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A recollection of best practices from Water Security and Development in Thar (WSDT) Project

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Written by
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Author's Note

This report is an effort to document the innovative and effective practices adopted the project, namely'Water, Sanitation and Development in the Thar Desert (WSDT), implemented by GraminVikasVigyanSamiti (GRAVIS), Rajasthan in one of the most water scarce regions of the country. The project was implemented in 15 villages in two blocks of Jaisalmer district that is among the lowest rainfall receiving of the country with extreme climatic conditions during most of the year. Water shortage affects daily lives, food security, hygiene and eventually health of rural population in the region. Cumulative impact of all such deprivations manifest in exclusion from development processes in other regions of the country, and keeping the rural communities in the Desert within the fringes of underdevelopment. WSDT project is premised on the acknowledgement of all such challenges and adopts an integrated approach to resolve them effectively.

WSDT project, through its multipronged approach aimed to accelerate the development process in the region by improving health and sanitation situation in the identified villages and creation opportunities for enhancing income and ensuring general wellbeing of the community. Local issues pertaining to scarcity of water, food insecurity, and agricultural resilience were addressed through innovative sustainable interventions, ranging from rainwater harvesting for household needs as well as for cattle and farms, ensuring availability of safe drinking water, building capacities on community and community based groups, and creating spaces for financial empowerment of people, especially women. As a leader in drought mitigation in the region, GRAVIS has undertaken several initiatives to build community resilience against drought like situations, and has alongside innovated several interventions through its vast experience.

WSDT project is an extension of GRAVIS' endeavours to uplift the rural communities in the Thar Desert. The author is extremely grateful to GRAVIS team for exposure to the local experiences, providing an opportunity to document the key project highlights, and also supporting the documentation by collating useful information and cases studies.

Neetu Sharma

Introduction

The Thar Desert, occupies a significant portion of western Rajasthan and presents a unique set of challenges due to its harsh climatic conditions. With minimal and erratic rainfall—often less than 250 mm annually—and absence if any regular water sources such as perennial rivers, this arid region creates several survival and development related challenges for the farming communities living in the region. Water scarcity has direct implication for availability of food not only for human consumption but for agriculture and livestock, that are central to the local economy dependent on rainfed farming.

Sandy soil, dry weather and lack of scanty rainfall, which is sporadic too, keeps the agricultural productivity very low, which insufficient even to meet household needs. Inability to main hygiene and keep their surrounding clean, results in prevalence of water borne diseases. Low nutrition levels owing to lack of food diversity too affect the health profile of people adversely. Inadequate infrastructure is another significant barrier to development in the region. Because of remote locations and difficult terrain that make the outreach challenging, many villages lack basic amenities such as well-connected roads, reliable electricity, quality healthcare, and educational institutions. This underdevelopment in infrastructure restricts opportunities for economic advancement and hampers the overall quality of life.

The Thar Desert

Traditional occupations like livestock rearing and small-scale agriculture dominate, but there is limited access to broader markets or integration with industrial growth. This economic stagnation keeps income levels low and perpetuates cycles of poverty. Consequently, a considerable number of people, especially the younger population, migrate to cities in search of employment. This out migration not only weakens the local economy but also alters the social structure of rural communities.

Gramin Vikas Vigyan Samiti (GRAVIS), an NGO has been working relentlessly in remote parts of Thar Desert with a mission to enable an improved quality of life for the most marginalised communities living in the remotest areas that are difficult to reach because of extreme heat and difficult terrains. At present, GRAVIS directly reaches out to the populations in more than 1,300 villages of 8 districts of the Thar Desert of Rajasthan for empowering the communities by ensuring access to sufficient water and nutrition that determine their health as as well as financial well-being. Over the past almost four decades GRAVIS has innovated several solutions to contribute towards integrated community development and general welfare of the rural communities in Thar Desert. These innovations range from utilisation of available natural resources to the fullest, empowering the local communities for taking the decision making for themselves in their hands through community mobilisation and capacity building efforts.

GRAVIS focuses its efforts on the restoration of dwindling natural resources and on the promotion of marginalized groups. It believes in blending the traditional wisdom with new techniques to create long-term, sustainable and cost effective means for improving the lives of rural inhabitants. In order to achieve its overall goal of creating self-reliant village communities, it strives to involve the local communities in its programmes and interventions, train and build their capacities further and develop community ownership. GRAVIS' actions focus on poor, backward and marginalized section of Thar Desert communities with particular emphasis on women, children and elderly.

