

Harvesting Rains to Mitigate Drought in the Thar Desert, India

Initiatives by the *Gramin Vikas Vigyan Samiti (GRAVIS)*¹

The Context

The Thar Desert of India, with a population density of 83 persons per sq. km. stretches through the State of Rajasthan in India and expands into Gujarat, Punjab and Haryana States as well as into Pakistan on the West. The Thar is a severely drought impacted region. Rainfall is extremely low and communities here live with food and water shortages, under poor health conditions and abject poverty. Despite this, it is the most densely populated desert ecosystem in the world, and is home to nearly 27 million rural inhabitants. It is also the smallest desert in the world, but contains a wide variety of habitats and biodiversity that has adapted to the extreme weather conditions.

While perennial droughts have always been an issue for the desert people, climate change has exacerbated the situation by unpredictability and shift in the rain patterns in recent years. For instance, while overall precipitation may have increased in the last few years, rains are neither widespread as they are during the normal monsoon, nor do they come when most needed for the agricultural season. In the absence of water storage structures, both for household use and irrigation, people are unable to use rainwater from unseasonal rain and ironically end up paying a considerable sum to buy water for household use.

Extreme weather conditions and water scarcity that define the life of impoverished rural communities in the Thar leaves an even more belligerent impact because of the dependency of people on agriculture and animal husbandry. Poverty in the Thar Desert is inextricably linked to local environmental conditions. The proportion of people living below the poverty line is much higher than the national average in India as they live in the dry or un-irrigated areas where rainfall is low and highly variable. Rainfall is limited to about 2 months of the year and annual rainfall varies from less than 100 mm to about 200 mm in some parts of the desert. Of the 27 million inhabitants of the Thar, 70% live in rural areas in extreme poverty particularly in low rainfall areas.

For the agrarian and pastoralist communities of the Thar, depleting soil and vegetation cover results in a direct threat to food security. Water scarcity impacts agricultural productivity and also milk produced from cattle. While the rural communities in these regions have always borne the brunt of such conditions, climate change has come to affect their livelihoods in a much more volatile manner, with their water, food security, nutrition, and health status under constant threat.

¹ GRAVIS is a leading NGO working in the Thar Desert, Rajasthan, Uttarakhand, and Bundelkhand regions of India. GRAVIS' work gives the villagers of the Thar Desert access to the resources they need to survive. As environmental conditions threaten the livelihood of farmers and herders GRAVIS has specially developed programs to improve the agricultural yields and well-being of livestock. Email: prakash@gravis.org.in

GRAVIS is an NGO that works for the integrated development of the Thar Desert region through a holistic, community-led drought mitigation programme. GRAVIS believes in addressing drought conditions through active community involvement and by blending traditional knowledge with innovative and modern technologies.

This case study elaborates the work of GRAVIS on revival of rain-water harvesting (RWH) technologies and capacity building in this context as a core element of its approach.

Support to Rainwater Harvesting

Water shortage for household consumption and for agriculture production is a daunting challenge for local communities in the Thar. GRAVIS has been supporting a community-led approach that focus on revitalization of Rain Water Harvesting (RWH) practices, on innovating with the design and construction of structures, and on training and capacity building of communities on maintenance of RWH structures.

Two types of structures are being promoted by GRAVIS

1. For drinking water security

Taankas (drinking water storage tanks)



A taanka ©GRAVIS

A *taanka* is an underground RWH structure that stores water for household needs. In the Thar, water scarcity is a major challenge and without drinking water, achieving food security and good health is not possible. *Taankas* enhance drinking water security and also relieve women and girls from drudgery associated with fetching water. Over the years, GRAVIS has made several innovations to these *taankas* that include improved water catchment areas, innovated inlet structures and a cemented apron along with the *taanka* wall to avoid any water damages. A total of 8,149 *taankas* have been constructed by GRAVIS benefitting a population of over 100,000.

Taanka for a Better Life

Mani Devi is a resident of Taratara village. She is 62 years old and has 8 family members. The family is dependent on rainfed farming and lives in severe poverty due to lack of rains, and droughts. Drinking water is a major challenge for them. Mani Devi and other members of her family need to walk 5-6 kilometers to bring water several times in a day. As a result, Mani Devi and her family have been leading a life of water shortages, poor health and poverty. A drinking water facility would make a big impact in their life. Under GRAVIS' organized Water Nutrition and Health in Thar (WNHT) project, Mani Devi was identified as a *taanka* (drinking water storage tank) beneficiary. The project focuses on the needs of older people in particular. The new *taanka* has been constructed with a storage capacity of 20,000 litres of water.

Beri (percolation wells)

These large underground water storage percolators are covered with a concrete top and collect ground water during the monsoon season. These wells can store up to 500,000 liters of water and do not require a pump to pull water, making them easy for villagers to fix and maintain. This traditional method of water gathering uses no artificial catchments and holds enough water to sustain several families year-round. GRAVIS has built or renovated 642 *beries* to date.

Naadi (village ponds)



A Naadi © GRAVIS

These village ponds are natural collections of rainwater which provide an open source of water to the entire village. In order to remove silt and debris, they have been building short loose rock structures in the water pathway to the *naadi* to keep gravel, sand, and other material from entering the pond. These rocky borders also help to replenish the soil outside the *naadi* with moisture and fertile topsoil. Natural vegetation grows easily in these areas and helps to further reduce soil erosion and silting of the *naadi*. Over 312 ponds have been constructed and renovated by GRAVIS till date benefitting over 1 million humans and over 4 million cattle.

