CIRCLE OF BLUE IDEA CENTRAL
Responding to Australia's Epic Drought

Following publication of The Biggest Dry: Australia's Epic Drought is Global Warning – a comprehensive multimedia report on the dire drought in Australia's Murray-Darling River Basin – Circle of Blue added a new dimension to international water coverage and social innovation.

Circle of Blue partnered with London- and Boston-based Imaginatik, a World Economic Forum technology pioneer company, to develop an online forum to tap public wisdom. The joint project, Idea Central, invited the civic, academic and government communities from Australia and around the world to brainstorm and share ideas about how to respond to Australia's extreme drought and rescue the Murray-Darling River Basin, one of the most important food-growing regions in the world.

The forum built on Circle of Blue's finding that the 12-year drought in the basin was the most significant example of water scarcity in the industrialized world and had far-reaching consequences for Australia's capacity to feed itself, as well as for global food security.

In the course of eight weeks, Circle of Blue engaged nearly 300 global participants and collected 130 ideas that could help shape policy and the future uses of water in Australia.

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CIRCLE OF BLUE
Circle of Blue is the international network of leading journalists, scientists and communications design experts that reports and presents the information necessary to respond to the global freshwater crisis. It is a nonprofit affiliate of the internationally recognized water, climate and policy think tank, the Pacific Institute.

IMAGINATIK
Imaginatik is the leading provider of collaborative innovation and idea management technology and services. For more than 10 years Imaginatik has developed software and consulting services to deploy enterprise-scale solutions for large and mid-sized organizations globally.
www.imaginatik.com

Read more at:
www.circleofblue.org/waternews

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The ideation campaign was a first step and one of the first public uses of powerful software for facilitating collaboration on a specific water problem. "It is helping to concentrate many many minds on understanding this issue, first of all," said Mark Turrell, CEO of Imaginatik. "But then it is also applying this brainpower creatively to bring the solutions to the table. It is obviously important that more and more people realize this is an issue. And water is one of those where individuals can make a difference."

Researchers, engineers, financial consultants, educators, policy makers and journalists from around the world exchanged ideas and critiques and revisited existing solutions for farming, evaporation, water allocations and recycling, among others. More specific ideas referred to Australia's topography, climate and political landscape.

Others challenged the public to look for alternative solutions. One idea suggested the use of anti-ideation – a creative approach that actively brainstorms ways to aggravate a certain problem and then seeks actions to avoid these scenarios. Used in massive engineering projects, anti-ideation asks specific instead of open-ended questions in order to understand the issues better and prevent failure.

"The same approach should be applied to the solutions that come out of this campaign," wrote Mark Burnett, head of IT strategy & transformation at BearingPoint and one of Idea Central's most active participants. "If we are considering planting trees, digging wells, transporting seawater, desalination, we should think of all the consequences and actively try to think of ways in which these actions could make the situation worse."

Created as a pilot project, Idea Central also revealed the challenge of finding feasible and smart solutions to water issues, as well as translating public ideas into actions that have the potential to shape policy.

"Part of the point of ideation events is that they drive creativity by allowing injection of all sorts of ideas from 'outside the box," Burnett told Circle of Blue. "However, if the expertise that is available inside the box is not used to temper and refine these ideas, and provide feedback on the relevance and practicality, then it's just a lot of people throwing ideas around; you will never get solutions or results."

At the forefront of online collaboration, Circle of Blue's Idea Central used the latest tools available to engage the public in developing collaborative solutions. The goal was to create reasoned and effective responses to the world's most pressing water challenges.

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1 Campaign to hold the 2010 World Water Event in the Murray-Darling Basin

synopsis:

Holding the next World Water Event in Australia would attract thousands of experts from around the world to one of the places where water scarcity and industrial society are in confrontation.

disadvantages:

Just getting the event to be held in Australia would be a project in its own right and would involve competing with other countries. Even if Australia does not succeed, it can send a team to that event to participate, bring back ideas and muster support for the event to be held in Australia the following year.

