PATHWAYS TO ACHIEVING SUSTAINABLE DEVELOPMENT GOALS RELATED TO WATER AND SANITATION

An Experience from India

Hindustan Unilever Limited

Hindustan Unilever Foundation

(A wholly owned subsidiary of Hindustan Unilever Limited)

UN GLOBAL COMPACT

The CEO Water Mandate

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"The water problem is real and it's bad, affecting our local communities, environment, and even international relationships. But not everything is getting worse, and there are important and effective efforts underway to find appropriate technical, economic, and community-scale solutions. As the new Sustainable Development Goals are put in place, we will need new commitments to thinking about and acting on strategies to achieve these goals. This will require innovative partnerships, private sector and public sector strategies, and new tools for communications and social outreach. The water stewardship efforts in the portfolio of the Hindustan Unilever Foundation, the work of the UN Global Compact CEO Water Mandate, and the many diverse voices heard in this report are strong steps in the right direction. Congratulations on your efforts."

—Peter Gleick, President, Pacific Institute

Table of Contents

Foreword 2

Part 1: Meeting Global Objectives with Coordinated Local Partnerships 3

Part 2: An Experience from India 6

- Water—the Lifeline to Survival, Sustenance, and Sufficiency: A Forward-Looking Visitation 7
- Water and the SDGs 10
- Water Stewardship for Sustainable Sugar Business: A Case of Rajshree Sugars and Solidaridad Partnership in India 21
- Community Action: The Key for Water and Food Security 31
- Working with Water—It's Dynamic 36

Foreword

Gavin Power
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Head, CEO Water Mandate

2015 is a pivotal year in global sustainable development. It is a time to gain insight from our progress toward the Millennium Development Goals, to reflect on how global trends and priorities have changed over the last 15 years, and to realign our collective efforts to achieve a new set of global targets.

The UN Global Compact is the United Nations' corporate sustainability initiative, with more than 8,000 companies participating in 161 countries. The commitment of the private sector to sustainable development has never been greater, nor has it ever been more critical to succeed in achieving global objectives such as ending poverty, stabilizing the global climate, and protecting natural resources for the health and well-being of future generations.

The development of the Post-2015 Sustainable Development Goals (SDGs) was a more inclusive and transparent process than it has been in the past, and the UN Global Compact's CEO Water Mandate gave endorsing companies an opportunity to advocate in favor of a dedicated goal for water. That goal will soon be a reality, with six likely targets—access to water and sanitation for all, water efficiency and pollution prevention, integrated resource management and healthy ecosystems—that support the ultimate goals of corporate water stewardship: to alleviate water stress and protect freshwater resources for domestic, agricultural, and industrial uses.

Now it is essential for the private sector to align its efforts with those of governments and civil society organizations to achieve these targets. The global framework laid out under SDG6 for Water and Sanitation can be applied to corporate water stewardship at many levels, and can be used to coordinate the investment of both financial and human resources and to apply essential local expertise to meet the needs of communities, bringing the world closer than ever to solving the most pressing social and environmental problems related to water.

To help achieve the necessary scale and drive progress toward regional, national, and global sustainable development goals and targets, leading companies can demonstrate how a global framework can be applied at the local level to meet the needs of all communities. This paper is one of the first to show how Hindustan Unilever Limited, through its foundation in India, is drawing connections between the local and the global. It looks at how the foundation is working to share the voices of local organizations and how community members are working together to make a notable contribution to the achievement of water and sanitation for all.

Part 1: Meeting Global Objectives with Coordinated Local Partnerships

Heather Rippman
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India is the world's seventh-largest country by area. It is home to the second-largest national population, with more than 1.2 billion people (World Bank 2015). The country is geographically, culturally, and religiously diverse, with 29 states and 22 officially recognized languages. India's size and diversity pose unique challenges to the realization of its sustainable development goals, and this is especially true for goals related to water. In grain-producing agricultural regions, energy subsidies for pumping wells intended to avert a food crisis have led farmers to overuse groundwater. Economic inequality and unplanned settlements in urban areas undermine access to water for basic needs and drive counterintuitive disparities in prices paid for water. In recent years, thanks to the work of local organizations like those featured in this document, access to water and sanitation have increased, but 61% of India's rural population still lacks access to basic sanitation (WHO/UNICEF 2015).

Supporting Global Development at the Local Level

Similarly, multinational corporations face diverse water-related challenges at a global scale. Water stress threatens to limit growth, disrupt supply chains, adversely affect quality of life for workers and consumers, and damage brand value. Many companies recognize that social and environmental sustainability are critical to their long-term success and are embracing the concept of water stewardship as an essential element of corporate sustainability.

The CEO Water Mandate provides companies with guidance that helps them to deliver on their commitment to the Mandate's six principles:

- Direct Operations
- Supply Chains and Watershed Management
- Policy Engagement
- Community Engagement
- Collective Action
- Transparency and Disclosure

CEO Water Mandate-endorsing company representatives at a WOTR project site in Ahmednagar district, Maharashtra, India, 2013.

This September, the post-2015 Sustainable Development Goals (SDGs) will be adopted, shaping global development priorities for the next 15 years. The UN Global Compact has helped to give the private sector a voice in the international dialogue that has defined the SDGs, which include for the first time a goal dedicated to Water and Sanitation, Goal 6 (SDG6).

With the introduction of SDG6 and related key performance indicators and measurement systems for its targets—access to water and sanitation for all, water efficiency and pollution prevention, integrated resource management, and healthy ecosystems—Mandate-endorsing companies are uniquely positioned to align formerly disparate corporate water stewardship strategies with these global priorities as a shared definition of success.

A T-Shaped Approach to Water Stewardship

Improved water stewardship that supports social and economic development is needed at a global scale; but in practice, it is fundamentally a local issue. Many organizations and individuals have invested considerable time and resources in attempts to solve fundamental water-related challenges, but even the most innovative solutions sometimes fail due to unique and unexpected local obstacles.

Changing climate patterns and seasonal availability; inequality in price, allocation, and distribution systems; and prolonged neglect and decline of water quality and freshwater ecosystems create varying degrees of risk across the developing and the developed world. Regional, cultural, political, and economic differences demand specialized knowledge and understanding of best practices in a variety of disciplines, from financial and technical capacity-building to governance and accountability, in order to deliver effective solutions. Few organizations possess the diversity of knowledge and understanding to overcome complex local challenges and equitably address all stakeholders' needs and concerns to achieve a global goal at scale.

Water stewardship could be described as a horizontal discipline that is practiced in multiple vertical silos. Effective water stewardship demands deep subject matter expertise in multiple disciplines, but to be successful, all stakeholders should share a definition of success. For example, the private sector can make unique and valuable contributions to global water stewardship, but its efforts must be aligned with those of governments and civil society organizations to achieve the SDG6 targets (Figure 1).

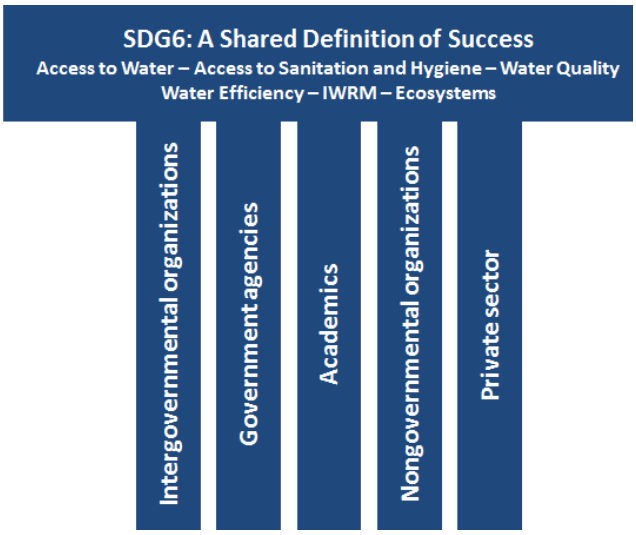

Figure 1. Example T-Shaped Approach to Water Partnerships Across Sectors. Adapted from Uhlenbrook and de Jong, 2012.

In most cases, successful initiatives that reduce local water-related risks and increase the positive contributions of multinational companies to global water goal will require a coordinated, cooperative approach by a portfolio of partners, possibly including other companies, industry sectors, government agencies, nongovernmental organizations, and local implementing partners.

At a smaller scale, opportunities exist to align the work of local implementing partners across a region, river basin, or country. A movement is taking shape in water stewardship, as companies recognize that individual actions alone typically do not address the root causes of water challenges. Collective action is required. However, gaps in understanding, language, and communication style exist between public, private, and nonprofit partners, creating a lack of coordination even between well-intentioned water stewardship initiatives. Now is a time to redefine partnerships, reinvent how we work together toward common goals, and reimagine a future when local approaches to global issues bring together the unique expertise, resources, and skills of local partners to achieve global sustainable development targets.

For example, a portfolio of partnerships may be required to deliver specific expertise uniquely suited to addressing different local issues or to design approaches tailored to overcoming unique local challenges (Figure 2). When aligned to a shared definition of success and to a measurement system using common indicators of performance, duplication of effort can be avoided, effectiveness can be monitored, and progress can be measured.

A suite of tools exists to support this new approach to coordinated local partnerships for global impact, including, for example, the CEO Water Mandate's Water Action Hub, Guide to Water-Related Collective Action, and Integrity in Water Stewardship Initiatives.

Part 2 of this document contains some examples of local partnerships and water stewardship initiatives in the portfolio of the Hindustan Unilever Foundation (HUF). The CEO Water Mandate looks forward to working together with HUF and its partner organizations in India to achieve unprecedented global to local coordination and cooperation toward the shared development objective of water and sanitation for all.

Figure 2. Example T-Shaped Approach to Water Partnerships Across Regions and Cultures. Adapted from Uhlenbrook and de Jong 2012.

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Part 2: An Experience from India

Ravi Puranik
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As global thinking evolves to a post-2015 agenda on sustainable development, it is timely to explore perspectives from which the desired outcomes can be delivered or, for that matter, whether the outcomes can be rooted in communities for enhanced ownership based on values that are/could be material to them over the long run and therefore could be pathways to understand and respond to them.

Hindustan Unilever Foundation, a wholly owned subsidiary of Hindustan Unilever Limited, has initiated this journey with its partner network across India. The journey is layered over its ongoing partnerships spread over nearly one in seven districts in India. The partnerships stem from the hypothesis that water can have a bearing on sustainable development outcomes and that, within this space, water for livelihoods impacts water for life. HUF's "Water for Public Good" program therefore enables practice-based enquiry in this space and supports actions emanating from such enquiries. The partnerships span NGOs, businesses, development programs of the state, international finance bodies, and communities.

The UN CEO Water Mandate Multi-Stakeholder Working Session being held as a part of the Stockholm Water Week has served as a stimulus to HUF's partners to reflect on water in the SDG framework to enunciate an enquiry and relay associated actions. The reflection put forth in this compilation includes experiences from multiple states in India by five partners of the Hindustan Unilever Foundation.

1. Water—the Lifeline to Survival, Sustenance, and Sufficiency: A Forward-Looking Visitation (BAIF Development Research Foundation
2. Water and the SDGs (Watershed Organisation Trust)
3. Water Stewardship for Sustainable Sugar Business: A Case of Rajshree Sugars and Solidaridad Partnership in India (Rajshree Sugars and International Finance Corporation)
4. Community Action: The Key for Water and Food Security (People's Action for National Integration)
5. Working with Water—It's Dynamic (SAMUHA)

It is hoped that this partnership will see enhanced and purposive participation from other partners within and beyond this network.

"The Sustainable Development Goals help to bring in the dimension of sustainability into development planning. Superimposing the lens of water on the SDGs will further help to sharpen the resource management efforts pertaining to water."