Chapter 1

Water Security and Development in Thar (WSDT)

Gramin Vikas Vigyan Samiti (GRAVIS), conceived the 'Water Security and Development in Thar (WSDT)' project in order to take the work on integrated community development and drought mitigation in the That Desert forward. The project was implemented with support of Standard Chartered Bank. The project aimed to uplift lives of communities in 15 villages in Jaisalmer district to tackle the challenges posed by long-lasting droughts through strengthening the capacities of local community-based institutions, constructing and renovating water harvesting infrastructure, enhancing community knowledge on efficient water management and rainfed agriculture practices, and documenting and sharing project insights for replication. Gender inequality is also addressed by bringing women and girls in central roles within project activities thus giving women and girls the recognition that they have lacked despite of being active contributors and will significantly empower them at household and community levels.

The overall goal of the project was to enhance water and food security, focusing on drought mitigation and community development, and it was implemented in 15 most backward villages of Jaisalmer district, in Rajasthan's Thardesert region. Specific objectives of the project were:

1. To establish and empower resilient and self-sustaining Community Based Organizations (CBOs) that effectively address the needs of the community.
2. To implement the construction and renovation of rainwater harvesting structures, fostering water conservation and management practices within the project area.
3. To strengthen the technical knowledge and skills of rural communities in water management and rainfed farming techniques, enabling them to enhance their agricultural productivity and resilience.
4. To systematically document and share project outcomes, lessons learned, and best practices to facilitate learning and replication in similar contexts.

The project specifically aimed at uplifting the lives of communities in 15 identified villages in Jaisalmer district to tackle the challenges posed by long-lasting droughts through strengthening capacities of local community-based institutions, resolving the water insecurity related issues by constructing and renovating water harvesting infrastructure, enhancing community knowledge on efficient water management and rainfed agriculture practices by conducting a series of trainings for the community, and documenting and sharing project insights for replication of the successful strategies in areas with similar challenges. The project built in the component of addressing gender inequality by ensuring participation of women and girls in central roles within project activities thus giving women and girls the recognition that they have lacked despite of being active contributors and will significantly empower them at household and community levels.

It was planned to achieve its objectives through following identified interventions:

Sl.	Activity	Interventions
1.	Formation and strengthening of CBOs (ILGs, SHGs and VDCs)	30 SHGs formed
		30 ILG formed
		15 VDCs formed
2.	Training of CBOs	Yearly Trainings of CBOs - 45 per year, Total 90 Trainings
3.	Technical Trainings on water management and rainfed agriculture	15 Trainings per year and 30 Trainings over 2 year
4.	Creation of Khadin / Farming dykes	395 Khadins
5.	Construction of Taankas	395 Taankas Constructed
6.	Provision of Bio Sand Water Filters	395 BSWF set up
7.	Renovation of Nadi / Pond	19 Nadi / Pond Renovated
8.	Setting up or Arid Horticulture Unit	380 AHUs Established
9.	Setting up of Agro Forestry Unit	8 AFU Established
10.	Assessments	Base line and evaluations - 2
11.	Publications	1

Bio-sand Filters (BSF)

A biosand filter is a simple and water purification system that uses sand, gravel, gravity and some simple engineering to purify water contaminated with biologics and some chemical. BSF aided in provision of clean and safe water for drinking for families in the project villages.

Strategies adopted by the project aimed at generating long term impact at various levels, most widespread being the enhancement of technical capacities of the community and community based organisations. In order to achieve that, it was planned to build capacities of the inter-generational learning groups (ILGs), and self help groups (SHGs) of women, on drought mitigation and natural resources management. In particular, it was planned to build their knowledge and skills on rainwater harvesting techniques, rain-fed farming (crop practices, seed management and horticulture) and on managing community level assets such as ponds and berries. In addition, the project worked on improving their general management skills so as to enable them to participate in collective actions in future as a community resource with greater confidence and enhanced technical knowledge.