2 Utilize complimentary crops to improve water efficiency and crop yield

synopsis:

Different crops can be combined to increase yields and more efficiently use water for irrigation. Existing research in this area should be extended involving a combination of a bulk crop, such as maize; forage to provide a pest and disease break, and improve soil aeration; and a legume for nitrogen fixation. The result could also increase farm revenue and profitability.

disadvantages:

More elaborate cropping patterns increase the complexity in farming. The idea also does not address specific crop combinations.

links:

Future Dairy

3 Structured problem solving

synopsis:

Ad hoc creativity can be very powerful with the right combination of people. A rigorous approach to analyzing the situation and exploring all the potential areas of improvement can provide a more complete assessment and would work well with the wisdom-of-crowds approach.

comments:

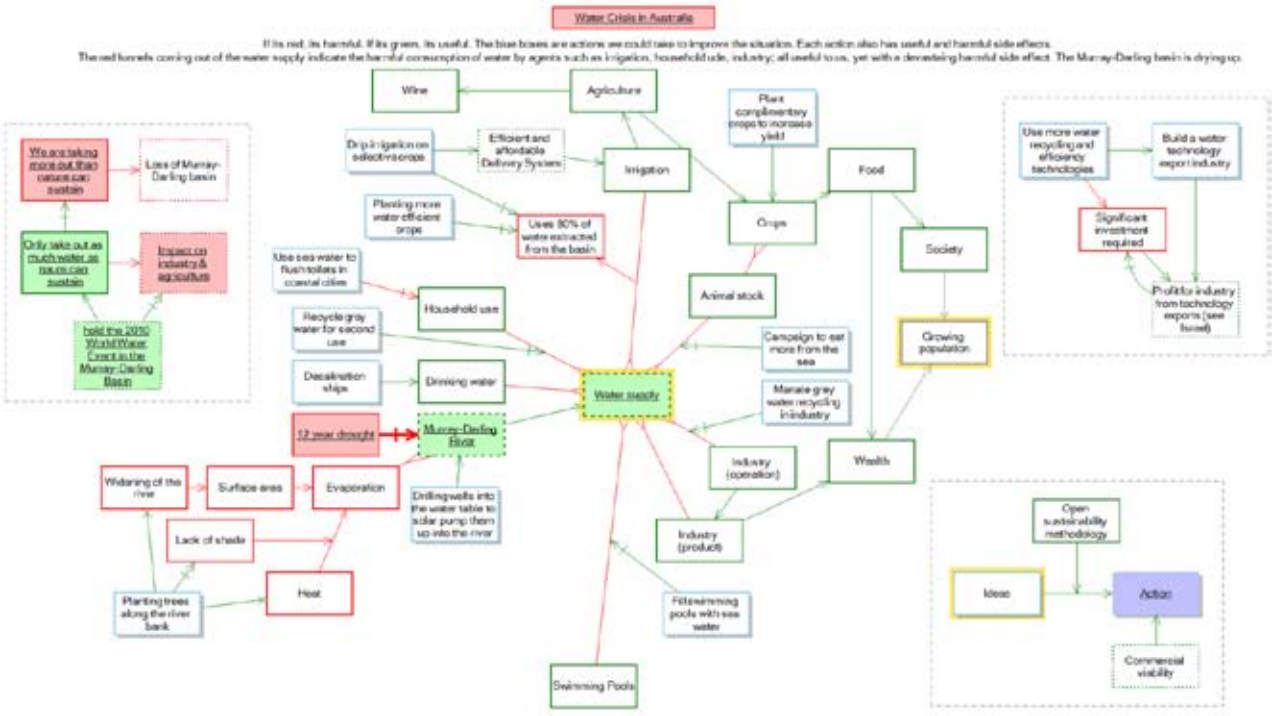
We don't need abstract models for illustrating concepts, as if there aren't already too many out there. We need ideas on how to increase the water supply in the Murray-Darling River System, or, more realistically, make more economic use of the water already in it.

advantages:

The problem is systemic. Therefore, understanding the whole system is necessary. A holistic approach is required.

links:

Southbeach Examples blog



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4 Seawater Greenhouse

synopsis:

An innovative project that turns the normal function of greenhouses upside down has been garnering environmental awards. The Seawater Greenhouse uses seawater to cool and humidify the air that ventilates the greenhouse and sunlight to distil fresh water from seawater. The approach enables year-round cultivation of high value crops that would otherwise be difficult or impossible to grow in hot, arid regions.

