Actions and commitments to the Sustainable Development Goals
A Better World

Combatting desertification through participatory natural resource management

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Approximately 1.2 billion people are at risk from desertification as deserts expand and degraded drylands cover close to a third of the world’s land surface area, according to estimates by the United Nations. While Africa is the worst affected continent, India too has about 32 per cent of its land affected by land degradation. New areas in the northern state of Jammu and Kashmir, and eastern Indian states like Orissa and Jharkhand are turning arid, with nine states together accounting for nearly 24 per cent of desertification. In states like Jharkhand, Rajasthan, Delhi, Gujarat and Goa, more than 50 per cent of land is under desertification.

Desertification is mainly a problem of sustainable development. Its causes include over-cropping, overgrazing, improper irrigation practices, and deforestation. Poor land management practices such as these often stem from the socio-economic conditions in which the farmers live, and can be prevented.

Watershed development to combat desertification

Agriculture in India is predominantly rainfed (68 per cent) and farmers depend on livestock in addition to arable farming as an alternative source of income. According to the Food and Agriculture Organisation, nearly two-thirds of India’s cattle subsist in rain-fed regions. Intensive cultivation in marginal areas, together with unbridled grazing, has led to a decline of common property recourses.

Compounding issues of a poor resource base is the uncertainty in climatic conditions. Rainfall is becoming erratic. Droughts occur once in 3 to 5 years either due to a deficit in seasonal rainfall during the main cropping season or from inadequate soil moisture availability during prolonged dry spells between successive rainfall events.

This necessitates development measures targeted at enhancing capacity of rural habitat to utilize existing resources optimally and to ensure their sustenance through regeneration. Herein lies WOTR's approach of participatory watershed development to deal with the issue of land degradation.

Wasundhara — the participatory approach

Watershed development projects are designed to harmonize the use of water, soil, forest and pasture resources in a way that conserves them while raising agricultural productivity, both through in situ moisture conservation and increased irrigation through tank and aquifer-based water harvesting. Watershed projects have become widespread in rain fed areas in recent years. Hence, the watershed development interventions focus at improving agricultural productivity by initiating various soil, water and biomass conservation measures, thereby reversing a vicious cycle of resource degradation and underdevelopment.

While the interventions include operations like forestry, fodder, soil and water conservation, agriculture, drinking water supply and livelihoods, the Watershed Organisation Trust (WOTR) strongly believes that unless the whole community commits to participate in the process, it will not impact strongly on the area nor can it become sustainable.

Wasundhara means “caring earth,” and for WOTR it also means WOTR Attentive to Social Unity for Nature, Development and Humanity in Rural Areas. Wasundhara represents a paradigm shift, placing the responsibility for development in the hands of not only NGOs and agencies but of the villagers themselves. Only in this way can the projects sustain themselves organically over time.

The Wasundhara strategy has four main components for leading villagers in creating economic prosperity and a greater sense of dignity for themselves.

• Each group and hamlet designs their development plan starting from what they agree to be their most pressing needs.
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- Village leadership represents all classes and both genders proportionately, and decisions are made with social equity in mind. Likewise, there must be a transparent and socially just system of monetary contributions, in which those with higher income pay more to the general fund than those with less.
- Micro-loans are provided to village women and their self-help groups so they can lend money to jumpstart economies and livelihoods.
- The Village Development Committee is linked to the Gram Panchayat (village council) and is encouraged to work with the government on development projects.

Impacts of the Wasundhara approach
The WOTR has played an important role in developing technoparticipatory approaches to watershed development that have proven to significantly conserve soil and water and improve land productivity. Importantly, WOTR has always focused on developing scalable and replicable interventions and has directly and indirectly implemented and supported watershed development works across 9,250 km² in 1,552 villages in seven states of India, benefiting over 1.43 million people.

The impacts of WOTR’s watershed development on land, measured through vegetation cover changes and the assessment of soil samples, show a significant improvement in combatting desertification.

Land use and land cover changes
In the Bhokardan block, Jalna district, Maharashtra state, WOTR has been actively implementing watershed activities for some 25 years and, in the process, has covered almost 90 per cent of the villages in the block.

The impact of the watershed activities on the drylands of Bhokardan can be seen for the fact that the vegetation cover has changed from approximately 28,400ha to 48,700ha; an increase of 71.5 per cent.

In the Sangamner block of the Ahmednagar district, Maharashtra, a total of 4,180ha was treated covering 17 villages. Besides this, in the previous decade, 4,506ha in six villages had watershed development works implemented with WOTR support.

Satellite image analysis shows that the area under vegetation cover in project villages increased by more than 500ha, or almost 30 per cent, between 2009 and 2013. This can be attributed to plantation and grazing regulation and monitoring activities done under watershed development projects by WOTR and other government project implementing agencies.