For food, fodder and nutrition security

Khadins (farming dykes)



Crops in Khadins farm © GRAVIS

Khadins are part of a runoff-based farming system constructed for an individual family or for a group of farmers. *Khadins* help in moisture retention in the farming lands even when the monsoon rains are as low as 50 mm in a year. As a result, the crop yield of farmers, dependent on rains, increases significantly. *Khadins* support agricultural production significantly.

GRAVIS has provided some innovation to these traditional structures to enhance their effectivity. As a result of GRAVIS' innovations, *khadins* are approximately 1 to 2 meters high and the length varies from 250 to 800 meters. Top width of *khadin* bund varies with height. The shape of *khadin* depends on average rainfall, catchment area, slope and soil type. Adequate catchment, bund, outlet for excess water or spillway are essential elements of a *khadin*. Masonry spillway in it is an innovation and regulates access water outflow and increases the longevity of walls. Till date, GRAVIS has supported the construction of 6,208 *khadins* benefitting over 10,000 households and covering farming area of over 30,000 hectares.

More Crops with *Khadins*

Chandra Devi is a poor farmer from Kernada village. Her family has 5 members and they suffer with chronic droughts and with crop failures. Lack of rains has been a big challenge for their farming. Under GRAVIS' Addressing Climate change, Drought and Poverty (ACDP) project, their family has been identified as a *khadin* beneficiary. A *khadin* has been constructed on their farming land and has started showing positive impacts with better crops. In years to come, *khadin* will continue to be a reason for enhanced crops. A second crop in the year can also be grown in the winter. More crops for family will mean more income and better health.

"The *khadin* is of great help for us. We now harvest 2 time more crops than before. We can eat more, earn more, live better" – adds Chandra Devi.

Arid Horticulture Units (AHUs)

In arid regions, where food choices are extremely limited, fruits and vegetables are almost non-existent in people's diets. Fruits and vegetables bring all-important micronutrients to people's diets reflecting an overall improvement in health and in ensuring well-being. AHUs are small, household level units established by GRAVIS that are used for cultivation of fruits and vegetables crops grown with rain-water and through organic farming. GRAVIS sets up these units of about 20 fruit plants and vegetable crops in a land area belonging to the family. The fruit plants include pomegranate, guava, lemon and plum (all desert friendly), and the vegetables include pepper, tomatoes, okra, coriander etc. Organic manure is used for growth and rainwater harvesting pitchers are planted to irrigate the plants roots constantly. Beneficiaries consume fruits and vegetables in their diets and the surplus is sold in the markets for income generation. 5,195 AHUs have been set up till date.

Pastures

Fodder security and food security have extremely important inter-relationship. Animal husbandry is a crucial mainstay of the desert economy as the milk products provide nutrition as well as income. Droughts cause serious damage to vegetation and livestock have to suffer a great deal with no fodder available. GRAVIS has been working on developing community owned, rain-fed pastures and it has set up 79 pastures till date benefitting nearly 10 million cattle.

Challenges

During the journey of innovating with RWH and in their expansion, GRAVIS met with several challenges and worked on overcoming these:

- GRAVIS' optimum design for household level structures met with technical resistance in the beginning with a question mark on the size of structures and its impact. With time, the design proved its worth by being cost effective, long lasting and of adequate storage capacity.
- Rainwater harvested in farming dykes brings in opportunities for new crops to be sown in deserts, particularly in winters. For that, availability of seeds, knowledge about new crops need to be in place.
- From the very beginning, empowering women and girls has been in the core of GRAVIS' RWH approach. However, in the initial phases of projects on RWH, community dynamics is difficult and not always conducive for promoting gender equality. Patient engagement with the community helps.
- Maintenance and judicious use of community assets (ponds and pastures) requires active involvement of local Community-based Organizations (CBOs), which varies from community to community. Adequate focus on capacity building of CBOs is required in this context.
- Documentation of progress, data collection of evidence continues to be a significant challenge due to limited human resources, which is crucial for replication advocacy.

Cross-cutting components of GRAVIS' rain-water harvesting work

- **Community ownership** - It is extremely important in GRAVIS' ideology to seek full community ownership and sustainability. To do this, GRAVIS forms Community Based Organizations (CBOs) including Village Development Committees (VDCs) and Self-Help Groups (SHGs). Till date over 3,800 CBOs have been formed and have been directly involved in all our rain-water harvesting interventions
- **Ensuring gender equality** – women and girls are often neglected at the community level and are greater victims of water scarcity. GRAVIS's RWH interventions target at women and girls bringing them in the leadership roles.
- **Training and capacity building** – to empower rural communities on RWH, GRAVIS has till date organized over 5,000 training and capacity building events.
- **Research, documentation and advocacy** – GRAVIS focuses a lot on documenting its work on RWH, on conducting internal research and on sharing their learning as they believe that there is enormous scope for replication and scaling up of their experiences.

Impact

GRAVIS' interventions on RWH have impacted the lives of over 1.6 million people living in over 1,600 villages. Over 4,000 CBOs have been taking the lead with a strong gender equality. Over 200,00 hectares of land has been covered, all of this leading to poverty reduction and in improved biodiversity.