Improvement in economic conditions of the rural communities was another critical component of the project strategy. Rainwater harvesting structures that were built for drinking purpose considerably reduced financial burden on people of procuring water. Increased crop yield and enhanced fruits and vegetable produce raised income levels significantly. Village ponds (nadis), as community water resources were cleaned to provide water for additional months for both domestic and livestock needs, which eventually improved health and nutrition status through increased dairy production.

Development processes have social aspects too. Ownership of property and assets are not only financially beneficial, they also elevate social status of households. Recognising this, WSDT project transferred the ownership of rainwater harvesting structures created under the project to the community, providing them the dignity and control within the communities. By saving time on water fetching drudgery and other chores, productive members of the households could have more time and more energy at the disposal to use them for further beneficial purposes for the families.

Taanka

A taanka is a household level rainwater harvesting system. Through a cylindrical underground water tank connected with the water sources from roof tops and other relatively higher plains, rain water accumulates. With a capacity of about 20 to 25 thousand litres of water, this tank has the capacity to meet water-related requirements of families for upto 6 to 8 months, depending upon the usage andsize of the family. Since its rainwater, it is safe to drink, too, after basic filtering.

A cumulative number of 22000 people were reached out directly or directly through WSDT project.

Total Outreach

Sl.	Villages	No. of Households	Population
1.	Unda	325	1600
2.	Mundari	150	700
3.	Amarpura	300	1500
4.	Dhoba	200	1500
5.	Bhilani	350	1500
6.	Khuldhara	100	650
7.	Vijay Nagar	200	1000
8.	Jasuwa	100	1000
9.	Keeta	600	3000
10.	Kapuriya	560	2500
11.	Janra	250	1500
12.	Bhakhran	300	2000
13.	Dhuliya	500	2500
14.	Nada	100	600
15.	Sanjeet	100	1000

Khadin

Khadin is an embankment towards the downward slope of a rainfed farm, which helps retain moisture from the rainwater for a prolonged period of time. As a result, soil fertility and farm productivity is enhanced, contributing ti the food security of farming communities

Chapter 2

Innovation through Development

WSDT project offered a basket of solutions for various issues being faced by the rural communities, and created opportunities for overall development and sustained improvement in the quality of life of people in the region. Enhanced local capacities, improved food and nutrition security, improved financial status, along with empowerment of women and the farming communities, were integral components of WSDT project.As GRAVIS has been engaging with the local issues and has been working along with the local communities to resolve them, a number of strategies, and approaches have come to inform its work across various projects. WSDT project is not an exception. It is important to reflect on the good practices, including the strategies and interventions, and document them for wider dissemination and replicability. These practices are guiding principle on which GRAVIS builds its interventions, and these have contributed immensely towards a greater impact of the project.

Successful completion and visible impact of the project on the lives of people, are attributable to a variety of practices, principles and strategies that GRAVIS adopted. These practices were guided by the importance that the project attached to the community and their potential in resolving their own problems; cognisance of the complexity of issues in the wake of climate change; as well as environmental sustainability and financial viability of the interventions. Following is a description of such practices that were embedded in the project development and execution:

2.1 Community at the heart of interventions

Community development initiatives aimed at fostering the well-being and advancement of the entire community, or specific groups within it, must ensure that local residents, including influential thought leaders and the most vulnerable populations, are not merely participants in the project but also possess a sense of ownership over its interventions. It is solely through community ownership that the desired outcomes can be realized and sustained over time. It has been observed that GRAVIS demonstrates a robust community-centric approach across all its initiatives, and the WSDT project serves as an exemplary model of recognising both community needs and inherent strengths that can be harnessed, thereby encouraging community members to emerge as proactive protagonists in their own development.

2.1.1 Community mobilisation

Recognising that the programmes designed and managed by trained local actors are more effective and are more likely to be sustained over time, GRAVIS ensured that local communities have the central role in identifying their needs, as well as choosing the solutions that they feel are most appropriate for them.WSDT projects drew immensely from community strength and relied on the community resilience for ensuring that the project interventions are valued by the community, and over a period of time community takes charge of the whole process if their own development. As in the case of other community development

projects implemented by GRAVIS, it was ensured in case of WSDT project that the beneficiary community participates in all processes of the project including planning, implementation and monitoring. The community representatives play key roles in organisation of field-based activities. This is particularly in case of women and girls who are the focus of the project, and who played critical leadership roles through SHGs and ILGs. Right from the discussion of the problems encountered by people, selection of beneficiaries, provision of support and trainings, to keeping the community members motivated, SHGs and ILGs played a pivotal role in the project implementation, and thereby assuming the role of change makers and catalysts. Over the course of the project, 30 SHGs and 30 ILGs were formed benefiting a total of over 2,200 women and girls. Another 150 people became members of 15 village development committees (VDCs). All these community based members.

