and time efficient to tap groundwater in contrast to building a dam, especially for drinking water.*

Desalination, is the failure in the scale and decision process

- Historically, at least in the United States, by the time desalinization plants are constructed the areas realize they no longer need the plant, or the plant only needs to operate at half production to supply the community's needs, driving the per gallon cost upward. Construction often does not start until the community is forced to build due to shortages, which create the immediate need for conservation of resources.
  - *For drinking water, it is a worthwhile process in those areas that are strapped for water supply.*
  - *Desalinization is relatively expensive because of the energy required.*
  - *In areas with abundant fuel, such as the Arabian Peninsula, this is not a factor.*
  - The operation should be powered by sustainable sources such as solar or wind when feasible.
  - The byproducts of the desalinization process and pipelines for transferring the water are additional expenses of desalinization.
  - Desalination has a place in water supply, but may merely be a "bright shiny object (BSO) for other areas.

Conclusions

Based on the information derived from the interview with Dr. Campana and previous knowledge of water resource management, as well as local and international transboundary agreements and negotiations, the following list of recommended actions have been compiled as guidelines for evaluating a multitude of conditions relating to water management and policy.

- When evaluating areas with water scarcity and water security issues two alternatives should be examined externally of ground water and surface water.
    - Desalination may be considered for coastal regions or endorheic basins
    - Recycling of sewer wastewater
- Each of these alternatives has several factors that should be considered in the initial evaluation.
    - Recycling of sewer waste water
        - What are the local utility district composed of, a single organization responsible for sewer treatment and the supply of drinking water? Alternatively, is it multiple independent entities in charge of water and sewer?
        - What are the local regulations governing the wastewater and are there ecological requirements for the water.
        - What is the distance from the wastewater treatment facility to a point the treated water is added back to the system (cost of pipeline construction).
        - Is it possible to return treated wastewater to an aquifer for additional filtering and community support?
    - Desalination near coastal areas and endorheic basins
        - What is the methods water conservation may reduce shortages.
        - Will projected growth affect the need for the desalinization plant?
        - What is the distance the water will have to be pumped to reach a facility (cost of pipeline construction)?
        - Will construction of the desalinization plant allow water to be pumped back to an aquifer and prevent saltwater intrusion of said aquifer?
- Knowledge is a resource when preparing for negotiations relating to water.
    - What, if any, are the cultural norms of the region that may aid in creating a comfortable environment for meetings and negotiations?
    - What are the things a country or region cannot do for itself that may be used for bargaining?
    - What do they not need, avoid loss of time offering proposals that receive rejection.

    - Where is there a common goal or need that can function as a rallying point to aid in negotiations?
    - During negotiations look for the member that is ready to compromise and propose an unofficial meeting in a relaxed environment.
- Diversify committees wherever and however possible
    - Engineers will seek engineering solutions.
    - Groundwater people will seek solutions using groundwater.
    - Surface water people will seek solutions requiring surface water.
    - Environmentalist will seek solutions that benefit the environment.
- The Global Water Partnership's vision is for a water secure world and several factors may be required for fruition.
    - No policy without a calamity is the normal progression.
    - Calamity must be to a level never seen before.
    - A large-scale water disaster may come about slowly and simply "appear" one day.
- The one thing all people should know or understand about water is that we are all in this together. Water is a common and limited resource requiring management be both cooperative and collaborative.

References

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