—Girish Sohani, President, BAIF Development Research Foundation

Water—the Lifeline to Survival, Sustenance, and Sufficiency: A Forward-Looking Visitation

Girish Sohani
President, BAIF Development Research Foundation

Water Resource—the Cradle of Civilisation

Water has been the lifeline for human existence: for survival, for nurturing human existence, and being the cradle for human civilization—not just in river valleys but also around lakes and springs, over shallow aquifers, and along seashores. For ages, these civilizations sustained and grew within the balance of water cycles and with the gut-wisdom-driven sustainable use that encompassed all life. Existence was life-centric.

Exploitation—the Lament of Nature

The unprecedented and seemingly unbounded control over nature during the last two to three centuries changed the equations of natural resource management and shifted existence to being human-centric at high costs—at the cost of life as a whole, at the cost of balanced sustainable use of resources, and at the cost of a secure future. The state of the water resources of the world is a case in point, and the results are legion: extinct life forms, imbalanced loads beyond the capacity of ecological services, moving beyond the use of annual water recharge into mining of fossil water, "poisoned" water sources, rivers that are dead because of lack of base flows or because they were transformed into sewers. A major factor in these transitions has been the rapid erosion of the application of innate traditional wisdom, based on the values of moderation, respect, and frugality.

Resource Management—Innate Local Wisdom

Traditional water usage patterns had built-in norms for managing catchments, allocating water resources to various life-forms, channelizing and sharing water flows for production, using groundwater for various purposes, ensuring riparian rights, and protecting water quality.

Water tanks were constructed, but catchments had to be left undisturbed and vegetation-protected, and communities had to ensure maintenance of watercourses. Water sources were reserved for nonhuman life forms—whether domesticated or wild—and fish life cycles were left undisturbed,

ensuring water flows for up-flow migration to breeding grounds. Stream banks were left undisturbed as grasslands and with riparian vegetation, thereby facilitating a rich hyporheic zone. Surplus water flows were channelized to enable rotational sharing of the resource and make adequate quantity available to riparian users. Groundwater usage purpose was restricted based on rainfall patterns and adequacy of recharge.

All these norms of resource use were developed out of a long experience of resource use and strictly with community governance, occasionally codified by prevailing ruling authority.

All this also led to development of then-appropriate technologies such as the ***agor*** and ***tankas*** of arid Rajasthan, the ***phad*** systems of diversion-based irrigation in Maharashtra, and the ***tank systems*** of South India. Most of these still remain appropriate in these local contexts even in modern times, and BAIF and many other organizations have successfully resorted to these community-based technologies and resource-use systems even in current times.

Tanka: Cylindrical well for drinking water
Agor: Sacred catchment area surrounding the tanka

Phad: Small-scale community-led diversion for irrigation

Tank systems: Reservoirs, often with steps, that have practical, spiritual, and sometimes architectural significance

Life and Livelihood—Balancing Values

The balance between "water for life" and "water for livelihoods" is thus emerging as the new balancing act between values that are life-centric and those that are human-centric. A balance must be found, only because it also represents the balance that will spell sustainability of human existence and a dynamically stable biosphere.

Metrics for Sustainability

The defining of SDGs has helped to bring in the dimension of **sustainability** to be superimposed on the erstwhile Millennium Development Goals (MDGs). It is equally important to elaborate the SDGs by applying a **water lens** so that a critical resource is factored into the SDG setting.

The metrics for sustainability are very different from what we have been used to. "Development" can no longer be measured only in terms of "standards" or "quantum" of output, but rather by quality measures. Maximisation of output can no longer be an objective, but rather it will need to be the "minimalisation" of resource input. Likewise, not only reducing the quantity of "waste" is important, but also the quality of the "wasted" resource—or the effluent—will be of paramount importance. Applied to water resources, it implies that the **water footprint** of an activity or usage will be important, but so will be the **drop in quality** that is caused by any usage.

Communitisation—Putting People First

In recent times in India, the communitisation of the process of natural resource management has been a major turning point in the way such programmes are conceived, planned, and implemented. BAIF has experienced the power and vitality of this process through community-planned and -executed watershed development and landscape development measures using demystified planning methodologies; through community-managed silvi-pasture programs; and through community-designed and -executed diversion-based irrigation projects. This process of putting people first is a vindication of the older forms of community-based natural resource management but with a healthy blending with modern knowledge and technology. Such vibrant stakeholder involvement is perhaps the only valid approach to bring sustainability into natural resource management and usage.

New Age Means and Approaches

New Age needs—necessitated by the pressures of large populations, a depleted resource base, and disturbed ecosystems—will require the use of new-age means and approaches to address the requirements of SDGs. The old values of moderation, respect, and frugality will need to be reinterpreted and applied in current times. **Moderation** will require application of interdisciplinary efforts encompassing hydrology, agronomy, use of new technologies of water saving, recycling and high use-efficiency, but also introducing decentralized management and usage; **respect** will imply mutuality and equity, and also voluntary allocation of water resources to wild flora and fauna, as well as to ecosystem service functions; and **frugality** will require changed societal norms for waste reduction.

The concept of **circular economy** recognizes how the output at one stage becomes the input of the next stage. When applied to water usage, it helps in understanding water usage as a continuum rather than as a fragmented usage. But such a concept must start with the appreciation that water is a **single resource** that changes hands many times between different users and sectors. A responsible resource usage will ensue only if water usage is done through **closed water cycles**, which require the user at each stage to take care of the resource quality passed on to the next stage. If these cycles are closed and made short—through proper incentivisation—even the first user is directly affected by downstream effects. Appropriate policy measures will need to be developed to put the new-age mechanisms in place.

Toward Sustainable Sufficiency for All

It is thus crucial to appreciate that in whatever fragmented manners we may tend to look at and manage water in our various endeavors, it is after all **one resource** and is in the form of a **global common property** that belongs not just to humans but to all life-forms.

"Realising the SDGs crucially depends on adopting an integrated, inclusive, and life-encompassing approach to the availability, accessibility, and use of water, for present and future generations."

—Crispino Lobo, Managing Trustee, Watershed Organization Trust

Water and the SDGs

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Watershed Organization Trust (WOTR)

Introduction

The Sustainable Development Goals have been designed as aspirational global targets: action oriented, global in nature, and universally applicable. They have been designed keeping in mind different national circumstances, realities, capacities, and priorities. The goals and targets seek to integrate economic, social, and environmental aspects and to recognize interlinkages in achieving sustainable development in all its dimensions.

The argument developed here focuses on the SDGs, and water in drylands and the developing world, in the face of climate change. In particular, in India, where the Watershed Organization Trust (WOTR) has been working for more than two decades developing sustainable solutions in the context of rainfed farming, we argue that water is a pivotal resource and sector for achieving the SDGs.

The SDGs recognize the role that water must play, with the focused goal to "ensure availability and sustainable management of water and sanitation for all." However, it is important to avoid approaching the 17 SDGs as separate silos but instead take an integrated and systems-oriented approach to them (ICSU, ISSC 2015). In doing so, it becomes obvious that in order to achieve the targets that the SDGs set, the subgoals under SDG6 must be seen as necessary enabling conditions for achieving many other SDGs and vice versa. Further, we argue that a key aspect for making the SDGs operational is developing strategies to "localize" them—i.e., to make explicit the role that local actors and stakeholders must play. Finally we demonstrate how WOTR's work contributes to realizing the SDGs.

Mapping Water onto the SDGs

While the SDGs "constitute an integrated, indivisible set of global priorities for sustainable development," there is a danger that, presented with the sheer number of goals (17) and subgoals (169), actors across the board may lose sight of the interlinkages between goals in the pursuit of their sectoral targets. Anticipating that danger, we argue from the perspective of the water sector: that achieving many of the SDGs requires an adequate focus on water. Similarly, addressing practitioners in the water sector, we argue for the need for an integrated approach, as achieving SDG6 requires progress in several of the other SDGs.

Among the SDGs, water has its own dedicated goal, Goal 6, which, as mentioned above, aims to "ensure availability and sustainable management of water and sanitation for all." The goal specifies six technical targets and two additional targets on the means of implementation. From the point of view of grassroots practitioners, the points regarding the means of implementation are well received, as they explicitly provide a means to strengthen community participation in the management of water resources.

While the SDGs promote the participation of local communities in water governance, it is important to see water management in the larger perspective of ecosystems management and the other SDGs. Figure 1 maps the water subgoals onto the other 16 SDGs and their respective subgoals. The diagram also indicates the kinds of relationships between them. It demonstrates that water-related goals contribute to 51 of the outcomes; additionally, 37 outcomes act as enablers for achieving water-related goals. It follows that more than half of the SDGs are relevant from the perspective of water.

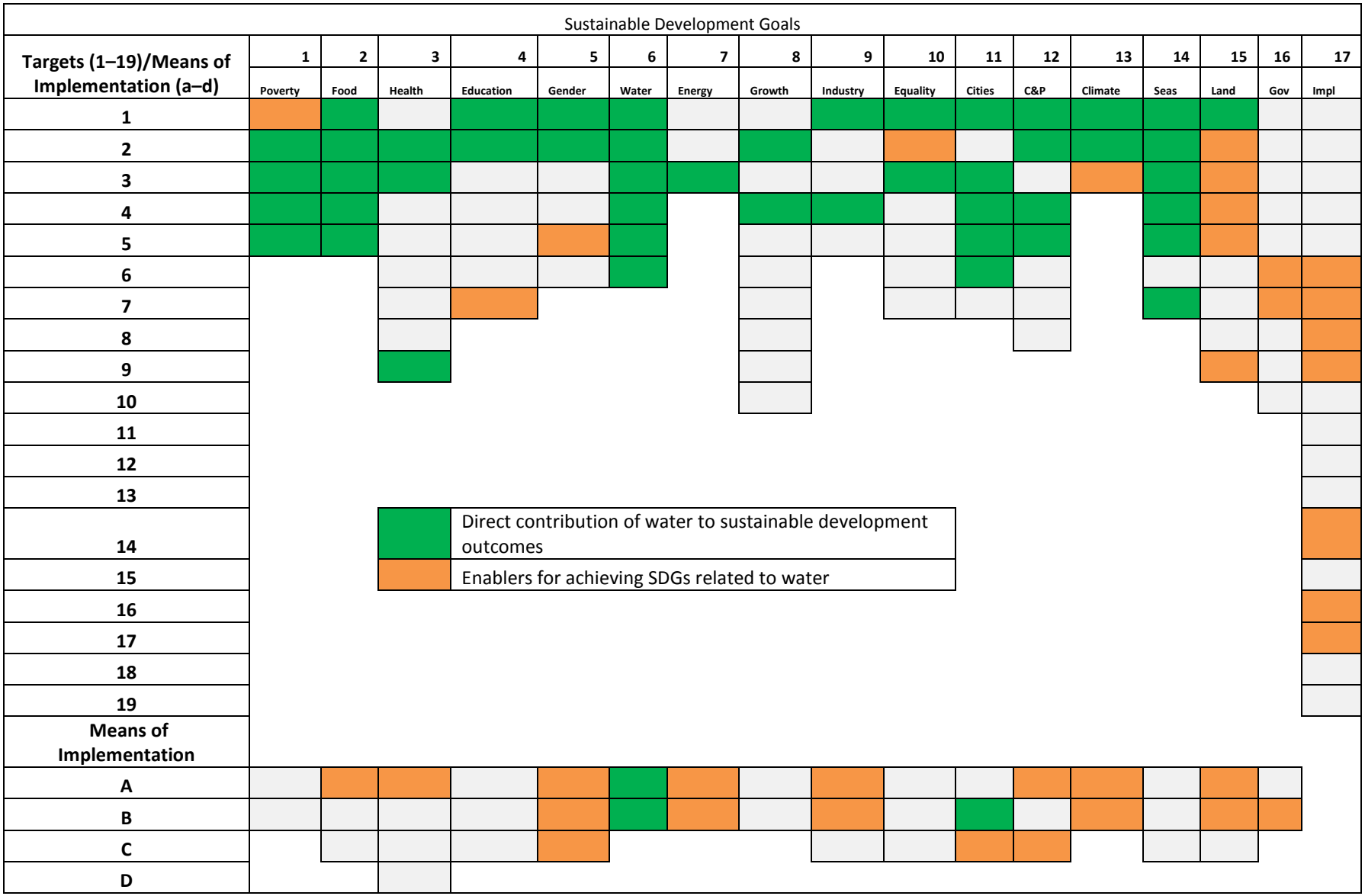
Drylands, Climate Change, and Adaptation

Water resources are crucial for rural livelihoods in dryland areas, especially in the poor and marginalized communities. Degraded watersheds and depleted aquifers impoverish rural households. Further, water is a contested resource, with access being largely determined by land location and access to technology. Drylands cover about 41% of the earth's land surface, and over 2 billion people (about 35% of the human population) inhabit them. Their primary productivity is limited by low soil water resulting from low precipitation and high evaporation. Though semi-arid areas can support croplands, populations living in drylands lag far behind in the areas of human well-being and development indicators. Yet almost half of the people worldwide who live below the poverty line live in drylands.