Besides the impact on land restoration and arresting degradation, the interventions under the project have had tangible impacts on the livelihoods and well-being of local communities. While the pre-project intervention was characterized by widespread reliance on daily wages, the end-line assessment of the project found that the average number of days where
people are engaged in primary occupation (agriculture) has increased by 16.8 per cent (from 184 days to 215 days) post-project implementation. Further, due to poor land conditions within the village, in the pre-project period 22.7 per cent of the individuals reported temporarily migrating in search of labour. Post-project data indicates a 29 per cent reduction in the number of individuals reporting temporary migration.

Concerning the aggregate benefits of watershed interventions, the World Resources Institute calculates that the net present value of a project implemented by WOTR in Kumbharwadi village in Sangamner ranged from US$5,573 to US$8,172 per hectare treated or US$29,650 to US$43,479 per household, with a benefit-cost ratio that ranged from 2.28 to 3.76.

Samples of soil were collected and assessed to measure the effect of these interventions. Some 180 samples from each watershed were taken at two depths and analyzed for their physio-chemical parameters. Preliminary results of the study showed that the treated watershed had approximately 19 per cent higher organic carbon than the controlled, untreated watershed.

The area treatments implemented during the watershed development allow runoff water to infiltrate the soil and retard soil erosion. Soil erosion washes out the fertile topsoil (especially silt and clay particles) leaving behind sand and gravels. It has been observed that the treated watershed has 3 per cent less sand particles than the controlled watershed. Moreover, the bulk density of the treated watershed is also lesser by 5 per cent, which shows that the soils in the treated watershed are well-structured, having good aeration capacity. Such well-structured aerated soils facilitate better crop growth and higher production.

**Wasundhara in the future – the water stewardship programme**

Inclusive development and a strong sense of ownership of the projects are core values of the Wasundhara approach. WOTR has been applying these values over the years to deepen its engagement in rural areas as well as across other activities. One such ongoing initiative is the promotion of water stewardship. This initiative involves:

- A village water management committee or a team of water stewards, who promote and ensure effective management of local water sources.
- Jal Sevaks – local youth trained as para-technologists for water management. They motivate the water stewards as well as farmers and help prepare and implement water management plans at the village and farm level.
- Water management plans prepared by undertaking water budgeting exercises. A customized water budgeting tool enables villagers to estimate water availability and plan cropping patterns and water uses accordingly.
- Villagers monitor daily rainfall through rain gauges and use the data to better manage their crops and estimate the next cropping season’s water availability.
- Several automatic weather stations have been installed in some of the villages to provide weather-based crop specific advisories to farmers to reduce crop losses and improve productivity.
- Multi-stakeholder engagements involving villagers, service and technology providers, local and state level government officials and researchers are regularly organized to promote cross-learning, increased access to technology and resources, a shared understanding of problems and a consensus on solution pathways.
- Preparation of projects that improve water use, for instance, micro-irrigation and other plans, and submitting them to the district authorities.

The inclusivity in the development activities can be seen across a diverse array of WOTR projects. Entering its 25th year, WOTR would like these values to be its guiding light. Together with the information and knowledge that is
provided to the villagers, the protagonists of the development activities — the village communities — are encouraged to keep sustainability in mind and work towards the creation of wholeness in their lives.

Climate change considerations
It has been observed that, unless climate change adaptation is factored into project design, weather variations will continue to obstruct progress and development. Land degradation is a major contributor to climate change, and climate change is foreseen as a leading driver of biodiversity loss, along with crop agriculture and infrastructure development, up until 2050. The contribution of land degradation to climate change includes the release of carbon sequestered in soil. Between 2000 and 2009, land degradation was responsible for annual global emissions of 3.6–4.4 billion tonnes of CO$_2$.

With this in mind, WOTR is introducing new elements such as agro-meteorology for tracking weather patterns at the village level leading to the generation of advisories to farmers on what steps to take in emergency conditions. This is also linked to water budgeting, crop planning, adaptive and sustainable agronomic practices and irrigation management. Added to this, WOTR integrates biodiversity concerns in all its activities and encourages alternate energy to meet some of rural energy requirements. Overlaying these initiatives is a focus on securing sustainable livelihood opportunities together with market linkages for people in these areas. Advanced project management and geographic information systems are also being deployed so as to track progress, capture results and identify impacts.

Given the complexity of the challenge presented by land degradation and climate change, it is apparent that any effort to respond to these problems would require collaboration among various stakeholders, both state and non-state. WOTR’s work demonstrates that with appropriate support, communities are able to combat land degradation, co-create a sustainable natural resource base, and leverage the possibilities presented by innovations in information technology to develop inclusive governance of shared resources and increased access to benefits for all.