Greenhouses were built in 1992 on the Canary Island of Tenerife and in 2000 on Al-Aryam Island in Abu Dhabi in the United Arab Emirates. The quality and quantity of crop production has been excellent in both cases, and the greenhouse has supplied more water than was needed for irrigation.

By combining natural processes, simple construction techniques and mathematical computer modeling, the Seawater Greenhouse thus offers a sustainable low-cost solution to the problem of providing water for agriculture in arid coastal regions and a sustainable approach to desalination.

links:

Seawater Greenhouse

5 Secondary seawater pipe system in coastal cities

synopsis:

Seawater could be used in large coastal cities to flush toilets. Authorities should require new buildings to have a secondary piping system to support this new wastewater application. In Hong Kong seawater has been used to toilet flush since the 1950s.

disadvantages:

Cost and the need for national policy.

6 Residential and commercial construction

synopsis:

Mandatory rainwater tanks - It wasn't that long ago that the installation of rainwater tanks was severely restricted, if not outright prohibited in some urban areas of Australia. Now it is encouraged. Reticulation systems should be installed to provide this water for toilet flushing. Moreover, outside watering should be mandatory in all new residential construction. It is also necessary to include comparable measures in commercial and industrial construction. Yet, collected water used for toilet flushing and other applications should be decided on a case-by-case basis. One office I worked at used collected rainwater for washing cars.

Grey water collection - Ideally, grey water would be collected and reused. If rainwater is used for domestic washing, returning grey water to the rainwater tank could result in the stored water becoming overly contaminated. Having two storage tanks could be overly expensive. In most cases the ideal would be to have grey water added to the rainwater tank instead of using rainwater for washing. One challenge is that in most domestic environments the washing machine is below the level of the input to a rainwater tank. Perhaps the pumps in most domestic washing machines are more than capable of pumping the water up the one to two meters required to discharge into a water tank. Perhaps most manufacturers who would endorse doing so would cancel the warranty. But this must be researched and addressed.

Hot water pipe length - The longer the pipe from a water heater to a faucet is, the more water is wasted when the user waits for hot water. I have been advised that Sydney Water has restrictions on the volume of water between the heater and each faucet. I would like to see both comparable rules applied by other water authorities and greater awareness of this issue.

Circulating hot water systems - Related to the above is the deployment of circulating (flow and return) hot water systems. When I built a house many years ago, I raised the idea with my plumber, who balked at the idea in a house. However, if such systems were deployed in residential construction – perhaps with timers – the amount of water wasted waiting for it to become hot would be dramatically reduced.

roadblocks:

A reluctance of governments to introduce legislation, plus limited awareness among architects and plumbers.

7 Free, fresh and unlimited water

synopsis:

Current desalination techniques are expensive or ineffective. The physical process relies on two variables: temperature and pressure. In a normal desalination plant, the water to be distilled is raised to a very high temperature by means of natural gas or other fuel. The resultant water vapor is cooled, using more energy, until it returns to a liquid state.

In solar or other "passive" systems, the sun heats shallow pools of seawater in a closed environment, which can be as simple as a plastic shelter. The vapor condenses onto the cooler plastic and gathers at the base.

My idea: a high vacuum (HV) process relies less on heat than on manipulating the pressure in a closed vessel. By using a concrete airtight building, warm seawater is introduced and directed onto flat evaporation beds. At the other end of the building, cool sub-surface brackish water circulates through condensing coils. An initial vacuum is established using a vacuum pump, eliminating most of the atmosphere. As the warm water evaporates, the atmosphere in the chamber is composed essentially of water vapor. That vapor is condensed on the cooling coils. The vacuum is maintained by the simple expedient of "liter in/liter out." For every liter of warm seawater entering the chamber, a similar amount is removed as fresh.

8 Flood Lake Eyre

synopsis:

Flood the middle of Australia – the center is below sea level – and create a natural cloud forming mechanism. The area is known as Lake Eyre.

comments:

Between 500,000 and one million tons of salt arrives in the Murray-Darling Basin each year in the rain. Flooding Lake Eyre may well increase the volume of inland water available for evaporation and thus increase rainfall, but it might just lead to more salt in the rainwater. I would like to see this idea thoroughly assessed by specialists in this field.