India has 16% of the world's population and 4% of its freshwater resources (UNICEF, FAO, and SaciWATERs 2013). In per capita terms, the annual availability of freshwater in India declined from 5,177m3 to 1,545m3 between 1951 and 2011, which is well below the 1700m3person/year threshold for considering a country "water stressed" (Khurana & Sen 2010). In addition, the availability of water varies widely across the country. Dryland regions of India (arid, semi-arid, and dry sub-humid regions) constitute approximately 69% of the total land area in the country (GOI 2011). These areas of India are characterized by pervasive general and seasonal water scarcity. Of the 141 million ha of net sown area in the country, 80 million ha is rainfed. Much of semi-arid India is characterized by hard-rock aquifers, with limited yields, and the Central Ground Water Board estimates that groundwater resources in 1288 bocks in India are in the "dark-zone"—i.e., overexploited or critical; many of these fall in the already water-scarce, dryland regions (CGWB 2014).

Furthermore, dryland areas are more vulnerable to climate risks. Projections show erratic rainfall, rise in surface temperatures by 3.5°–5°C by the end of the century, and decrease in precipitation by 5%–25%, especially in drought-prone central India. Droughts will be more severe, and episodes of extreme precipitation will increase in frequency and intensity, concentrated over fewer days. Given that a certain amount of climate change is locked in, it becomes essential to enhance the adaptive capacities of communities, particularly the most vulnerable. In these circumstances, effective management of water resources, both surface and subsurface, as well as the ecosystems that provision them becomes a pressing concern.

Figure 1. Mapping Water onto the SDGs. Source: WOTR.



Localizing the SDGs in the Context of Climate Variability

There is strong evidence from across the globe that demonstrates the strength of community stewardship and collective action in the management of natural resources such as forests, pastures, river, streams, lakes, canals, and groundwater (Ostrom 1990). Because of their spatial scale, it is difficult for individuals or actors at the household level to manage forests, rangelands, watersheds, and fisheries (McCulloch et al. 1998). Further, at the local level there are generally multiple uses, as well as multiple users, of these natural resources. In such situations, management regimes that are locally developed through negotiation between different stakeholders, such as pastoralists, farmers, industry, and local government, can present equitable and sustainable outcomes (Meinzen-Dick and Knox, 1999).

Watersheds present an appropriate scale for integrated water resource management. Rockström et al. (2010) argue that, nestled between the basin level and the farmer's field, the catchment or watershed provides a meso-scale offering opportunities for investments in water resources and governance that build resilience in smallholder-based agricultural systems and address trade-offs between water for food and other ecosystem functions and services. However, traditional watershed development concern with water has been restricted to in-situ water conservation while paying less attention to water management in the conditions of water scarcity and rainfall variability that characterize semi-arid dryland agriculture. Many conventional natural resource development programs could increase the vulnerability of those they seek to benefit because they present a development pathway that depends heavily on water availability (Brooks et al. 2011, Gray and Srinidhi 2013).

The effects of climate change are experienced locally by communities, local institutions, and stakeholders. Responding to climate change necessitates engaging stakeholders in a transparent and sensitive manner in order to uncover the complex dynamics that engender poverty and vulnerability, and calls for design interventions that lead to fair and acceptable outcomes for all stakeholders. The adaptive capacity of a community depends upon the degree of understanding it has of the threat it is facing, the resources it has access to, and the depth of social capital it can draw upon. Social capital in the form of local institutions, be they public, civic, private, formal, or informal, plays an important role in shaping the adaptive capacity of local communities (Lobo 2011). For these reasons, it is imperative, as a prerequisite for adaptive development measures, to enlist the active cooperation of local groups, communities, local institutions, and stakeholders; strengthen their capacities; and empower them as active participants in decisions involving responses and strategies for dealing with climate variability.

There is a need to promote a bottom-up approach to ensure ownership of the Post-2015 Development Agenda at the local level. WOTR's own experience in designing participatory development programs and other evidence from across the world tells us that with the right support, and often independently, communities are capable of coming together to successfully protect and restore forest and pastures on common land, increase rainwater storage in soil and surface water bodies, and recharge aquifers (FAO 2010, Bruns 2015).

WOTR's Approach to Watershed Development and Water Management in the Context of Climate Change

The watershed development approach that WOTR implements and which has been replicated across India is based on four non-negotiables: the project would follow a ridge-to-valley approach beginning from the ridgeline down to the valley; people would make a contribution (cash or in-kind) that would develop ownership of the project; there would be representation from each economic and social group (with a specific representation for women); the community would work to restore forest and pasturelands or the village commons.

Using conservative estimates, Gray and Srinidhi (2013) calculate that the net present value (NPV) of a watershed development project (Kumbharwadi watershed) implemented by WOTR ranged from $5.07 million to $7.43 million. This amounts to benefits of $5,573 to $8,172 per hectare treated or $29,650 to $43,479 per household, with a cost–benefit ratio that ranged from 2.28 to 3.76. Reports from the field suggest that many of WOTR's watershed development projects (WSD), as well as other participatory WSD projects, have in general performed better than nonparticipatory schemes and been able to withstand impacts of drought, changes in rainfall patterns, unreliable precipitation, and temperature-extreme changes better than watersheds not using a participatory, ecosystem-based approach (Kerr et al. 2000, Nair 2013).

Concerned that recent and projected climatic trends could decrease the benefits that communities receive from the watershed development programs that it had pioneered, from 2005, WOTR began orienting its strategy so as to better equip poor communities to adapt to climate change. As a result of this, WOTR has developed a series of innovative programs that integrate technological innovation, watershed development, agricultural extension, and demand management (see Boxes 1 and 2 for a snapshot of some of WOTR's interventions).

As argued earlier, conditions in dryland regions can be significantly improved by better and integrated management of water and natural resources. However, management of dryland resources must be viewed from the broader socioeconomic circumstances. Not only should it rejuvenate fast-depleting natural resources, but also it should provide opportunities for local communities to explore viable, alternative livelihoods while maintaining their own cultural and societal fabric.

While WOTR has historically applied a systems-based approach to watershed development that focused on people-centric participatory interventions, due to non-normal weather variations now being experienced, WOTR has moved into ecosystem-based adaptation (EBA)—an emerging approach that helps vulnerable communities build resilience in their degraded ecosystems and livelihoods now threatened by climate change impacts. In the process, WOTR has introduced a bottom-up, holistic, and integrated approach with appropriate interventions, toward adaptation and resilience building. Table 1 shows how the pillars of WOTR's revised approach integrate with the SDGs.

Table 1. WOTR's Approach and the SDGs.

Participatory Ecosystem-Based Approach	SDG Goals
Community led: WOTR's interventions are community led and people-centric. Local institutions are strengthened to create an inclusive programme that ensures that benefits reach all stakeholders. A significant part of project efforts are directed to building the capacity of local communities to participate in and lead interventions.	5, 6, 10, 13,16,
Ecosystem-based watershed development is based in ecosystem management as a means to reduce risks, mitigate the impact of extreme meteorological events, increase productivity, conserve biodiversity, improve the quality of life, and stabilise and enhance nature-based livelihoods.	1, 2, 3, 13, 15, 16
Adaptive sustainable agriculture promotes low external inputs and use of indigenous seeds to increase crop and land productivity and reduce costs of cultivation. This is combined with agro-meteorology and water budgeting to make agriculture sustainable, efficient, and adaptive, keeping in mind food security, nutrition security, and market demands.	1, 2, 6, 12, 13
Agro-meteorology uniquely combines locale-specific meteorological advisories and agro-advisories that provide timely information to farmers so that they can plan their agricultural activities accordingly. Evidence from around the world shows that text-based advisories and reminders have a positive effect on adoption of new technologies and techniques (World Bank 2014).	2, 6, 13
Water budgeting helps communities visualize and plan their crops based on their existing needs and requirements of water and water availability, ensuring optimum and more efficient use of water by optimizing irrigation, equitable sharing of excess water, and informed decisions on groundwater withdrawals.	6, 13, 15
Biodiversity: WOTR integrates biodiversity concerns and builds an awareness in the community about the importance of promoting, conserving, and protecting the local biodiversity; helps them to keep a record of it through participatory mapping; identifies and sustainably promotes biodiversity-based economic activities; and sensitizes local bodies to the likely adverse biodiversity-related impacts of decisions made by them.	12, 15, 16

WOTR has also made significant contributions to participatory natural resource management in India. WOTR, in its role and function of program coordination and capacity building agency of the large-scale, successful bilaterally funded Indo-German Watershed Development Programme (IGWDP), has pioneered many of the processes and approaches to watershed management that are now part of the participatory natural resource management canon. Concepts and processes developed and adopted by WOTR and the IGWDP, such as ridge-to-valley treatments, site-specific and community-determined measures, people's ownership, and civil society–public sector partnership, have been incorporated in government-run watershed programs and are now widespread across the country and part of the normal developmental discourse. The success of the Capacity Building Programme (known as the Participatory Operational Pedagogy—POP), which WOTR had developed, led to the practice of capacity building as a separate, prior, and integral component of a watershed development project being adopted by other donor- and government-funded large-scale watershed programmes in the country.

A major structural initiative from the replication and upscaling point of view in this direction has been the setting up of the Watershed Development Fund (WDF) by the government of India (GOI) at NABARD in 1999. The WDF, developed in partnership with WOTR, extended the experience of the IGWDP across 100 of the poorest rainfed districts in the country. WOTR has supported NABARD in this effort by conducting training and exposure programs for its officers and government officers, as well as participating NGOs from different states of the country.

Box 1: Cooperation for Irrigation

Mandla is a tribal-dominated district located in the hilly and forest areas of the Maikal hill range of the Satpuras, in mostly scattered habitation. The Watershed Organisation Trust (WOTR) is active in the Niwas Block of Mandla District. While the district receives about 1400 mm of annual rainfall on average, one of the main problems is access to water—poor tribal farmers simply cannot afford investments in irrigation technology. This makes them more vulnerable, as agriculture is completely dependent on the vagaries of nature.

Under its Climate Change Adaptation (CCA) project, eight villages were selected and water management initiatives were carried out. While designing the initiatives, it was decided that a community-based approach would be used. This decision was made with the consideration that (1) utilization of several sources of water could lead to further land and water resource degradation; (2) given the small, fragmented landholdings that characterize this area, collective ownership of assets was the most cost-effective approach, as it allowed for optimum utilisation of the asset; and (3) social cohesion was very strong in the area, creating an enabling environment for collective action. Under this initiative, 60 groups of two to four farmers in each group in the villages were formed, and sprinkler and 3 hp motors were given to each group.