A VDC training

2.1.2 Building local capacities and leadership

In order to encourage the engagement of local people in diverse processes, GRAVIS has invested in building and enhancing the capacities of local communities. Local capacity building is critically important in rural impoverished areas because it empowers communities to identify, plan, and address their own development challenges in a sustainable and self-reliant manner. Rather than depending solely on external assistance or top-down interventions, capacity building focuses on cultivating local skills, institutions, leadership, and systems that can sustain enduring transformation. Trainings were conducted for both men and women on a number of themes: including: financial literacy, agriculture, climate resilient farming training, technical training water, leadership, and health education. Community members benefited tremendously from these trainings - they acquired improved financial management, farming skills, and health awareness, leadership skills, water management skills, etc. All thee trainings helped people do better financial planning, and use improved farming techniques. Trainings also resulted in increased participation of all the groups in decision-making.

Capacity building enhanced the ability of local peopleto make decisions and take control of resources. It reduced dependency on others and fostered ownership of development processes. With capacity building of community based groups such as SHGs, ILGs and local communities, the demand for accessing public services and improvement in the quality of services such as education, health, and water management improved significantly. Trained local personnel in many cases bridged the last-mile gap in service delivery where government outreach is limited.Powered by the skills and knowledge and experience of managing the groups and taking decisions, over a period of time community takes on the vision of their own development in their own hands. This was visibly seen in case of SHGs and ILGs, wherein women and girls, with comprehensive trainings and refreshers were able to articulate their needs, explore solutions and eventually became the change makers in their very own community.

Through the project period, a total of 120 trainings were conducted on a range of themes relevant to rural livelihoods and community development. These trainings focused on building capacities of more than 2500 people on the themes of rainwater harvesting, sustainable agriculture practices, such as use of native seeds, organic fertilisers and pesticides, and other practices that trigger enhanced produce such as sowing in a scientific manner, and the suitable seasons for various crops, etc, and various new techniques that can be used for better yield. The space of trainings was also used to generate awareness of issues such as girls' education, gender parity and leadership building. The community members also got equipped with the technical skills to maintain rainwater harvesting structures, including taankas and khadins, and BSF.

2.1.3 Interventions designed to address critical community needs

With development of entire community in the project villages as the key goal in sight, WSDT project placed specific emphasis in recognising and addressing the problems of local people that impeded their development. Taking into account the extreme weather conditions and water scarcity that severely impact the lives of therainfed farming communities, the project kept resolving the at shortage problem at the centre of all its strategy. Provision of rainwater harvesting tanks (taankas) at household level ensured water security for drought communities and relieved them from constant worry for water. Availability of water for farming through *khadin*, resolved water scarcity issues with relation to agriculture and ensured that rainfed farming communities were able to grow sufficient food for themselves and fodder for their livestock. Dependence on rains for farming in an arid agricultural zone is one of the key issues that farming communities in the Thar region are normally confronted with. Since they are primarily dependent on rainfed farming for their livelihoods and food security, they constantly struggle to find solutions for water scarcity related problems in their farms. Khadin, is a low cost, traditional, sustainable and highly effective rainwater harvesting system that preventswater run off from the farms. With construction of *khadin*, rainwater gets better absorbed in soil, erosion of soil is prevented and land fertility is enhanced. Khadinshelped farmers capturing the runoff rainwater water, which led to improved soil moisture and fertility. It was noted that most of the farmers were able to double their income as a result of increased food production enabled by khadins in their respective farms. Food insecurity is a significant challenge in India's Thar Desert due to severe water scarcity, climate change impacts, and limited agricultural opportunities.

