Perspective

Why sustainable water management is not about efficiency

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Abstract

Water stress and scarcity is one of the biggest environmental, geopolitical and resource risks facing businesses today in many parts of the world. But the 'wicked', complex nature of the water challenge demands adaptive responses that are collaborative, multi-stakeholder and inclusive. In this paper, we examine the critical nature of this challenge set in the urban context of Bangalore city in India. Through the illustrative case of Wipro's multi-year engagement on participatory groundwater management in Sarjapur, Bangalore, we examine the nature of the problem in some detail. Wipro's program can be characterized as a social experiment in progress that is centered around the ideas of decentralized, citizen-led governance of groundwater. This requires an artful blending of a rigorous, data-driven approach based on hydrogeological science and a decision making template that is citizen-driven and participatory. Emerging from this is a key axiomatic principle that businesses must learn to look beyond the notion of efficiency. Water is a boundary-less issue and efficiency based approaches result in limited outcomes that prevent the ability to look at the larger picture. It is increasingly imperative therefore that businesses recognize the changing nature of the water problem and embed such an inclusive approach in their risk management strategies.

Setting the Context: The Multi-dimensional Nature of Water Scarcity

The global risk report for 2015 released at the World Economic Forum event at Davos in January earlier this year lists 'Water Crises' as the number one risk in terms of impact. The significance of this should not be lost on anyone – for a forum and an event that represents the gathering of the most powerful names in business, *the recognition of water* as the top risk facing the business sector is indicative of a tectonic shift. This shift is characterized by the rapid emergence of environmental risks such as climate change and water in the center stage of the radar of business risks. It is highly improbable that water scarcity would have featured at all in business forums of any kind a couple of decades back.

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What is even more interesting is that the report classifies water crisis as a 'geopolitical' risk rather than an environmental risk. For those familiar with the politics of the middle-east, this will not be surprising. Several battles and wars have been fought over water, the most recent being the Turkey-Syria face-offs. An axiom that is often quoted in the case of oil is increasingly true for water: "Those who have it wield power over those who don't".

The multidimensional nature of the emerging water crises has been studied in depth and is well established in both, academic and popular discourse. While an in-depth analysis of the same is beyond the scope of this paper it is worthwhile to start with certain foundational issues that the business sector must be cognizant of and engage with.

- Many parts of the world face varying degrees of water stress and scarcity today and the situation is likely to only worsen rather than improve. The factors driving this situation are the accelerating demands of food, fiber and fuel for a global population of 7 billion that will increase to 9 billion by 2050.

- China, India and the United States have the largest water footprints at a country level in terms of absolute consumption. However, when measured on a per capita basis, the picture that emerges shows the inequitable nature of the water crisis with the per capita footprint of the United States almost three times that of India and China and nearly double the global average.

- Long and deep supply chains of global companies have resulted in as much as 41 percent of industrial water consumption being accounted for by trade and export. On the other hand, international trade in crops and agri-products accounts for 19 percent of the water footprint of agriculture. This is likely to have strategic implications for national level water policies as many of the largest virtual water-exporting countries also face some degree of water shortage.

- Water is typically underpriced with respect to its true costs since negative externalities like pollution of water bodies are rarely accounted for in the pricing of water. As governments at national, regional and municipal levels start correcting this anomaly, it could pose potential regulatory and economic risks to companies in water intensive sectors like beverages, power, paper etc.

- Given that water is a scarce resource in India with competing uses among different stakeholders, a company's societal license to operate is often directly linked to how it manages water in an inclusive manner along with the community that it is a part of. There is clear anecdotal evidence to this effect of companies that have not only had to stop its business operations due to conflict with the community arising from depleting ground water levels but in the process, they had to suffer loss of goodwill as well.

## Beyond the Boundary: Wipro's Approach to Holistic Water Management

The Wipro context

The world of business understands the paradigm of efficiency very well. Operational and resource efficiencies are a sine qua non for companies given that there are usually compelling cost savings associated. This has been true for Wipro as well and we have long running quality programs on resource efficiency, including energy and water. However, we realized a few years back that focusing on efficiency alone is not only limiting but hides important facets of the larger picture. What we present below is a case study that illustrates this axiom. The case study pertains to our facilities in Sarjapur, Bangalore where Wipro has its corporate headquarters and a large SEZ (Special Economic Zone) facility with more than 10000 employees.