These initiatives resulted in significant changes. It was observed that villagers (who were not related by blood) shared not only the sprinkler sets but also the source of water, which is unique where a well is concerned. Also, at times, when group members do not require the sprinklers, they are able to rent them out to other farmers. As a result of the intervention, there has been a 48.4% overall increase in area under cultivation in the clusters (consisting of 60 groups of two to three farmers each) and an 82% increase in total production. Earlier they were able to take just a single kharif crop (mainly rice); but now, with these sprinkler sets, they are able to take another crop (rabi) of wheat and various varieties of pea as well.

Box 2: Last Mile Service Delivery through SMS-Based Agro Advisories

Farmers of Sangamner and Akole tehsil (blocks) of Ahmednagar District, Maharashtra, are mostly dependent on seasonal rains, which are highly variable in time and space. Certain weather events, such as drought, storms, cold waves, and heat waves, have severe effects on agricultural production in project villages. The impact of these events on farmers' livelihoods can be reduced if farmers have advance information about the probable occurrence of these events as well as the possible contingency measures in their geographical locations.

WOTR has installed automated weather stations (AWS) in project villages. Villagers are trained to read the meteorological data, and information is displayed on blackboards in the village. Information is provided in the local language to the villages through SMSs together with crop-specific advisories. Weekly forecasts and advisories for the common crops are also printed on wall papers. The agriculture team of WOTR then prepares the agro-advisories based on forecasted weather events (such as delayed onset of rains, dry spells) and suggests crop management practices, which include dealing with pest and disease problems, nutrient and irrigation management, market rates, etc.; these help mitigate risks and reduce losses. In the winter cropping season of 2013–2014, WOTR provided SMS-based advisories to 3664 farmers in 24 villages in these two blocks.

In the face of climate variability, the locale-specific weather information helps in reducing and managing the risks, and agro-advisories based on these forecasts help farmers improve their productivity and reduce the related vulnerabilities. This intervention by WOTR helped create awareness among the farmers of the project areas and also in the nearby villages about climate variability, climate change, and its impacts on their livelihoods. An increased use of organic manure and pesticides has been observed by the villagers who received information from the agro-SMS services provided to them. A decrease in the use of inorganic pesticides and fertilizers has also been observed, as the farmers are sensitized about the need to promote soil health. This has helped them ensure income even during low rainfall years and improve overall crop productivity. Manjula Lohate, a smallholder widow, cultivates high-value crops such as pomegranate, onion, and tomatoes on her small, 3-acre plot. She uses a small farm pond to provide supplemental irrigation to her crops. Based on an SMS advisory, she applied mulch to her pomegranate plot. This reduced the evaporation rates considerably and lowered the water requirement by 50%. "Earlier I used the drip for two hours every day. Now I use it only for one hour," she remarked.

WOTR's more recent work on climate change has resulted in the development of a participatory climate vulnerability assessment tool called CoDriVE-PD. The tool has been disseminated widely across NGOs, government departments, universities, and research agencies. The state-level nodal agency (SLNA) for implementation of the Integrated Watershed Management Programme (IWMP) in Andhra Pradesh has sanctioned a pilot project for the use of CoDriVE-PD as an action research project in two districts of Andhra Pradesh (Anathapur and Mehabubnagar[1]). The government of Maharashtra has also expressed interest in piloting CoDrive-PD in some of its large-scale watershed development projects. In 2014, through the initiative of WOTR and NABARD, the government of India set up the National Adaptation Fund (NAF) of $25 million to build adaptive capacities and resilience in vulnerable communities across the country. The design and operationalising of this fund is drawing upon the large-scale pilot Climate Change Adaptation (CCA) project of WOTR, which has been implemented in three states in India.

[1] Now part of Telangana, the recently bifurcated part of the erstwhile Andhra Pradesh state.

On the ground, WOTR has made direct contributions to achieving a sustainable future. On the level of policy, they have been able to leverage the wealth of experience that they have in order to contribute to scaling up sound and effective watershed development and climate smart and adaptive practices. Overall, WOTR's work has been consistent with the goals of the SDGs and to a degree, has anticipated them.

Conclusion

The SDGs present us with goals but not the strategies required for achieving them. As a reflexive-action and outcome-oriented organisation, WOTR understands that strategies are often as important as the goals that they aim to achieve. The SDGs are meant to apply to a wide array of contexts and circumstances, and hence there can be no single one-size-fits-all strategy to achieve them. In fact, it is the prerogative of practitioners around the world, civil society, activists, governments, resource users, local communities, and the private sector to design these strategies.

However, from our experience, limiting ourselves to water resources, we believe that for any strategy concerning Goal 6 to be effective, it must take a broad and system-wide view of water as a resource, including the aspects of water for drinking, sanitation, agriculture, industry, ecosystems, and spiritual and recreational needs. As demonstrated in Figure 1, this SDG is intimately linked with all other SDGs. Therefore, it is imperative that, first, any strategy developed for achieving the SDGs associated with water must involve concerted and coordinated action across sectors, particularly with respect to terrestrial ecosystems such as forests and grasslands and their management. In the context of agrarian production systems, a watershed- or catchment-level approach is appropriate, as it presents a manageable scale for coordinating efforts at a higher level. Second, any strategy that is developed must be predicated upon the free and meaningful participation of local communities and resource users. WOTR's work demonstrates that with appropriate support, communities are able to cocreate sustainable natural resource management systems and develop inclusive governance of shared resources that increases access to benefits and balances countervailing interests. Finally, strategies developed for achieving SDG6 must also explicitly consider the impacts that projected climatic change will have on water resources and the ecosystems that they are a part of.

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"Rajshree Sugars and Chemicals, as one of its policies, to give back to the community, has taken a lead in reaching out to the farming community to be water efficient, which is one of the vital resources for the production of sugarcane. We have taken the initiative to create awareness among farmers in managing this risk in partnership with Solidaridad. We are proud that despite the drought situation, our farmers are able to maintain the cane area and get good yield due to this awareness creation. Also, we as a business group have been able to sustain good supplies over the past two years. Sustainable consumption and sustainable production has been the mainstay of RSCL's work, and it is reflected in our supply chain, where we are addressing the issue of water consumption and environment-friendly farming and thereby achieving sustainable sugar production."

—M Krishnan, Senior Vice President, Rajshree Sugars

"As water scarcity is becoming a challenge in the country, it is critical that agri-supply chains look deeper into the issue and address it as part of their business strategy. . . . Working with the leadership of Rajshree Sugars and Chemicals Ltd is an inspiring effort. The commitments reflect at all levels. . . . The partnership of Solidaridad-Rajshree Sugars and IFC is setting a new paradigm for efficient water use and produces more crop per drop of water."

—Prashant Pastore, Senior Programme Manager–Sugarcane, Solidaridad South and Southeast Asia

"While drip irrigation is a proven technology for water-use efficiency and farm-productivity enhancement in sugarcane, many farmers, particularly small and marginal, are unable to reap its full benefits on account of limited access to drip finance. IFC, in partnership with Solidaridad and RSCL, is promoting farmer financial literacy with a focus on drip irrigation to enable sugarcane farmers in their efforts for water-use efficiency in sugarcane cultivation."

—Harsh Vivek, Operations Officer of Advisory Services, International Finance Corporation (IFC)

"As oil conflicts were central to the 20th century, the struggle over freshwater is going to be the focal point in the 21st century for most of the countries. This problem would be particularly severe in India, which has only 4% of the world's renewable water resources, and yet it is the world's largest consumer of groundwater. India's progress with SDGs will depend directly on how we could sustainably achieve water efficiency in agriculture. In this context, Solidaridad initiated a partnership with RSCL, HUF, and IFC for water efficiency in the sugarcane sector that provides livelihood to approximately 6 million smallholders. The programme adopted a combination of India's traditional knowledge of agriculture in fusion with modern science to achieve water saving of 7.5 billion litres in just six months from 8.8 thousand acres benefitting 35,000 smallholders. The project shows that, with the right will, expertise, and partner relationships, public-private partnership is a worthy investment for water efficiency in agriculture of India."

—Dr. Shatadru Chattopadhayay, Managing Director, Solidaridad South and Southeast Asia

Water Stewardship for Sustainable Sugar Business: A Case of Rajshree Sugars and Solidaridad Partnership in India

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This paper presents a case study of an initiative taken up by Indian private sugar company Rajshree Sugars and Chemicals Limited and Solidaridad Network, a civil society organisation with support from Hindustan Unilever Foundation (HUF), to address the issue of water in the sugarcane sector. The case presented here acts as a bridge to connect CEO Water Mandate and SDG water goals. The effort justifies the work taken up by the private sugar company to address water as a critical input for their security of supplies and showcases how this can be well addressed as a business case for both farmers and companies.

Introduction

The SDGs will replace the UN's Millennium Development Goals, which expire in 2015, and set the international development agenda for the next 15 years. For the first time ever, the goals could offer new transparency and accountability in how the world uses its water resources. Goal 6 of the proposed SDGs has specific targets related to sustainable and efficient water use, water and sanitation, water quality, and protection of critical natural infrastructure.[2] The goal of efficient water use is critical for a country like India, where almost 80% of the water is utilised in agriculture, thus efficiency in agri-practices is critical to attain more sustainable development where benefits serve all the communities and businesses.

Beyond Goal 6, Goal 12 of the proposed SDGs mentions sustainable consumption and production, which makes it important to look into the demand-side use of water in agriculture, specifically those commodities which are linked to supply chains. The initiative needs strong will across all the stakeholders, from communities to corporations to governments. India has more than 17% of the world's population but has only 4% of the world's renewable water resources, with 2.6% of the world's land area. There are further limits on utilizable quantities of water, owing to uneven distribution over time and space pushing overdependence on groundwater. India is the world's largest consumer of groundwater, and its agriculture is critically dependent on it. Groundwater irrigation has been a major component in agricultural development since the 1960s. It enhanced agricultural productivity, ensured food security, and induced commercialization of agriculture. Groundwater accounts for over 65% of irrigation water and 85% of drinking water supplies. But all over the country, groundwater is extracted faster than it is naturally replenished, water tables are falling, and wells are drying up.

According to an analysis by NASA hydrologists, India's water tables are declining at a rate of 0.3 meters per year. Reports across India indicate that, at the majority of the locations in India, the groundwater level is dropping at alarming rates—in some districts of Andra Pradesh more than 5 meters in 2012.[3] Water security is widely recognized as one of the major challenges to India's economic and social development. The World Bank predicts that India has only 20 years before its aquifers will reach "critical condition"—an eventuality that will devastate the region's food security, economic growth, and livelihoods. In its 2013 Outlook Report, the Asian Development Bank calculated India's water security based on household, economic, urban, and environmental needs, and concluded that India's water prospects are "hazardous."

Effective management and development of water resources is essential for growth, poverty reduction, and equity. In many parts of the world, the livelihoods of the poorest are directly linked to water resources, such as for fishing, farming, household supply, navigation, small-scale industry, and livestock care. Water resources are crucial for socioeconomic development and for maintaining healthy

[2] Betsy Otto and Kitty van der Heijden, "Opinion: Sustainable Development Goals Could Be a Game-Changer for Water," Inter Press Service, March 20, 2015, http://www.ipsnews.net/2015/03/opinion-sustainable-development-goals-could-be-a-game-changer-for-water/. Accessed 27 June 2015.