9 Water allocations

synopsis:

When governments decided to reduce air pollution, they didn't pay polluters to stop emitting. When countries, including Australia, introduced unleaded petrol, they didn't pay petrol companies to manufacture it or retailers to stock it. When countries removed fluoro-chloro-carbon propellants, they didn't pay any compensation for the cost of manufacturing alternatives. So why is so much of the discussion about reducing the overallocation of water in the Murray-Darling River premised on buying back allocations?

The solution is as simple as it would be politically unpalatable to MPs representing affected voters. Convert all allocations to percentage and reduce the total amount of water allocated to irrigation to that which can be sustainably taken from the river, determined on an annual basis. This wouldn't cost anything but would force irrigators growing marginal crops out of the industry.

roadblocks:

The biggest opposition would come from MPs from areas highly dependent on irrigation. It would be overcome by political leaders with backbone willing to stand up to irrigators, rural mayors, backbenchers and public servants, who would want $10 million and two years to study the idea.

Sound water management needs to be based on cooperation, not so much on competition. The South Australia precedent may need to be revisited, or the people of Australia may need to have a court translate both natural rights and the human right to water into specific legal obligations. There is much to define, but such action in the courts costs serious money.

10 Limit evaporation

synopsis:

Irrigate only at night. Urban Australians are subject to watering restrictions that limit domestic watering to certain days and times, typically in the early morning and late afternoon. For farming, specific crops may require more watering than the limited to two days a week. The only downside to prohibiting irrigation during times of strong sunlight is that it would inconvenience irrigators.

Replace open channels with pipes. A significant percentage of Australia's rural irrigation water flows through open channels. A very large percentage of water is lost due to evaporation. Replacement of open channel distribution with pipes must be a matter of high priority.

roadblocks:

The rural sector has long cried poor and will invariably object to any proposals, which will incur any cost, retire equipment or inconvenience agricultural producers and employees.

11 Grey water recycling

synopsis:

I understand sewage water is not recycled in Australia. In some instances, it is not even treated before being dumped to the ocean. Grey water recycling is mandatory, I understand, in Brisbane. If recycling and reuse of sewage water has a mental block, Australia can desalinate seawater, and recover the fresh water from the sewage water by using the seawater desalination system brine as the draw solution in a forward osmosis system. This will return the brine to the ocean with the same salinity as seawater. The desalinated seawater can then be used without the mental block. As a bonus the sewage water is concentrated – making treatment and anaerobic digestion very economical – generating methane gas that would subsidize the energy required to run the seawater desalination system.

12 Mandate agricultural drought insurance

synopsis:

Although it would be difficult to implement in the middle of a drought, requiring primary producers to have adequate insurance coverage for crop failure would be entirely consistent with the requirements placed by home mortgage and business finance providers to take out insurance cover for fire, storm damage, public liability and other mishaps. Yes, this would impose a cost on primary producers, but others would incur a comparable cost. It would be paid for by the community through slightly higher prices for these commodities.

But more significantly, if primary producers were required to take out such coverage, insurance premiums would reflect the proneness of the locality to drought. Those properties for which insurance would be too expensive for the crop in question would be those on which that crop should not be cultivated in the first place.

roadblocks:

The rural lobby would object to having to pay drought insurance premiums and thus be weaned off receiving semi-permanent assistance, especially those in the most marginal land where the premiums would be the highest. These couldn't be overcome but can be countered by phasing in the implementation and requiring all large insurance companies to offer such coverage.

13 Tax products utilizing water based on the scarcity of the source

synopsis:

The government could commission a study to assess the scarcity and risk of adversely impacting the environment for the major water sources. They could charge firms, or tax firms, different amounts depending on the source they use. Thus, for example, firms selling bottled water that is sourced from a river in trouble will have a much higher fee to pay than those that have invested in sourcing water from less convenient sources. This fee would have to be high enough that companies would seriously consider the cost of moving a production plant rather than paying the fee if it is to have a big environmental impact.

In addition to acting as the compelling event to change the behavior of industry, this would raise money that can be invested in projects related to water, sustainability and related problems such as irrigation. Such action would also create publicity that could change the behavior of consumers as well.

comments:

The underlying principle is a good one, but it would be far simpler to tax the water itself instead of the products. To give one example, rice uses a lot of water, but how would this approach apply to commercial rice that was a combination of irrigated and non-irrigated harvests?