The 40 km^2 Sarjapur area, symbolizes the story of Bangalore – and perhaps many other large Indian cities – over the last two decades. Twenty years back, Sarjapur would not even have registered a bell for most citizens of Bangalore. Lying in the south-eastern periphery of the city, the area has seen breakneck growth over the last fifteen years. The growth has been multi-modal covering residential housing, schools, industry and trading establishments. Typical of such growth, the developments in core infrastructure like roads and water supplies have not kept pace. Water poses a unique challenge to the area in that there is no piped supply to the area from the municipal water utility, Bangalore Water Supply and Sewage Board (BWSSB). The entire area is thus completely dependent on private supply through water tankers that draw groundwater through private borewells.

Wipro's Water Efficiency Story

Wipro's annual water consumption in the Sarjapur campus is of the order of 250 million liters of which between 75 to 80 million liters representing one-third of the total demand is supplied through treated, recycled water. This metric compares favorably with industry benchmarks. In fact, in some other campuses, Wipro's recycling levels exceed 50 percent. In addition, Wipro's efficiency of freshwater usage has been improving at a compounded annual rate of nearly 7 percent over the last five years
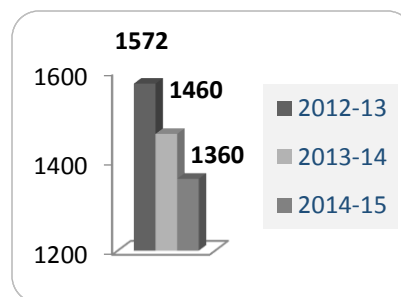
(2010–11 to 2014–15) translating into a cumulative savings of more than 560 million liters of water. This has been driven by a variety of measures that have been implemented over the years e.g., push-taps and flow restrictors, replacement of salt based softeners with membrane softeners, continuous audit and plugging of pipeline losses, standardization of metering systems are some of the illustrative measures.

The Need to Look Beyond Efficiency

Prima facie, Wipro's water efficiency and recycling story look good and there should have been no undue reason for alarm. However, in 2010 we decided to step back and do an integrated assessment of the emerging water risks across our locations in India. From this analysis, two locations stood out in terms of higher than average risks – Sarjapur in Bangalore and Chennai. It was clear to us that addressing the risks in these locations will require a larger, collaborative, multi-stakeholder approach and that efficiency alone will not suffice. This strategic review led us to initiating the Integrated Water Management program at our Sarjapur facility which broadly consisted of two pillars: (I) An internally focused 'Responsible Water' program; and (ii) An externally oriented "Participatory Ground Water Management.

The Concept of Water Debt

In 2011, we initiated an internal exercise - in partnership with Biome Trust – to recalibrate our water metrics to a more holistic framework that introduced the concepts of water debt. Water debt measures freshwater consumption weighed against rainfall endowment and normative entitlement norms. In other words, it is a measure of the extent of overdraft on the natural capital endowed to a company. Its significance also lies in the fact that it introduces measures of parity and equity in the consumption of a scarce resource like freshwater. Our baseline assessment revealed that we were indeed in water debt at our campuses in Sarjapur, Bangalore and Chennai. For example, in Sarjapur, against our rainfall endowment of 63 million liters per annum, our net freshwater consumption was around 148 million liters translating into an overdraft of more than 125 percent.

The Participatory Groundwater Management Program

From the above exercise, it was clear that while we were progressing well on freshwater efficiency and recycling of wastewater, it was still not sustainable from a larger community context. It was apparent that if everybody is in overdraft or in water debt, the tragedy of the commons will be a reality sooner rather than later for the Sarjapur area and that we stood the grave risk of disruption to our business continuity on account of severe water scarcity. It was therefore critical that we shed conventional approaches and adopt a progressive, different approach of treating water as a larger commons resource.

At the heart of such an approach is the imperative for a paradigmatic shift from a centralized provisioning model to a decentralized model of citizen-led governance of groundwater. It is with this broad vision that we initiated the Participatory Groundwater Management (PGWM) program in early 2014. We wish to emphasize that we see this is as a social experiment in progress as there are not too

many precedents and reference examples. This experiment is based on a set of assumptions and hypotheses. We describe below the key elements of the PGWM program.

i. **'Un-hiding the hidden':** Groundwater is a hidden resource. It is therefore even more critical that groundwater be managed on a rigorous, scientific basis which can render this hidden resource visible. As a first step, a detailed mapping of the 34 km^2 Yamalur aquifer – on which the Sarjapur area sits – has been developed. This was a necessary step as groundwater aquifer maps of urban areas are normally not available at the level of granularity that is required for making informed decisions. A detailed aquifer map can help aid key decisions like "Where should recharge and discharge points be located? "and "How does the ground water link with surface waters like lakes?". An aquifer map also provides a good supply estimate which when weighed with demand estimates can help provide a line of sight into water risks at a macro level.