[3] M Suchitra, "Ground water levels plummet in Andhra Pradesh," DownToEarth, January 16, 2012, http://www.downtoearth.org.in/content/ground-water-levels-plummet-andhra-pradesh. Accessed September 2014.

ecosystems. Water-resources management aims at optimizing the use of available natural water flows and resources, including surface water and groundwater, to satisfy competing needs between both users and uses.[4]

For a country of this magnitude and diversity, providing opportunities to a large number of people, escaping from poverty, and achieving both food security and high economic growth present a formidable challenge; thus, improving management of land and water is critical. Given the high level of physical and economic water shortage and the growing demand and competition for water from different sectors, there are far fewer options to expand irrigated areas. The project innovation addresses this by increasing the application of water-related solutions by sugarcane farmers for reduced pressure for water from agri-industry supply chains.

As per "post-2015 water thematic consultations" on water for food, discussions indicated that producing enough food for one person for one day requires about 3,000 litres of water. In the effort to feed 7 billion to 9 billion people, careless decisions could dry up aquifers and streams. The CEO Water Mandate recognizes that the private sector has an important stake in helping to address the water challenge faced by the world today,[5] and for an agri-based supply chain this becomes more critical for the existence of their business. Already 40%–50% of all nutrition—along with half of all water embedded within food—gets lost in the increasingly long food chain moving crops out from rural farms into urban mouths. Yet efficiency gains that reduce direct and indirect wastage of water throughout the food value chain, from field to fork, could save significant amounts of water and money.

One such initiative to look at water from the business perspective in the sugar supply chain has been initiated with support from the Hindustan Unilever Foundation by Solidaridad in partnership with Rajshree Sugars and Chemicals (RSCL), one of the leading sugar businesses in the state of Tamil Nadu, India. The underlying principle of this initiative was Solidaridad's belief that the projected world population in 2050 of 9 billion people can be sustained only if the agricultural sector makes a transition to smart and sustainable land and water use and produces enough to provide sufficient food, feed, fibre, and fuel. In this scenario, the future farmer is not just a provider of food but also a supplier of energy (e.g., ethanol from sugarcane) and raw materials to industries, and will need irrigated water to produce these supplies.

Criticality of Sugarcane

India is the world's largest consumer of sugar and, as producer, second only to Brazil. With an annual turnover of $17 billion, the sugar industry is India's second-largest agri-based industry, after cotton. About 6 million farmers and a large number of agricultural labourers are involved in cane cultivation. More than half a million workers, mostly from rural areas, are engaged in the sugar industry. The cultivation of sugarcane provides livelihoods for an estimated 50 million farmers and workers in India. Smallholder sugarcane farmers are caught in a vicious cycle of low productivity, high input costs, low

[4] UN-Water, *The Post 2015 Water Thematic Consultation Report*, http://www.unwater.org/downloads/Final9Aug2013_WATER_THEMATIC_CONSULTATION_REPORT.pdf. Accessed 27 June 2015.

[5] *The CEO Water Mandate*, http://ceowatermandate.org/files/Ceo_water_mandate.pdf. Accessed 30 June 2015.

income, and, consequently, low investment in improvements. Cane farming uses as much as 3000 litres of water per kilogram of sugar produced. Appropriate soil management, improved water harvesting, evaporation-loss-reducing techniques, increased irrigation efficiency using micro irrigation systems (drip and fertigation), and sound agronomic practices can reduce water usage by 10%–30% while increasing productivity by 15% and incomes by 10%–15%.

A total of 571 sugar mills process cane into about 25 million tons of sugar per year. Other products derived from sugarcane include molasses and bagasse. Molasses is the main raw material for ethanol production, whereas bagasse, the other byproduct of sugar processing, is raw material for co-generation of power in sugar mills. Thus, a strong case can be made for addressing water management in this sector.

As water scarcity becomes a bigger and bigger problem, sugarcane-farming areas will be hit hardest, as sugarcane consumes most of the irrigated consumptive water use. The situation is exacerbated by increased rainfall variability due to climate change, which may reduce sugarcane yields by up to 30%.[6] There is no additional water that can be diverted for increased sugarcane production. This means that the water requirements of sugarcane need to be minimized and water productivity in sugarcane farming needs to be improved. The new paradigm for efficient water use is to produce more crop per drop of water.

The Initiative: Water in the Sugarcane Supply Chain

The HUF-Solidaridad project brought in the business innovation of integrating on-farm water efficiency for increased productivity and water conservation in the sugarcane supply chain through strengthened farmer-factory partnership to reach out to smallholder farmers and producers with information and training in efficiently adopting water-saving technologies. The business innovation has been plugged in within the ongoing sugarcane programme of Solidaridad and RSCL in the state of Tamil Nadu. The activities are in line with the proposed SDG Goal 12 on sustainable consumption and production, where RSCL as a sugar business took the lead in bringing changes in their supply chain by directly addressing the issue of water consumption and environment-friendly farming and thereby achieving sustainable sugar production.

This has brought demand-side reduction of water use as a key sustainability approach in sugarcane supply chains for increased productivity and increased food security. The project has directly reached out to about 35,000 smallholder farmers linked with RSCL sugarcane supply chains in adopting farm water efficiency solutions (micro irrigation, in-situ soil and water conservation using trash mulching and shredding) for increasing productivity and household income of farmers while bringing profits in sugar business. The innovation is unique in the country, where until now water saving and conservation have been addressed only from the supply-side perspective, and emphasis has been mainly on water harvesting and storage. The joint effort of Solidaridad and Rajshree Sugars in securing water in agricultural supplies has presented a strong business case for its adoption at scale in the country.

[6] Ashley D'Mello, "Climate change may hit sugarcane crop: WB report," *Times of India*, May 27, 2009, http://timesofindia.indiatimes.com/city/mumbai/Climate-change-may-hit-sugarcane-crop-WB-report/articleshow/4581721.cms.

Water-Saving Practices Promoted

The project accelerated the large-scale rollout of a set of irrigation and farming practices that have proven to raise the water productivity and profitability of sugarcane farming. These techniques and practices include the following:

1. **Drip irrigation:** surface and subsurface drip irrigation can contribute substantially to saving water by eliminating conveyance losses and percolation losses while also boosting yields, as a result of more even and frequent water delivery. Drip irrigation manages moisture consistently and makes it possible to apply fertilizers throughout the system according to the specific needs of the crop, allowing for the crop to grow to its maximum potential for a longer period. Drip irrigation can save 40%–60% water compared with furrow irrigation in sugarcane growing. Drip irrigation can increase sugarcane yields by 23% under farm conditions.[7] Drip irrigation combined with **fertigation** saves fertilizer by providing fertilizers right in the root zone, at the proper time and in the right quantity, thereby enhancing productivity. Other benefits include savings on fuel expenses and improvement in fertilizer-use efficiency.

2. **Trash mulching** (making a 10 cm thick cover from removing spread in inter-row spaces) is a most practical and cost-effective way to increase the effectiveness of irrigation by reducing evaporation loss from the soil surface. It maintains the soil moisture at a higher level for a relatively longer time compared with uncovered soil surface, controls the emergence of weeds that compete with the sugarcane, and reduces shoot borer incidence. When decomposing, the trash releases nutrients, which improves the fertility of soil. The trash-mulching practice requires some extra labour during cultivation but no capital investment for the farmer. **Trash shredding** before planting and in between ratoons improves germination rates and soil structure. Trash mulching is reported to save as much as 23% irrigation water and improve sugarcane yields by up to 30%.[8]

3. **Composting** improves the water-holding capacity of the soil, while application of **biofertilizers** containing beneficial microorganisms such as acetobacter (nitrogen fixation and growth promotion) and mycorrhiza (phosphor solubilisation and increased nutrient availability) helps in sustaining the soil fertility and reduces dependence on chemical fertilizers, which have a detrimental effect on soil structure, crop productivity, and groundwater quality in the long run. It is economical to use biofertilizers, as they are a cheap source of nutrients when compared with chemical fertilizers and can increase yields by up to 24%.[9]

Making the Change Happen on the Ground

The water-efficiency activities were carried out among 35,000 smallholder farmers (having an average land holding of 2 acres) and their respective sugar supply chains in the three mills of RSCL in the District of Villupuram and Theni in Tamil Nadu. These farmers are usually resource constrained, especially in terms of access to technology and information.

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[7] A. Narayanamoorthy, *Efficiency of Irrigation: A Case of Drip Irrigation*, National Bank for Agriculture and Rural Development, Mumbai, https://www.nabard.org/pdf/OC%2045.pdf. Accessed 21 May 2015.

[8] Nguyen Thi Mui, *Effect of management practices on yield and quality of sugar cane and on soil fertility*, FAO Corporate Document Repository, http://www.fao.org/docrep/004/ac151e/AC151E04.htm.

[9] http://tnau.ac.in/eagri/eagri50/AMBE101/pdf/lec25.pdf

The farmers were reached through structured three-day and one-day monthly trainings supported by behavioural-change communication packages designed in a manner in which the farming communities are the primary recipients. The “on-farm water efficiency” focused activities were included as an expansion of the “good agricultural practices” to promote judicious use of water in a focused manner supported by the active leadership of RSCL. The key elements for its promotions were as follows:

1. Increase in productivity through efficient farming
2. Training for adopting water-saving technologies
3. Continuous supportive supervision through business extension outreach
4. Strengthening food security through intercropping

The company leadership has also taken up specific initiatives to reach out to farmers to manage their farming and water-management practices through a drip diary and crop calendar. These tools have become very handy in terms of providing farmers with guidance in managing their farms and various farm-related schedules. Apart from these there were 24 demonstration sites developed to showcase best practices to farmers on the ground.

The Change on the Ground

The end users were nearly 40,000 smallholders in the RSCL sugarcane supply chain. They adopted specific behaviour to bring changes to their current practices toward efficient farming with greater emphasis on water savings. This behaviour change has been actively facilitated by the sugar business, which is increasingly demanding responsibly produced inputs for their production. This is primarily achieved by reducing water losses on the farmers’ fields. Measures involve the judicious, timely, more complete, and more effective use of the water supply, capturing more water for transpiration and leaving less for unproductive evaporation. At field scale, interventions led to adoption of efficient ways of water harvesting, trash mulching, and appropriate soil-management techniques to improve water productivity. Apart from these nonstructural measures mentioned above, structural measures such as improving irrigation efficiency using micro-irrigation systems (drip combined with fertigation) were adopted by the farmers to save water and improve crop productivity. Consequent to these interventions, the programme has reached over 20,000 farmers through trainings, and over 60,000 acres of land have been brought under multiple water-saving practices. There has been a clear increase in the area brought under these practices despite the drought faced by the region.

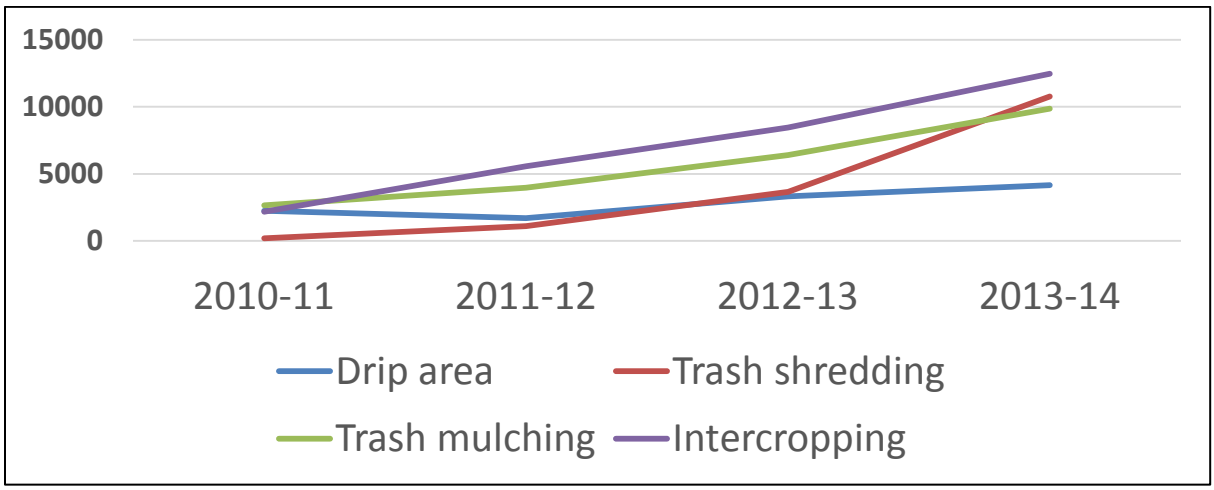

Figure 1. Due to the rapid adoption of these techniques, there has been a reduction in water consumption in sugarcane growing.