The region's arid climate, frequent droughts, and limited rainfall make it difficult for communities to cultivate crops and produce enough food. This, coupled with land degradation and a lack of access to nutritious food, contributes to widespread malnutrition and poverty. Significant increase in crop production manifests in improved food security for rural families who otherwise struggle to ensure availability of sufficient quantity of food grains for personal use. All families interviewed, reported that khadinis the epicentre of prosperity that helps them breakaway from poverty and hunger.The agricultural support provided through khadins led to crop yield increases of up to 100 percent for many farmers. Over 90 percent of families reported a rise in household incomes, with some earning up to INR 90,000 more per year. This increased household income is utilised for a variety of purposes such as - education, savings, investment in farming and other household expenses. Reduced workload, increased food security, and improved household income are the outcomes that have direct implications for women.

A khadin

Mini's journey from struggles to strength

Mini is a hardworking farmer who lives in a small village called Dhuliya, located about 64 kilometers from Jaisalmer city in Rajasthan. She lives in a semi-pucca (partly brick and mud) house with her husband, Ahmed Khan, and their six children—three boys and three girls. For Mini and her family, farming and daily wage labor were the only sources of income. Despite working hard, the earnings were barely enough to support the household. Mini had to constantly run between her home, the fields, and work. This hectic routine left her physically exhausted and mentally stressed. She felt irritable most of the time and was unable to participate in any social or community activities. Reaching work late even once had serious consequences for their livelihood.

One day, Mini attended a Village Development Committee (VDC) meeting organized by GRAVIS in her village. During the meeting, she openly shared the challenges her family faced—especially the burden of fetching water daily, which consumed a lot of her time and energy.

Understanding her situation, the VDC members and GRAVIS field team visited her home for an assessment. After seeing the conditions, they approved a proposal to construct a "*taanka*" (traditional rainwater harvesting tank) for her household.Within a short time, the *taanka* was built—and it transformed Mini's daily life.

Now, Mini and her family have easy access to clean water right at home. She no longer has to spend hours fetching water. With more time and less stress, she participates actively in social functions and spends more time supporting her children's education. The entire family feels happier and more at peace.

Grateful for this change, Mini says,"Many of my daily chores have become easier. My children are able to focus on their studies. Life feels more balanced now. I thank GRAVIS and the Village Development Committee for their support."

She also appreciates the work GRAVIS has been doing for the last 40 years in Western Rajasthan, helping underprivileged families. Through projects like *taanka* construction, *khadin* (traditional water harvesting system), beri (underground well), and programs on women empowerment, health, education, and girls' education, GRAVIS is bringing real change to rural lives.

With the benefits from *khadin* in terms of increased land productivity, ability to optimise water use, enhanced fertility and being able to grow more than one crop in a year, farmers are getting much more equipped to deal with the parched arid land of Desert. As all families have access to sufficient quantity of food grains, additional income by the sale of excess produce is used for purchase of other household essentials, investing in more livestock leading to further improvements in their financial situation, and also for higher education of children. Communities also acknowledge the importance of *khadins* in the context if their social status. Many people believe that prosperity as a consequence of *khadin* has also got them better social status within the community. They also felt that not only they feel more confident about the crop yield, they are also more assertive in their social interactions and are able to discuss the issues that matter to them and communicate their opinions much more effectively. However, the most eloquent indicator of their status is emancipation from loans that most families had to take to fulfil their household needs and social obligations such as weddings, etc.

Rainfed farmers in India, who cultivate crops solely dependent on rainfall, have a significant reliance on livestock for a variety of reasons, particularly in areas prone to drought and uncertainty in rainfall. Livestock provides a source of income, food, and labor, acting as a buffer against crop failures and contributing to household livelihoods. Livestock, especially ruminants (cattle, goats, sheep), serve as a liquid asset that can be sold to generate income when needed, especially during lean periods after crop failures. Animal husbandry is a significant revenue stream, with livestock production contributing 15-40% of total farm household earnings in India. Livestock can act as a social safety net, providing income in bad crop years when crop yields are low. With the availability of dairy products, meat and other animal product, livestock contribute to food security of rural communities in That Desert. Livestock, especially cattle, are used as draft animals for plowing and other agricultural operations, reducing the need for manual labour Livestock manure is used as fertilizer, enriching the soil and improving its fertility. Livestock is often integrated into mixed farming systems, where crops and livestock are raised together, benefiting from mutual synergies. Livestock can utilize crop residues and other byproducts that might otherwise be wasted, maximizing resource utilization. In essence, the reliance on livestock in rainfed farming is a strategic adaptation to the inherent risks and uncertainties of rainfed agriculture, providing a vital source of income, food, and labor for the farmers and their households.