14 Gradually repair the environment

synopsis:

The allocation of water is critical but highly contested in a free market. Water allocations should be prioritized to sites where land and groundwater management has minimized the flux of sediments, salts and nutrients to the wetland, as watering a degraded wetland is a waste of water and money. Floodplains and riparian zones need to be stabilized through fencing, eliminating stock from the vicinity of waterways (providing water through nudge troughs), and revegetation, where the water tables permit. We need a combined government/market approach to allocate water to industries that are water-efficient without running the risk of accelerating rural decline and social dislocation. This cannot be left to just price mechanisms alone. We need to ensure irrigation-reliant industries have no net accessions of saline water to the environment.

15 Anti-ideation think tank to understand ways to make the situation worse

synopsis:

Anticipatory Failure Determination is a TRIZ method for actively predicting how a system might fail in order to provide a basis for improvement and sanity checking of remediation plans. The idea is to actively think of as many ways as possible to make the problem worse. This is an approach that is used in big engineering projects such as bridge building – projects that must not fail.

The human mind is better at solving specific problems than answering open questions like "What could go wrong." So actively trying to think of all the ways we can make this worse will give us a better understanding of the problem. We can then put in mitigating actions to avoid these situations.

The same approach should be applied to the solutions that come out of this campaign. If we are considering planting trees, digging wells, transporting seawater, desalination, we should think of all the consequences and actively try and to think of ways in which these actions could make the situation worse. Through anti-ideation, we can avoid those outcomes.

For example, the government should check the planning permission and building activities in the vicinity of the river. We know we have a big problem in overuse of water right now – just looking at what we can see people using – but what plans have already been set in motion that if they are not stopped will make things worse? Anything that consumes water in this region should be regulated, and five-year plans examined to determine the impact on water resources.

Agriculture

Use crops that have a higher yield per square meter of land to reduce water requirement

Synopsis: This idea suggests an emphasis on crops that provide higher yield per square meter of land. This will reduce the amount of water required to irrigate the crop. Farmers should plant crops that maximize the ratio of food production to water consumption in favor of selecting crops that maximize profit. There must be regulation on what farmers grow.

Disadvantages: Farmers' unwillingness to sacrifice profit. There will always be a demand for the luxury crops, so some farmers may just play the waiting game and let others make the hard decision first.

Comments: Suggest crops with a higher yield and/or lower water requirement per hectare compared to those currently cultivated in the Murray-Darling catchment basin and land irrigated from its waters.

Use drip irrigation to improve water efficiency

Synopsis: It is estimated that irrigation systems waste 60-80 percent of all water. Following the example of Israel, drip irrigation in countries as diverse as Jordan, India, Spain and the U.S. has consistently been shown to cut water use by 30-70 percent, while increasing crop yield by 20-90 percent.

Disadvantages: Cost of implementation. It could be offset through water pricing.

Comments: Drip irrigation is used for higher value crops, where it recovers its costs and would be more applicable to an orchard than a broad acre field. Drip irrigation systems can also not be used in fields that will be ploughed but could probably be used more extensively than they are now.

Links: Israel Agriculture

Grow crops that suit the desert climate

Synopsis: The Sweden-based non-profit Eden Foundation has been working with hundreds of farmers in one of Niger's most arid zones to disprove the reigning logic that the desert is a tough place to nurture plant- and human- life. On a budget of about US $100,000 a year, the 13-person team in eastern Niger checks on 68 plots of plants, divided by varieties and years planted. Eden tests its seeds by planting them in a 20-hectare former millet field, which used to be a wasteland. The project pays 10 seed collectors who comb the desert country year-round looking for possible plants that can feed farmers. Once they pass Eden's criteria of viability and produce fruit, Eden distributes them to farmers. No fertilizer or water is needed.

Disadvantages: Since 1991 only 19 out of more than 100 seed varieties have passed the test to meet the three criteria: they can germinate, can survive and can bear fruit.

Comments: This may well have some applicability to Australia. But I expect that the farmers in Niger are probably undertaking subsistence, labor-intensive unmechanized farming of single-family plots. Agriculture in Australia is broad acre, capital-intensive and highly mechanized to deliver products to local and international markets.