Measuring the Change

One of the critical aspects of the demand-side management of water is to gauge the change on the ground. At the beginning of the programme, the targets and achievements were included as part of the business strategy and were monitored and discussed on a monthly basis. The critical part emerging is the emphasis on water, since in India, nearly 80% of water is used in agriculture, as has been mentioned. The project has included water-savings targets as outcomes of good agricultural practices to gauge water efficiency on farmland. By weaving these two, the project has created a basis for not just promoting good agricultural practices to farmers but also bringing efficiency in water use and saving it for critical periods. There are also associated benefits that contribute to the economy of the farmer, in terms of additional production and supplies to the mills. These indices could very well contribute to the SDG Goal 12, as the indicators on water savings associated with good agricultural practices would be a critical component of sustainable production and consumption. The programme monitoring and evolution has been the critical mainstay of the programme. Third-party auditing of these claims independently brings robustness in data management at all levels.

This process could very contribute to bringing timely reporting of assured data and measuring of impacts. By employing these systems, the project aligns with the principles of the SDGs, where the robustness of reporting and data is an important component. The efforts are made to establish baselines as a first step, and then the progress has been tracked on sustainable water use against the target through an annual assurance and audit process. Specific tools have been developed for the farmers, such as drip diary and crop calendars to support the same. The project aims to further improve these systems with the progress of the project in coming years.

The demand-side project for Solidaridad has been unique, as there are no fixed ways to measure water savings. This is mainly due to the fact that it has never been undertaken at such a large scale from a supply-chain and business perspective, and crop water requirements change from region to region and crop to crop. The reasons for this are multiple: (1) Water is always considered a free commodity, and it is utilised by farmers as per their requirements; thus the need was never felt to measure its use in agri-production. (2) The complexities involved in calculating water savings also bring challenges.

Thus, the project has initiated measurement of water savings through improved adoption of water-efficient practices by the farmers. In the beginning, the project assumed theoretical measurements available in secondary literatures and crop water requirements. The methodology was further refined by incorporating sample farmers for their actual water consumption by different stages of sugarcane (Table 1) and rainfall data for the corresponding month of the growth.

Table 1. Water Requirements at Different Stages of Sugarcane Growth.

Stages	Duration in Days	Irrigation Water Consumed in %*
Germination	0–35	12
Tilling	36–100	22
Grand growth	101–270	40
Maturity	271 until harvest	26

***In the state of Tamil Nadu the sugarcane crop total water requirement is 179–215 ha-cm. Approximately 60–65 ha-cm is provided through rainfall. Thus the net water required through irrigation is 119–150 ha-cm.**

Source: Amit Bhardwaj Dy., Indian Sugar Mills Association, *Benefits of Micro Irrigation System, Sugar Recovery & Productivity*, 8 October 2013, http://www.indiansugar.com/uploads/Workshop-Micro-irrigation.pdf.

By applying the above theoretical principles, the estimated water savings over RSCL's 8,808 acres of treated area (through trash mulching, trash shredding, drip irrigation, etc.) during the period of January–May 2014 was estimated to be 7.21 to 7.5 billion litres.

As part of the project mandate, continuous efforts have been made to improve these demand-side water-saving estimates. During the current period of intervention, the methods are being further refined, and to strengthen the same, the project carried out a farmer survey to measure actual consumption of the water vis-à-vis different practices and technologies for the whole crop cycle. In total, 210 farmers across multiple practices and regions were interviewed about their practices and water consumption. The findings clearly suggest that there is a substantive decrease in crop water consumption when a farmer adopts any one of the efficient practices mentioned in this paper. The graphs in Figure 2 suggest that when a farmer moves from the furrow method of irrigation to add any one of the water-saving technologies, it significantly reduces water consumption over the conventional furrow method.

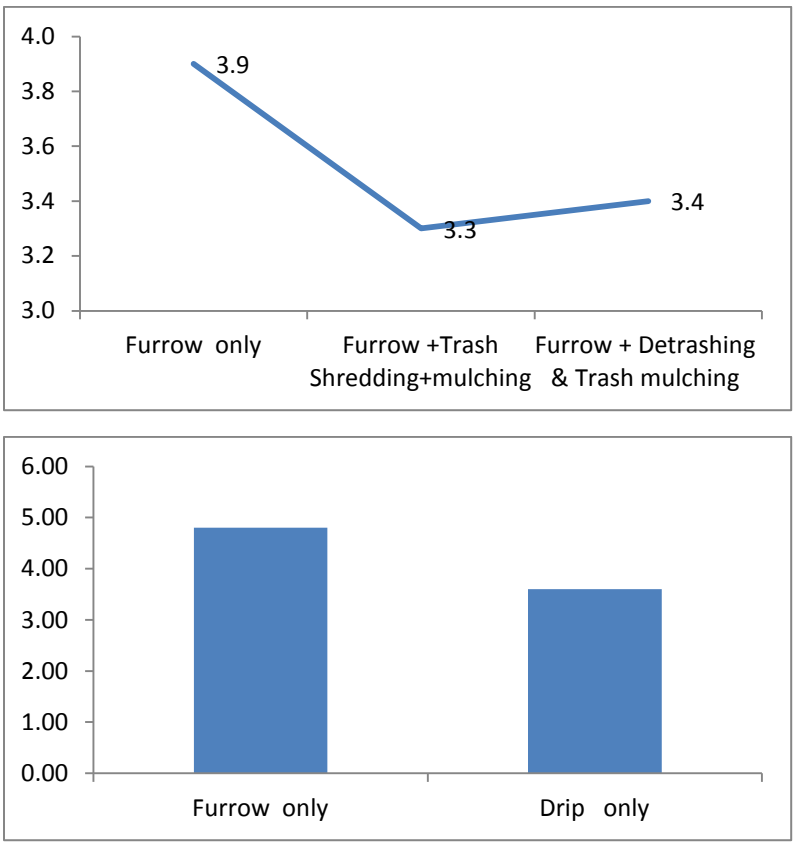

Figure 2. Total estimated quantity of water used per acre till harvest) in Million litres

Conclusions

The project is in line with the government of India's 12th Five-Year Plan and National Water Policy and proposed SDG6 and SDG12. In both of these frameworks water saving at the farm level is an important component for water resource management. The efficient farming along sugar supply chains directly aligns with the policy, which clearly proposes integration of water-use and land-use policies. The specific focus on smallholders is well supported by the national policy, which states that the water allocation in an irrigation system should be done with due regard to equity and social justice.

The project has envisaged one barrier to be the cost of adopting newer technology—i.e. drips irrigation by smallholders. Nevertheless, due to the strong stewardship of RSCL supported by Solidaridad, the project was facilitated by linkages with financial institutions and through continuous support on the ground by the business extension. To further mitigate this risk, a comprehensive training in financial literacy with support from the Indian Finance Corporation (IFC) has been initiated recently. The training aims to provide farmers with better decision-making power and minimise risk associated with adoption of water-efficient technologies.

The project will continue to improve the rigour and robustness of water savings metrics, and to that purpose it has set up scientific trial plots in the region. These trail plots would be providing the data on a real-time basis. By this method, the water savings estimations would be further strengthened and contribute to national and international policy formulation on demand-side water savings.

Solidaridad and RSCL already understand that the way farming is practiced around the world is not sustainable and thus threatens the security of supplies. The 2015 World Economic Forum listed “water supply crises” as the top global risks affecting businesses. As we understand that sugarcane is a water-intensive crop, if the issue of water scarcity is not addressed in a timely fashion, it will become a huge business risk for sugar companies, a risk already identified under the CEO Water Mandate.

In this context, RSCL, in partnership with Solidaridad, has been taking steps to reduce its risk and making investments toward sustainable sugarcane production to lessen water-related stress on the farmers. The company has devoted many resources to establish sustainable agricultural practices and water efficiency as a key business strategy.

The project also showcases the unique partnership of a private sugar company and civil society (Solidaridad) becoming allies in raising awareness for water resources. This effort to reach out to the smallholder farming community will motivate other businesses and policymakers to take positive action to reduce water stress, especially in regions such as Tamil Nadu (the project site), which is heavily dependent on groundwater. In addition, when the water supply becomes stressed, its cost is disproportionately borne by medium and small farmers. A declining water table coupled with a deepening of existing wells and digging of new wells aggravates overexploitation and hence threatens the livelihood security of many medium and small farmers and adjoining communities.

The RSCL initiative, well supported by Solidaridad and the Hindustan Unilever Foundation, should provide a significant push to business thinking on water efficiency in agribusinesses in the coming days and, more specifically, to the sugar sector in India. With India having more than 571 sugar mills and nearly 5 million hectares of land, this initiative demonstrates a direction for the nation to shift to water-efficient practices in the sugar supply chain and models a policy initiative for the national and state governments to initiate to support smallholder farmers.

For Solidaridad, a global nonprofit organisation working on sustainable supply chains, this partnership has been very significant. Efforts are planned to showcase the results of this project to other sugar businesses; and it can be scaled up in partnership not just with sugar businesses in India but also through its global sustainable sugarcane initiative in countries such as Brazil, South Africa, Malawi, Nicaragua, China, Colombia, and many other countries in South and Southeast Asia.

"Looking at SDG very optimistically. We believe in positive thinking and constructive action to achieve SDG. Very hopeful to make a contribution to achieve it."

—Bharat Bhushan,
Secretary, People's Action for National Integration

Community Action: The Key for Water and Food Security

Bharat Bhushan and Team Members
People's Action for National Integration (PANI)

Goal 2 of SDG talks about ending hunger, achieving food security, improving nutrition, and promoting sustainable agriculture. Hunger is undoubtedly the most pressing challenge before the modern world, and the concerns of adequate nutrition, judicious water use, and sustainable agriculture are profoundly linked together. We cannot consider ending hunger without achieving food security, and efforts toward achieving food security will be inept if they don't take cognizance of the fragile environment.

There is enough evidence to show that the various recent challenges before the human race—climate change, water conservation, food security, sustainable agriculture—are all interrelated. The Comprehensive Assessment of Water Management in Agriculture[10] seeks to determine if there is the possibility of enough food production over the next 50 years or if it will be constrained by a lack of water availability. "It is possible to produce the food—but it is probable that today's food production and environmental trends, if continued, will lead to crises in many parts of the world," says the report. Only if we act to improve water use in agriculture will we meet the acute freshwater challenges facing humankind over the coming 50 years.

Under the globalization model of development, the global gross domestic product has increased at the rate of 3.5% per year from 1960 to 2012,[11] but the huge social and environmental costs of such development are well confirmed today. Population growth, along with urbanization, migration, industrialization, and increases in production and consumption, has generated ever-greater demand for food production as well as freshwater resources.

[10] David Molden, ed. 2007. *Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture.* London: Earthscan; Colombo, Sri Lanka: International Water Management Institute, http://www.fao.org/nr/water/docs/summary_synthesisbook.pdf.
[11] World Economics. 2014. World Economics: Global Growth Tracker, http://www.worldeconomics.com/papers/Global Growth Monitor_7c66ffca-ff86-4e4c-979d-7c5d7a22ef21.paper.