The Yamalur-Sarjapur groundwater aquifer

(Based on data from more than 140 borewells)
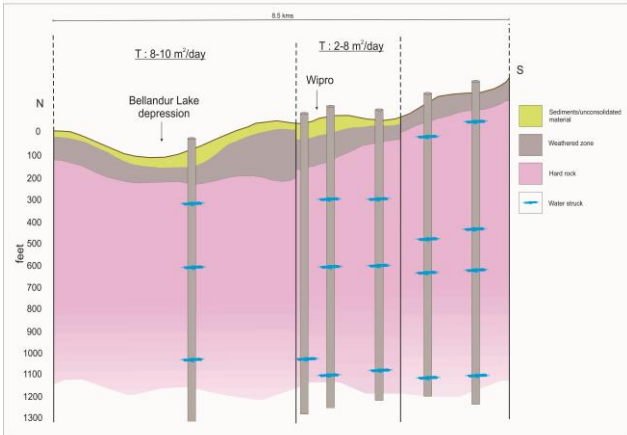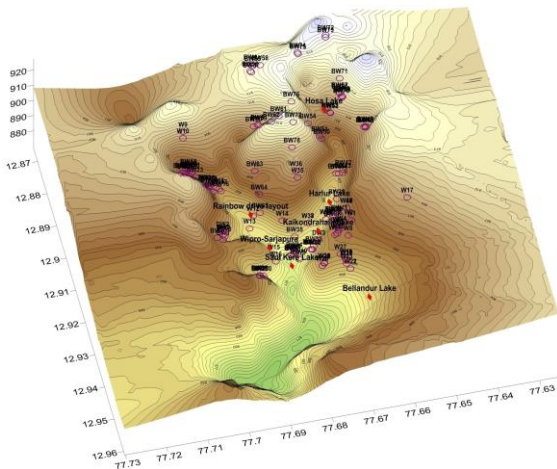
ii. **Engaging the citizen:** If the science of groundwater aquifers has to be translated into effective public governance, it requires common citizens to engage continuously with a multitude of issues. In a decentralized scenario, individual atomistic behavior without anchoring these actions to a larger reference picture are likely to lead to sub-optimal outcomes. These have been visibly evident in Sarjapur with plummeting ground water levels. Bore-well depths of 800-1000 feet are not uncommon. Private bore-well operators adopt an approach of 'abandon and shift', constantly searching and digging new borewells when the existing borewells dry up. In such a situation, citizen-actions that strategically contribute to a larger gestalt of effective water management can make a big difference. In this regard, Bangalore in general and Sarjapur in particular has been fortunate to have several committed citizen groups rallying together around different civic issues. We present below a few illustrative examples.

- **Self-sufficiency through self-governance:** Rainbow Drive is a large residential community in the heart of Sarjapur that has blazed a trail with several pioneering initiatives. It is probably the first residence community to be water positive. Among the several measures taken over the years are: (a) banning of all private borewells (b) more than 350 recharge wells at the community level (c) 100 percent harvesting of rainwater (d) phytoremediation based sewage treatment; and (e) Extensive reuse of the wastewater for landscaping

- **Data collection through citizen science:** The PGWM project is designed to be data intensive and information rich. But collecting good quality data through a small centralized expert group can be time consuming and operationally unsustainable in the long run. So, we are experimenting with the approach of involving a larger network of citizen-groups, Resident Welfare Associations (RWAs), school and college interns. The challenge here has been to devise empirical rules of thumb for collecting data on water depth or water quality that are easy enough to understand by non-experts and yet that does not compromise on the accuracy too much.

- **Building digital collectives:** An important element of citizen engagement is a digital platform that will enable conversations, sharing of ideas and good practices and the building of a critical mass of collective information, knowledge and wisdom on groundwater management in Sarjapur. The platform will allow for creative visual rendering of the Sarjapur aquifer adding an enriching dimension to the process. We are in an advanced stage of building such a citizen platform and it is likely to be operational by April 2016.
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iii. **Nudging the government:** The power of citizen engagement has also been evident in several other ways, some of them unplanned. An example of this is how the citizen groups of Sarjapur started engaging with government bodies on bringing about regulatory changes that were crucial in the overall systemic scenario on water, Bangalore is a city of lakes and the Sarjapur area alone has more than 15 lakes. Lakes act as important aquatic ecosystems in the urban context and can be potential sources of water for human use provided its pollution levels are kept low. The Lakes community of Sarjapur has been active on several fronts over the past few years.