Import grain instead of growing it

Synopsis: One ton of grain uses 1000 tons of water. People should stop doing the things that are water intensive locally and instead import goods from countries that have sufficient water to produce them without adversely impacting the environment or the standard of living. Policy makers should encourage imports and increase tax on locally produced grain.

Disadvantages: The impacts on the farming industry. This solution will create a new problem that will require a managed change. There must be a clear idea what the farmers who produce grain will do instead.

Comments: A broader proposal would be to replace high-water consumption crops with low-water consumption crops. The proposal to ban wheat or any other crop is simplistic, especially because much of Australia's wheat is grown in Western Australia and other areas outside the Murray-Darling River System.

Links: This idea was taken from the book The Skeptical Environmentalist by Bjorn Lomborg, Associate Professor of Statistics, University of Aarhus, Denmark.

Alternative Solutions

Develop edible plants that can grow in seawater

Synopsis: If food can be developed from algae, or other vegetation that can grow in seawater, then this could make a huge dent in our need for fresh water. Alternatively, maybe food from algae can be fed to farm animals to reduce their drain on the food chain of fresh water into agriculture.

Disadvantages: This is a long-term experimental approach.

Comments: The Japanese eat seaweed as part of their diet. But it's a small part due to the cost of harvesting it. Saying "develop plants that can be grown in seawater is as helpful as saying 'develop a cure for cancer.'" The Murray Darling River System is a long way from the ocean.

Consider ways of extracting water from atmosphere

Synopsis: There are various techniques that have been investigated and used over the years by inventors and even governments. Assessing these to determine which are applicable to Australia and where they could be applied could provide a new source of water.

Examples: Using silver nitrate in the atmosphere over crops to precipitate rain; using air wells at the top of mountains to extract moisture from the atmosphere to contribute to river sources, other types of water from air machines.

Disadvantages: Investment and cost of operation.

Comments: Cloud seeding has been researched for decades and has been successful under only certain specific climatic conditions and in only a few geographic localities, none of them in Australia.

Eat less meat

Synopsis: Animals eat crops that we could eat instead, or consume water that could be consumed by crops we could eat. The animals also consume water during their life that could either be consumed by us or used to water crops for us to eat. Authorities should increase tax breaks for foods that consume less water and increase advertising for vegetables and fish.

Comments: This notion might have some validity in the USA or Europe but not in Australia. About 2 percent of Australia's beef are on feedlots, consuming cultivated crops. The remaining 98 percent are grazing on land that in many parts of Australia cannot support any agricultural crops. Animal husbandry is actually the most efficient use of marginal land. When there is good rainfall, grasses grow, and cattle, sheep and other animals graze on it. When there is little or no rainfall, these animals can be driven to other areas (we call it droving), where there has been good rain. If crops were planted instead, when there was good rainfall, there would be a harvest. When there was insufficient rainfall, the financial and energy cost of planting the crops would be wasted. Australians eat a lot of fish, but many catchment areas are currently over fished. Australians also eat a lot of vegetables, but those consumed out of season must be transported here, usually by airfreight.

Sustainability

Sustainable building design

Synopsis: Australia already has an amazing example of sustainable, green building design, thanks to the work of architect Mick Pearce. Pearce's nature-based design for Council House Two, which opened in downtown Melbourne in 2006, is hailed as Australia's (and likely the world's) greenest and healthiest office building. Sustainable design permeates the $51 million, 10-storey building, which houses 540 city employees, ground floor retail space and underground parking. Features include: a water mining plant in the basement that uses membrane filtered sewer water to reduce water supply; phase change materials for cooling; automatic windows that open at night to cool the building; vaulted concrete ceilings that improve air circulation, cooling and natural light harvesting; a façade of louvers that track the sun to shade the Western façade; and the use of wind turbines to draw hot air out of the building. Although most of these principles are not new, never before in Australia have they been used in such a comprehensive, interrelated fashion in an office building.

Comments: The challenge is how to apply this to the Murray-Darling River System. Measures such as this could be used for new construction in the areas supplied from this river, although such areas are low growth areas where there isn't a lot of new construction of buildings of any size. Furthermore, about 70 percent of the water extracted is used for irrigation.