By 2050, agriculture will need to produce 60% more food globally and 100% more in developing countries.[12] However, current growth rates of agricultural demands on the world's freshwater resources are unsustainable. To achieve a world free from hunger and malnutrition, where food and agriculture contribute to improving the living standards of all, especially the poorest, in an economically, socially, and environmentally sustainable manner, the Food and Agriculture Organization of the United Nations (FAO) has proposed the following five principles:[13]

1. Improving efficiency in the use of resources is crucial to sustainable agriculture.
2. Sustainability requires direct action to conserve, protect, and enhance natural resources.
3. Agriculture that fails to protect and improve rural livelihoods and social well-being is unsustainable.
4. Enhanced resilience of people, communities, and ecosystems is key to sustainable agriculture.
5. Sustainable food and agriculture requires responsible and effective governance mechanisms.

While being open to all the opportunities in science and technology, especially as they pertain to agriculture and water use, it is important to give due attention to community action in context—not only because the lives and livelihoods of people are impacted by the availability or unavailability of water and food, but also because community action has the potential to influence public policy and the political agenda.

Water Management in the Ganga Basin

The Ganga has been a cradle of human civilization since time immemorial. It is one of the most sacred rivers in the world and is deeply revered by the people of India. The Ganga River basin, with an area of 8,61,452 sq. km, is one of the largest basins in the country; 2,86,557 villages fall in the basin, and the average population density is 520 persons per sq. km, compared with 312 for the country, as per the 2001 census.

The Ganga basin has vast water resources in the form of surface water and groundwater. Dams in the Ganga basin are used for varied purposes, such as irrigation, water supply, hydroelectrics, and drinking water, where 92.83% of total assets are used for irrigation purpose. The groundwater usage for irrigation in the 11 states that are part of the Ganga basin accounts for nearly 50% of the groundwater-irrigated area of the country. Of the 11 states that cover the Ganga basin, Uttar Pradesh accounts for the largest area (28.02%).

Some suggested indicators for water conservation:

- Reduction in water wastage per household per year
- Reduction in water wastage per acre per year
- Water saving per household per year
- Water saving per acre per year
- Reduction in groundwater-depletion rate per unit per year

[12] Nikos Alexandratos and Jelle Bruinsma. 2012. *World Agriculture Towards 2030/2050: The 2012 Revision.* ESA Working Paper No. 12-03. June 2012. Rome: Food and Agriculture Organization of the United Nations (FAO), http://www.fao.org/docrep/016/ap106e/ap106e.pdf.

[13] FAO. 2014. *Building a common vision for sustainable food and agriculture: Principles and approaches.* Rome: FAO, http://www.fao.org/3/919235b7-4553-4a4a-bf38-a76797dc5b23/i3940e.pdf.

The Ganga and its tributaries have formed a large flat and fertile plain in North India. The availability of abundant water resources, fertile soil, and suitable climate have given rise to a highly developed agriculture-based civilization and one of the most densely populated regions of the world. In India, 65.57% of the terrain is covered with agricultural land and supports 43% of the country's population. In general, the major crops cultivated in the area include rice, lentils, sugarcane, potatoes, oil seeds, and wheat. Along the banks of the river, swamps and lakes provide a rich, fertile area for crops such as legumes, chillies, sesame, mustard, sugarcane, and jute.[14]

A change in the water availability in the basin will have serious implications for the agricultural pattern in the area. It is important to promote judicious use of water, so that prevalent agriculture practices take due consideration of water conservation while continuing to serve the farmers' interests. The set of indicators in the box can be used to measure the water saved on a temporal and spatial scale and will contribute to sustainable management of water envisaged in SDG6.

If the Ganga basin area experiences water scarcity, it will be difficult for the farmers in the catchment to accommodate the changed water-supply situation, and it will have consequences on the entire culture of the area. Deepening and de-silting of the riverbed can potentially increase water recharge and finally the water table.

Further, water conservation efforts at only the demand side are not enough; to have the expected results, it is important to make conservation efforts simultaneously at both the demand and supply ends.

Efforts of PANI

Water conservation in agriculture

In places where water is sufficiently available, people consider it to be an infinite resource. This is evident from the fact that while calculating the cost of cultivation, the cost of lifting water is factored in (in cases where water is lifted using diesel pumps), but the price of water is not. The situation becomes more dreadful when a subsidy on electricity apparently encourages farmers to harness water at no cost. The purpose of giving this example is not to suggest slashing subsidies to farmers but to bring forth the complex linkages between the policies, perceptions, behaviors, and impacts as related to water.

Communities that PANI engages with understand the issue of water broadly and in general recognize that water should not be wasted. They appreciate that water should be used judiciously and that the cost of water lifting increases with groundwater depletion. Despite understanding the issues, communities in general do not act to address these issues, except at places where there are organised efforts toward their redress.

In several areas, PANI has mobilised the community by raising awareness and at the same time providing a package of alternative technologies and practices. People have adopted mulching, farming on ridge and furrow, inter and relay cropping, and also the machan model (multi-tier farming) of cultivation. They have also adopted systems of rice, wheat, and sugarcane intensification that require significantly less water as compared with other common practices. The farmers are more receptive to these practices, as they have to do less investment in water while the net returns are high. There have

[14] Government of India. 2014. Ministry of Water Resources. Ganga Basin.

been examples of families reporting increased access and availability of food after adoption of these technologies, which is directly in line with SDG6.

While the farmers experience economic gains in the short term, there sure are ecological gains in the long term.

Women's collectives

PANI sees the community not merely as a passive recipient whose well-being commands attention but also as an active agent who can act and bring about a change in almost any sphere. Accordingly, PANI emphasizes systematic efforts to inform, consult with, and collaborate with the community. It is easier to stimulate community when the benefits are direct and clear; and the issues of food and water security are straightforward public-interest issues.

PANI has facilitated collectives of over one lakh (100,000) women from 10 districts in Uttar Pradesh. Continuous dialogue and efforts at awareness and consciousness-building have mobilized them to raise a voice for their rights and lawful claims. As Nari Sangh, women have collectively spoken up in Gram Sabhas to catalyze realization of their entitlements of the right to work, the right to food, and the right to health. Whether it's the matter of food distribution through the public distribution system (PDS) or the midday meal in aanganwadis or work and payments in Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), women have learnt the power of information and are using the Right to Information Act (RTI) to ensure their entitlements. They have been able to bring about changes at the policy level too.

Similar efforts to raise collective consciousness around the issue of water not only have the potential to bring about a change on the demand side (community) but also can catalyse responsible political action on the supply side.

Engaging women farmers in water conservation

It is important to note that community is not a homogenous entity, and there are divisions related to caste, class, ownership, occupation, and also gender and culture. All these groups have different benefits, and their level of participation can vary. The challenge before the community participation manoeuvre is to ensure equitable participation of all these groups and to look at ways to ensure cooperation and coordination among them.

In rural India, 84% of women depend on agriculture for their livelihood. Women cultivators and agricultural laborers perform about 70% of all the agricultural activities. There is a lot of evidence to show that in instances of water crisis or any other threat to livelihoods, the drudgery of the women increases manifold. They have to travel long distances to fetch water for the family and do extra work to cope with other needs. It is important to recognise the different implications of the policies and programs on men and women. Taking into account the experiences of both men and women can help in better understanding of existing practices and challenges and can make the future action plans and initiatives more effective, efficient, equitable, and sustainable.

Engaging with women on this aspect will contribute not only to SDG6 but also to SDG5, which addresses empowering of all women and girls.

All segments of the community, including women, should also be engaged to give their feedback through progress reports, articles, publications, policy forums, evidence-based recommendations, seminars/workshops, progressive documentaries, assurance audits, program learnings and findings, lessons-learnt reports, etc.

If a food-and-water-security strategy purposefully guides the community understanding and voice, there is no reason not to believe that community action can play a crucial role in bringing about a change in the terrible problems of food and water security.

"When water is central to life, how can SDGs not be water-centric?"

T. Pradeep
Secretary, SAMUHA

Working with Water—It's Dynamic

T. Pradeep
Secretary, SAMUHA

Background: *Issues over water are accelerating tensions between irrigated and dry belts, rural and urban populations, people and industry. This looming crisis is compounded by climate change, which adds an external constraint that requires global consensus, for what most people experience as local/localised issues.*

To address water issues, especially in agriculture, HUF (Hindustan Unilever Foundation) supports a "Water for Public Good" intervention with more than 20 partners across India. Each of these partners is supported to demonstrate water conservation and management through a diverse portfolio that includes, amongst others, watershed development, tank irrigation, integrated crop management, drip irrigation, and participatory irrigation management.

SAMUHA is a development organisation that has been working in the Hyderabad-Karnataka region of Karnataka in South India for more than 27 years. SAMUHA has established the HUF-SAMUHA Partnership to save 179 billion litres of water over five years through integrated crop management in the cultivation of NPM (non-pesticide management) paddy cultivation in 180 canal-irrigated villages in the Krishna and Tungabhadra river basins. It has in its first kharif (monsoon) season of 2014 already saved 2.8 billion litres over 1,194 acres. That's a saving of 2.3 million litres of water per ac, or 5.6 million per ha, for one kharif season of paddy cultivation.

Water Pressure, a project of Centre for Water Enquiries, is being set up as a cross-partner platform within the HUF-SAMUHA Partnership to promote strategic learnings and practices in water consciousness, conservation, and management.

from: **Agriculture Census 2010 -11**

Water Savings in Canal Irrigated Tail-end Paddy Fields	**ha**
Total Holdings - canal	1,69,07,833
% Paddy cultivation of NIA (net irrigated area)	40%
Estimated Canal-irrigated Paddy	67,63,133
Estimated Tail-end deprivation of canal-irrigated lands at 10%	6,76,313
Water savings per ha/ac through integrated crop management	56,81,000
Projected water savings through Tail-end intervention in canal irrigated Paddy lands	38,42,13,58,66,390
in Billions	3,842
in Trillions	3.8

Water Pressure is in the process of identifying and operationalizing the following local/localised solutions for water conservation/management.

1. **Tail-end deprivation in canal irrigation systems**

   Tail-end portions of a canal system, or the areas farthest from a water inlet, often face water shortages because of excess water use in the upper reaches.

   Traditionally, tail-end issues pertain to issues in the lower reaches of a canal system. However, the HUF-SAMUHA Partnership has identified water deprivation as a tail-end issue at the field irrigation channel (FIC) level itself. This is the "last mile" at which water exits a canal, a distributary, or a lateral, and enters a farmer's field. Tail-end deprivation is, therefore, a question of not only where a farmer is sited over the length of the canal but also how far the farmer's land is sited from the FIC outlet.

   Presently, India has 64.5 million ha net irrigated area as per the 2010–2011 Agriculture Census. Of this, 26 million ha is under paddy cultivation, accounting for 40% of the cropping; 16.9 million ha is under canal irrigation. The estimated area under canal-irrigated paddy is 6.7 million ha.

   Assuming that 10% of the land under canal irrigation faces tail-end deprivation, Water Pressure will introduce water-monitoring technology and experiences at the FIC level to initiate both participatory irrigation management and equitable sharing of water. This should result in more equitable sharing of water, water savings of 3.8 trillion litres, and enhanced crop yields in the formerly water-deprived areas.