One of the main sources of pollution of urban lakes is the discharge of untreated waste water. There are existing laws that prohibit such discharge, however, the same laws also prohibit the discharge of treated waste water. This poses a strange dilemma since vide another law, all apartments in Bangalore with more than 49 houses have to install water treatment plants. This has led to the situation where the excess treated water is let out directly onto the roads. In order to address this as well as other related issues, our partners and the citizen groups have been engaged in a series of conversations with the state pollution control board wherein we have been sharing all that we are attempting to do. The regulatory body saw merit in our arguments and has agreed to amend the laws to the effect of permitting good quality treated

waste water into lakes. This is another illustration of citizen power and more importantly of nudging systemic changes into place.

iv.   **Spreading the good word:** In the course of the project, it was clear to us that the power of networks can be transformative in getting social change off the ground. Whether through digital platforms, electronic communication or face to face engagements, strategically designed conversations and advocacy have powerful ripple effects. We have been using various platforms and forums that get stakeholders from government, civil society, academia and business together. State bodies like the Bangalore Water Supply and Sewerage Board, the Lakes Development Authority, the Karnataka State Pollution Control Board, the Central Groundwater Board, academic institutions like the Indian Institute of Science, civic citizen groups and various residence welfare associations have participated in workshops and meetings that we convene regularly.

One such forum that we started in collaboration with the Confederation of Indian Industry's (CII) Bangalore chapter is the Karnataka State Water Network (KSWN). The KSWN offers a physical and virtual platform for multiple stakeholders to come together and collectively build advocacy on water self-sufficiency and sustainable water stewardship. There are five geographic clusters, each focused on a particular area of Bangalore along with a horizontal expert group that works on lakes across Bangalore. The KSWN forum has been successful in expanding conversations and catalyzing actions on water in a systemic and structured manner.

Concluding Remarks

It is appropriate to end this paper by going back to the beginning. What is Wipro's larger purpose and objectives on water? Why are we engaging so deeply and broadly with multiple stakeholders on issues that do not directly concern our business model? What do we hope to achieve from exercises like the participatory groundwater management program? The answers to these and related questions can be framed in terms of certain normative principles and specific hypotheses

- Water, in its essence, is a normative issue and cannot be addressed through conventional approaches of resource scarcity and depletion. In order to assess the business risks from water, we need to necessarily have a wide-angle view in front of us that includes community narratives of different hues.

- By getting together a dispersed set of actors to view their own individual stories on water through the lens of hydrogeology and groundwater science, can we achieve a multiplier effect of optimal actions and decisions? As citizens start interpreting their data on a more scientific basis and become increasingly water literate, can we achieve a critical mass of collective knowledge that could translate into effective governance decisions.

- Can these enhanced network effects lead to higher and higher levels of self-regulation and self-organizing similar to the Rainbow Drive example? Such a virtuous cascade can aggregate to significantly higher levels of rainwater harvesting, community-level water abstracting *vs* individual withdrawals and waste water recycling thereby drastically improving self-sufficiency levels

- Eventually, if this large scale social experiment is successful, can it lead to policy level changes that could then serve as a template not only for the rest of Bangalore but for large parts of urban India where the contexts are similar?

Wipro's conviction is that several of the defining sustainability challenges that humanity faces today will need fresh and radical approaches. One of these is a shift away from old centralized models to more living, dynamic configurations where the centers of gravity are dispersed and local. The late Nobel winner, Elinor Ostrom's work suggests that that local governance of public commons can overcome the inertia that often besets centralized schemas. It was the famed anthropologist Margaret Mead who suggested that one should never doubt the power of a small group of committed people to usher in big change. This axiomatic truth is even more self-evident today. Businesses have to adapt to this model and should see themselves as co-creators and collaborators rather than patrons and experts. Our work on water over the last few years reflects this emerging paradigm. In conclusion, we wish to emphasize that we are nowhere near conclusion. Water is a 'wicked' complex problem and our response has to be calibrated likewise. We see our initiatives on water as part of a series of experiments wherein we hope to continually learn what works, what doesn't and apply these learnings as part of a continuous feedback loop.