The Murray Basin Aquifer – Use and Recharge

Synopsis: An Aquifer Recharge could capture the imagination and include concepts of seasonal storm water management, gray water purification, drought alleviation, agricultural collective effort, CO2 capture and sequestering (imagine pumping carbonated water subsurface to strengthen limestone matrices). It could also exemplify architecture and engineering in the green age and provide public space (much like Lake Powell and Lake Mead in the U.S. were sold to us as recreational areas!).

There are many places in the world that need help in the area of aquifer water supply and over usage, but Australia has the funding and engineering capacity to make prototypes for recharge to occur. I believe that given seasonal water flow potential, temperature differentials and solar/wind exposure potential, the projects should have established goals as net energy providers. To draw attention to the project, we could enlist an international architectural competition through, for example, the "Storefront for Art and Architecture" in New York, which has lean yet adequate funding along with strong media visibility for rising ideas. I believe there will also be much interest in the concept through foundations concerned with water issues and other interested individuals.

Comments: Suggesting a work to capture the imagination sounds like repeating what Circle of Blue has tried to do through this forum. We don't need media attention, we need ideas on how to increase the water supply in the Murray-Darling River Basin, or, more realistically, make more economic use of the water already in it.

Evaporation

Replace curved river segments with straight canals to reduce evaporation

Synopsis: The river bends a lot. This increases the surface area (shortest distance between two points is a straight line). So start projects to build canals between near points on a curve, cut the curve off so it dies and the water takes the new straight route, taking the water ultimately to the same place but losing less to evaporation due to the reduced surface area and reduced dispersal due to contact with land. Only do this in areas where the bends in the river are not required for agricultural reasons. Example of similar activity conducted on the Hunter River in Australia where straightening was used and resulted in effective shortening of the river and measurable increase in flow:

Comments: This idea is totally impractical and would be prohibitively expensive given the length of the river. Straightening a short section of river can help, but the Murray Darling river system is a very long one. If there are specific sections of the river where bends cause flooding or water loss, these can be straightened, but this is not a solution to the overall issue facing the river itself -- which is that the demand for water from it exceeds the volume available for these demands.

Links: InterScience

Seek additional "Fire Ice" applications

Synopsis: Florida in USA is using a new chemical called Fire Ice. This is a white powder mixed with Fire Engine water to prevent it from evaporating before it lands on the flames of wild fires, so the water supply can be more effective. The claims are that it does no environmental damage. It sticks to where the fire is burning, cools rapidly and works to help put out the fire. Perhaps Australia should try this out in applications that also suffer from excess evaporation to see where else it can help, without messing up their functionality.

Comments: As the volume of irrigation water that is applied is a few orders of magnitude greater than that applied to fight fires, the considerations of cost, environmental risk and efficacy at ambient temperatures would be much more stringent. It may well pass these tests with flying colors. Perhaps you could contact the manufacturer and ask about the product's applicability to irrigation - they would certainly be interested given the potential size of the market.

Desalination

Build desalination plants aboard ships that disperse the brine byproduct as they travel

Synopsis: Use of ships that are traveling across the oceans, transporting goods, to also desalinate and store water for delivery when they arrive at port. Such ships could then also deliver this water to different ports where it is needed, rather than pay for expensive transportation of water across land from fixed desalination plants on the coast. A commercially viable ship based on water desalination is already in use around the world.

Disadvantages: Cost of building desalination plants on ships; all power for the ship would be provided from diesel engines, powered by fuel oil (greenhouse gases), which would have to power the ship itself in addition to the desalination plant. The ship itself would require maintenance in addition to that for the desalination plant. The ship would have to dock periodically to discharge the desalinated water. On-shore facilities would have to cater for the periodic discharge of large volumes of water which would have to be stored during periods when the ship(s) is/ are at sea. The land required would be comparable to that required for a shore-based plant.

Comments: This ship would be totally uneconomical.

Economics

Build a water technology export industry

Synopsis: Solving the water problem in Australia could result in a new industry of exporting water technology to other countries. For example, Israel has made $900 million out of selling to India the technology they created to solve their own water crisis. Such revenues could be partly reinvested to implement further water solutions in Australia. This can act as an incentive to get the industry to invest in solutions that might otherwise be considered commercially unviable.