Access to clean and safe drinking water is a luxury for most rural household in the Desert. Depleting water table forces people to extract water from unsafe water resources and most often they do not have means to treat the water before consumption. The project provided the filters to households and addressed their need to for clean drinking water. Coupled with these, other initiatives that focused on health of people, were equally critical too from the point of view of rural populations needs. In remote desert villages where public health care services are either unavailable or inadequate, provision of health care support and medical camps.

Water from *taanka* is used for drinking water, cooking, livestock, and small-scale irrigation, ensuring that all critical needs of the families are met. Availability of water enabled by *taankas* help rural families maintain hygiene. Not only the clean drinking water reduces waterborne diseases, improved hygiene and sanitation lead to better overall health. Access to potable water allows families to grow vegetables and fruits in home gardens, leading to improvement in nutrition status of family members.

A Tank of Hope – Water solution transformed Chandki's Life

Chandki, a resilient farmer from the village of Vijay Nagar, lives just 22 kilometers from Jaisalmer city in Rajasthan. She resides in a semi-pucca house with her husband Geet Nath, their three children—two sons and a daughter—and a small herd of nine goats and two dogs. Despite not owning any land, the family depends on farming and daily wage labor for their livelihood.

Life was difficult for Chandki. With limited income and no access to clean water nearby, fetching water became a daily challenge. She spent hours each day walking long distances to collect water. This left her

physically exhausted and emotionally drained. The constant stress made her irritable, and she found it hard to attend social functions or participate in community life. Arriving late to work affected the family's income, leaving little time or energy for anything else.

Once, Chandki attended a Village Development Committee (VDC) meeting organized by GRAVIS in her village. During the meeting, she shared her struggles, especially the daily burden of water collection. Recognizing the seriousness of her situation, the VDC members, along with GRAVIS staff, visited her home for assessment.

Soon after, her family received approval to build a taanka—a traditional rainwater harvesting tank. Within a few days, the taanka was completed, and it completely transformed their lives.Now, the family has easy access to clean water right at home. Chandki no longer spends hours fetching water. With this burden lifted, she has more time to focus on her family, support her children's education, and participate in social and community activities.

Gratefully, she says, “So much of my work has become easier. My children now have time to study, and I feel less tired and more connected to my community. I thank GRAVIS from the bottom of my heart.”

GRAVIS has been working for over 40 years in the backward regions of Western Rajasthan, helping marginalized families like Chandki's. Their work includes constructing *taankas, khadins,* and *beris* for water conservation, along with initiatives in dryland horticulture, women's empowerment, health, education, and promoting girls' education for Chandki and her family, the *taanka* was more than just a water tank—it was a turning point toward a better, healthier, and more dignified life. re dignified life.
Addressing poverty: Taankas result in financial benefits too. In the absence of *taankas*, families were

spending 500 – 2,000 per month on water-related expenses, which is saved now. This saving is a boon for the most impoverished communities of the Thar desert that struggle most of the time, to meet the two end meet. Expenses on vegetables and fruits that were not only expensive but were not even available in the vicinity, as well as the cost of travel to big markets, was completely saved when families started horticulture at home only. Additionally, it was observed that families were spending much less on health related expenses.

Another major problem being encountered by the rural communities was their inability to access safe drinking water. Water available through taankas, and village ponds always required treatment for it to be suitable for drinking. Through WSDT project, GRAVIS addressed the problems related to safety of water as well. Bio Sand Water Filters (BSFs) that are low cost and sustainable water purifying system, provided clearer, clean and comparatively much less contaminated, that is safe for drinking. Families that have been using the BSF reported that the water available from BSF is much cleaner, better in taste and visibly clearer as compared to the non treated water.

As rural communities food, nutrition and access to water related issues were resolved and their financial status steadily improved with interventions as discussed above, the need for safe and clean drinking water was addressed through provision of locally made, low maintenance and easy to use water filters. These filters are assembled locally and function on the principle of sedimentation. For rural household with limited access to electricity and lack of technical know-how, BSFs serve the most basic need of rural household to consume safe drinking water. As all household consume rainwater harvested in taankas, only simple filteration technique sufficiently cleans the water for consumption. All households were happy with the quality of the water as most of them reported that the water drawn from BSF is crystal clear and tastes good too. They also felt that consumption of clean water has positive impact on their health as stomach infections that were common during summer season have drastically come down. In order to ensure that families are able to make the best use of the filters, training/orientation given in installation, maintenance, upkeep, and repair of BSWF, which was extremely helpful for the families.