2. **Converting water savings into additional irrigated area**

   In NPM (non-pesticide management) cultivation, no synthetic pesticides are used. The HUF-SAMUHA Partnership has demonstrated that flood-irrigated NPM paddy can be cultivated with 2.934 million litres of water per acre, against the conventional requirement of 5.372 million litres in the Devadurga region. This savings of 2.438 million litres/ac in itself represents an additional irrigation potential of 0.8 acres, or 80% of 1 ha.

   a. Given that tank or open/tube well irrigation provides a more controlled environment and accounts for 17.3 million ha of paddy cultivation in the country, this water savings can bring additional land under irrigation. Even with an additional 50% conserved, and assuming only 2.8 million litres of water savings, this could bring an additional area of 6.7 million ha under irrigation with existing water use.

from: **Agriculture Census 2010 -11**	
Conversion of water savings into additional area brought under irrigation	**ha**
Total Other irrigated Holdings - Tanks, open/tubewells	4,33,30,025
% paddy of NIA (net irrigated area)	40%
ha paddy projected as % of paddy of NIA	1,73,32,010
water savings per ha @50% of canal-irrigated savings	28,40,500
Projected water savings in Paddy in Other irrigated lands - litres	4,92,31,57,48,82,204
in Billions	49,232
in Trillions	49.2
Water requirement - Paddy/season - litres	72,47,191
Conversion into additional command - ha	67,93,194

3. **Using economic benefits to drive an extension model**

   Presently, the HUF-SAMUHA Partnership's NPM paddy intervention is able to demonstrate a savings of Rs 4000–6000 per acre through not using synthetic pesticides.

In the coming year, Water Pressure will work to establish a market for community-guaranteed water credits and for WaterSmart produce—agricultural produce such as rice, with low water footprints.

If Water Pressure is successful in introducing these into the market, then it will earmark 50% of these income streams for the farmers from whose lands these water savings/the WaterSmart produce were generated.

Water Pressure believes these two additional income streams can create a significant economic driver to upscale adoption of water savings in NPM paddy cultivation.

a. Community-guaranteed water credits

   SAMUHA will identify partners whose communities are presently growing flood-irrigated paddy to explore how much additional income a Community-guaranteed Water Credit (CgWC) can provide. At 100 m^3 (or 100,000 litres) of water savings per CgWC, the HUF-SAMUHA Partnership has already demonstrated that its plots can generate 24 CgWCs per acre of NPM paddy cultivation. At what price will an interested supporter be willing to buy this water credit? This is something that Water Pressure will establish in the coming years.

b. Low-water-footprint agricultural produce/products

   Water Pressure will help SAMUHA and other interested partners to explore the possibility of a WaterSmart premium for low-water-footprint produce. It will offer buyers of NPM produce the opportunity to add 1 Re ($0.015) per kg of NPM rice as a WaterSmart premium. And it will work with other partners to make other WaterSmart produce/products available to the general public over time.

   - It will test this in the coming year with one wholesale and two retail outlets in Bengaluru.
   - It will also register WaterSmart as a trademark to facilitate subsequent market development.

4. **Water consciousness**

Water Pressure will use the Internet to create a platform for water consciousness as an environmental necessity, for water conservation/management as an integral component of adaptation, and as a standalone.

The Water Pressure website will use a combination of content generated through action research and media enquiries in water-focused community projects; the promotion of technology for water monitoring and conservation; and the sale of community-guaranteed water credits and WaterSmart rice to build a pool of water-sensitive development and low-water-footprint practitioners.

It will use community-guaranteed water credits as a primary driver to connect water consciousness, actions, and a willingness to pay for this to establish a financial mechanism that can help NGOs to support their communities through water-focused interventions and resources.

The larger acceptance of the centrality of water to development, as well as a tested, “Made in India” monitoring system and a monetised value for water savings, will also allow Water Pressure to advocate for government incentives for water savings in agriculture.

5. Water Food Energy Security as a Watershed Plus intervention

The Department of Land Resources, Union Ministry of Rural Development, is implementing the Integrated Watershed Development Programme (IWMP) from 2009–2010 with an objective to cover 55 million hectare of dryland by 2027 (http://www.modigovtpolicies.in/watershed-management/).

SAMUHA will influence watershed development in India through its WfeS (Water Food Energy Security) Framework.

The water component in WfeS is built around the trench-cum-bund (TcB), a 20-by-5-by-2-foot pit. Soil from the TcB is used to build a farm bund to arrest soil erosion; the pit itself harvests rainwater and converts this into sub-surface interflows; and its volumetric space is available for in-situ composting of crop residue and leaf litter.

With an average of 27 TcBs per ha, this creates the capacity to harvest 150,000 litres per 20 mm rainfall event per ha, or over 1.5 million litres over 10 such rain events.

6. Climate-Neutral Village to help communities to adapt

SAMUHA also plans to influence climate adaptation in India through its concept of the Climate-Neutral Village (CNV). While water (in terms of water harvested, as well as converted into sub-surface interflows) is already a part of its NRM (natural resources management) component, Water Pressure will now align this to water savings per community-guaranteed water credit.

The CNV is also in the process of being adopted by INECC—the Indian Network for Ethics & Climate Change. The CNV will be one of three methodologies that INECC will present at a side event at the coming UNFCCC COP meeting in December 2015 in Paris.

7. Introducing water-centric community perspectives into the SDGs

The recent and continuing conversation on introducing a community perspective on water into the Sustainable Development Goals will provide Water Pressure a community platform for an enquiry into water.

Specifically, Water Pressure will explore with SAMUHA and other interested partners water interventions ranging from how reducing water leakage and waste can be monitored and minimised, to the use of MGNREGA[15] resources for water conservation, to the linking of individual households to SDG-linked government schemes, benefits, and entitlements.

Trench-cum-Bund / ha		
area	2.47	acres/ha
TcBs	27.00	TcBs rounded-down
Volumetric space per TcB	200	cft
cft/ha	5,400	Vol of TcBs
ltrs/ha	1,52,911	rainwater harvested one-time
# of fillings	10	events =>20 mm rain
ltrs pa	15,29,110	

[15] Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). This provides every rural household in India the entitlement to demand 100 days of manual work from the government whenever they are in need of work.

Water Pressure will also explore with communities and partners concepts such as water poverty and water discrimination, amongst others, and see how these relate to SDGs on poverty, human rights, and gender, to name a few.

Strategies

Water Pressure will build these interventions around the following strategies:

1. **Water-centric SDGs:** This will allow Water Pressure to connect with all development groups across the country to explore the role of water in their interventions.
2. **Dryland areas:** This will introduce in-situ rainwater harvesting on each plot of land, dryland water credits, premiums for dryland crops, and an exploration of water savings through the green flows in hedge/energy plantations through its Water Food Energy Security (WFES) program.

   WfeS will translate the old watershed adage of "making running water walk" (which literally translates into allowing water to drop its silt and flow clear) into an intervention to convert rainwater into sub-surface interflows: rainwater will be allowed to leave land only as seepage.

   Rainwater harvesting and the conversion of this into sub-surface interflows is probably the single most important step toward climate adaptation.
3. **Irrigated areas:** This will introduce technology for equitable use of measured water in the canal tail-ends as a PIM (participatory irrigation management) intervention.

   In tank/open/tube well-irrigated paddy, Water Pressure will work to increase the area under irrigation: every 2.4 million litres of water saved in a paddy field is equal to another 0.8 acres of land that can be extended under paddy cultivation, for example, and even more under other crops with low water footprints.

   Water Pressure will work with other partners to identify high-water-footprint produce for targeted interventions.
4. **Markets:** Water Pressure will introduce farmers and consumers to:
   a. WaterSmart produce
   b. community-guaranteed water credits
5. **Internet-based global interface/presence:** Water Pressure will establish an Internet-based GIS/MIS digital backbone as a platform for all water and related interventions and achievements.
6. **Media and research-based content generation:** Water Pressure will identify and assign water and media practitioners to undertake a review of partners/projects to identify research questions and areas of media interest. Water Pressure will use a crowdsourcing approach by posting assignments on different websites and on social media, research, university, and development platforms inviting writers, researchers, and its own water credit buyers and supporters to take on assignments and get further involved.

Conclusion

Water Pressure as a name summarises the dynamics of water and is a descriptive for the Centre for Water Enquiries.

It reflects the dynamics of working with water: it's about survival, it's about play, it's about conflict, it's central to just about everything.

Water. It's a finite resource. Yet when supply and demand are balanced, it's limitless.

The CEO Water Mandate

The UN Global Compact CEO Water Mandate

Launched in July 2007 by the UN Secretary-General, the CEO Water Mandate is a unique public-private initiative designed to assist companies in the development, implementation, and disclosure of water sustainability policies and practices.

The CEO Water Mandate recognizes that the business sector, through the production of goods and services, impacts water resources—both directly and through supply chains. Endorsing CEOs acknowledge that in order to operate in a more sustainable manner, and contribute to the vision of the UN Global Compact and the realization of the Millennium Development Goals, they have a responsibility to make water-resources management a priority, and to work with governments, UN agencies, nongovernmental organizations, and other stakeholders to address this global water challenge. The CEO Water Mandate covers six elements: Direct Operations; Supply Chain and Watershed Management; Collective Action; Public Policy; Community Engagement; and Transparency.

The Pacific Institute

The Pacific Institute is one of the world's leading non-profit research and policy organizations working to create a healthier planet and sustainable communities. Based in Oakland, California, it conducts interdisciplinary research and partners with stakeholders to produce real-world solutions that advance environmental protection, economic development, and social equity—in California, nationally, and internationally.

Since its founding in 1987, the Pacific Institute has become a locus for independent, innovative thinking that cuts across traditional areas of study, helping make connections and bring opposing groups together. The result is effective, actionable solutions addressing issues in the fields of freshwater resources, climate change, environmental justice, and globalization.

Hindustan Unilever Limited

Hindustan Unilever Foundation

(A wholly owned subsidiary of Hindustan Unilever Limited)

Hindustan Unilever Foundation (HUF)

Future demand for water resources will increase significantly as the population, rate of economic development, and consumption grow. Estimates tell us that by 2030, the supply of water in India could be significantly less than the demand. The adverse impact of climate change on agriculture will further compound problems arising due to linkages between food, energy, and livelihoods in the country. To understand and partake in meeting this challenge, the Hindustan Unilever Foundation (HUF) was formed in 2010. By 2020, the cumulative impacts of our collective actions in partnership with multiple stakeholders through diverse projects are expected to result in:

1. Water-saving potential of 500 billion litres
2. Employment of more than 1 million person-days
3. Annual additional agricultural production of 0.1 million tonnes

At the same time, in doing so, the underlying processes are expected to contribute a body of evidence to macro thinking and discourse.

HUF is a not-for-profit company that anchors various community development initiatives of Hindustan Unilever Limited. HUF supports national priorities for socioeconomic development through its Water for Public Good programme. Its projects also comply with the requirements of the Companies Act, 2013.

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SAMUHA

SAMUHA

SAMUHA works with vulnerable people to improve their quality of life within defined periods of time. SAMUHA derives its name from the Sanskrit. SAMUHA means “an organized group or society.” This reflects our belief that development is best sustained when undertaken through group processes. We began our operations in January 1987, in the Deodurg Taluk of Raichur District in North Karnataka. SAMUHA’s mission is “to improve the quality of life of vulnerable people within defined periods of time.” SAMUHA works with women, children, people deprived of social justice, the resource-poor, and communities that are climate-challenged.

SAMUHA believes that all development is defined and parametered by issues of power and domination; that poverty and discrimination exist, and are nurtured because people profit from the many parasitic opportunities that these provide.

The poor, in the areas where SAMUHA works, often do not have an alternative, since the environment they live in is defined by low/no basic infrastructure and services, and by scarce investment opportunities. Private enterprise here is primarily based on the export of whatever resources that there are, and on the absorption of the little capital that this generates, primarily for consumption purpose. Benefits from this traditional model are restricted, since there is very little competition, and there is no pressure to provide people with choice or quality. By default, given that there is very little profit to be made in most areas, people are dependent on state services for even their basic needs. This is compounded by the low/no systemic pressure of governance on these services. The poor quality of these services often undermines the very value of these services. Despite this, SAMUHA believes that the environments in which our people live can meet their needs if interventions are based on equitable development. SAMUHA works in Raichur and Koppal districts, and with communities deprived of social justice across Karnataka.