Disadvantages: This will require export and tax regulation. The government should provide some incentives such as tax for exporting technology to drive up potential profit for such companies. They may then invest more in developing solutions to Australia's problem on the basis that it can then be sold to a world market.

Comments: Australia could potentially develop a desalination industry and export this technology. However, it must be recognized that the headwaters of the Murray-Darling River system are several hundred kilometers from the ocean, and desalination -- as useful as it may be for supplying or supplementing the fresh water supplies of coastal communities – cannot feasibly supply a significant volume of water to this river system.

Awareness, Education and Cooperation

Water saving tips

Synopsis: This kind of information ought to be distributed in schools and posted in the bathrooms of public accommodations, like hotel bathrooms and other places, to encourage the total population to think about these things, be aware of the many possibilities and act on them.

Comments: One I like is: Put food coloring in your toilet tank. If it seeps into the toilet bowl without flushing, you have a leak. Fixing it can save up to 1,000 gallons a month.

Links: PBS, 100 Ways To Conserve, Farming Water Use, WCA, rainwaterharvesting

Involve more people in this campaign with knowledge of how things work today

Synopsis: News and issues are one way of informing the debate and stimulating ideation. However, to be able to provide specific ideas, it's necessary to understand more details about the conditions and the ways in which people work. For example, in Stephen Coates' idea on limiting evaporation losses, he mentions that most irrigation is open pipe and that much irrigation happens in the heat of day, when it could happen at night instead. We need more people who live and work in the day-to-day problems to be invited to and participate in this ideation event even if only to tell us details about how they are operating, so that more ideas like this can be brought out. This must not be an academic debate.

Invest in education so the next generation does not worsen the problem but instead solves it

Synopsis: There are many firms producing educational packs on sustainability and the environment, and water in particular. National competitions could be run to come up with ideas for water conservation or education on the environment. Firms could be subsidized for creating educational packs or games that contribute to raising awareness. Teachers could be sent on programs to raise their awareness about the facts they will need to answer the probing and blunt questions children often asked when presented with a new subject.

Comments: The problems facing the Murray-Darling River System are not the result of a lack of public awareness. They are the result of demands for water from the river system beyond its capability to supply. This needs well-designed public policies, implemented by governments with conviction.

Links: A list of Web sites and organizations providing such services in Australia, Stormsaver Rainwater Harvesting System, EnviroScape, CAT.INIST

Invite global corporations with water solutions to demonstrate the ideas here

Synopsis: Companies like GE have invested millions in solutions that address the water crisis and have already deployed them around the world. They showcase some of these using a layer in Google Earth, which can be previewed here and downloaded to run on the Google Earth application. This provides examples of what GE have achieved. Companies such as this have significant technology and further investment power, and a sales team that would be prepared to go quite a long way to convince a government of the value of their product, perhaps as far as running pilots for the Murray-Darling Dam. If four firms are invited, this will at the very least give you four firms worth of serious advice (as they are competing for your business). You can then award the winning firm projects if they meet your requirements.

Involve the sponsors or authorities that will act on the results of this idea campaign

Synopsis: Rather than going at the end with all the five-star ideas, why not take them through experts and let them nominate their own star ratings and provide their own feedback? You can then bring this back to the event as new ideas and comments on existing ideas. You should facilitate the involvement higher up to get buy-in.

You should produce a professional report summarizing the key findings and most promising ideas from this campaign for use in awareness campaigns, and engagement with universities, governments and Industry. Make this publicly available as a download from the Circle of Blue Web site.

Comments: If you ever do anything like this again, I suggest you give serious thought to how to do a better job of recruiting people to participate. I think, you would have been a heck of a lot better off, had you recruited some science fiction writers, especially some that have done stories on all the things they think can go wrong when you mess with the environment. They are skilled at thinking outside the box. But this discussion needed more people with relevant experience, who knew from past efforts what does not work and WHY it does not work. Circle of Blue could probably have done a better job of soliciting suggestions from those involved in and informed about the issues facing the Murray-Darling River System. Few of those posting are Australians, few have any involvement in the water industry, none appear to actually be involved in rural industries, and few have a reality gene in their DNA.