All the interventions in WSDT were based on the cognisance of the lived realities of rural communities in the Desert. Impact of all the interventions for water, food and nutrition security manifested in creation of water, food and nutrition secure families with improved health status and decreased illnesses. As harvested water contributed towards enhanced food production, families profit from selling of yield continued to increase, leading to sustained improvement in their financial status. Additional savings came in when water was not required to be purchased any more and they people did not have to even buy fodder. As transport is unreasonable expensive for those not having their own vehicles to move around, all expenditures on travels, for water, fodder, etc. came down, making rural household much more comfortable with their finances.

1.1.1 Dignity through ownership of assets

Impoverished communities that navigate through life in penury and are in constant struggle for survival, in most cases do not have any access to productive resources, except the small pieces of lands that they plough. Most marginalised and vulnerable people in the region experience exclusion and very often attach their sense of social value with the ownership of assets. Living in deprivation most part of their lives, makes the rural societies draw their sense of dignity and self esteem from ownership of immovable assets. This particularly true with relation to rainwater harvesting structures as these structures emancipate them from the repeated borrowing of water from their neighbours or others in the vicinity. Construction of taankas at home and khadinat the farm, is a symbol of self reliance in water access and use. Provision of BSFs that ensures their access to clean and safe drinking water further adds to their pride that they get from serving clean drinking water to guests. Permanent ownership of assets and enhanced income levels, encourages local communities to invest in health, education, and an elevated standard of living, all of these collectively ensures better social status in the community. Project interventions that enable access to water and enhance their income do not create a dependency relationship.

1.2 Innovation with inclusion

Ensuring the relevance and effectiveness of the interventions, and enhancing their impact on the community, may be achieved by constantly innovating the solutions. Along with that, it equally important to adhere to the principles of equity and fairness, and ruling out any sort of exclusion. Following are some examples of how WSDT project innovated and ensured that no members or groups are excluded from the process.

1.2.1 Intergenerational approach

Intergenerational approach adopted by the project is one of the unique aspects of the project. This approach and the intergenerational learning groups (ILGs) address the problem of knowledge gap between younger and older generations, by encouraging older women to share traditional wisdom with rest of the women and girls, and encourage young girls to discuss the issues and problems faced by them. Given the changing nature of the society and the exposure available to younger generations ILGs function as conduit between younger and older generations. Further, there are no such groups in the village that have membership of females from different generations and where women can meet and discuss myriad issues concerning their lives and the challenges they face, and ILGs address this gap.

ILG meeting

In the past, it was an arduous task for women to venture out of their houses and participate in the meetings and trainings of SHGs, the benefits that they saw in them motivated them to navigate their way through the cultural barriers. Formation of SHGs and ILGs was reported to have a life changing impact on the lives of women and young girls. Importance of saving and sustainable use of water were reported to be the most crucial learnings that girls would follow all their lives.

With the membership of women aged 20 to 60 years, and young girls between the age group of 14 to19 years, ILGs turned out to be a major source of increased confidence and leadership abilities. Women gained improved financial literacy and economic opportunities. Most women and girls reported enhanced knowledge because exchange enabled through these ILGs. Social support and collective decision-making, were other aspects of these groups that were valued by the members of ILGs, as women and girls were primarily occupied with water collection in the past.ILGs provide safe space to discuss issues that concern women and girls, and share experiences and challenge, along with finding solutions. In a patriarchal society that has restrictions on women's mobilisation and interactions with the outside world, women and girls are able to discuss their problems openly without being judged or shut off.

Poverty and lack of any social security mechanisms make people dependent on the welfare schemes and programmes of the government. However, those who are unaware of these schemes of the government or the means to access them remain at the periphery. Membership of ILG helps women,specially older ones, access the government schemes and entitlement, and strengthens their collective bargaining power in interaction with the institutions, and local self government.

Leadership development: As compared to other groups of women, such as SHGs, the focus of ILGs is slightly different. While all the groups aim at functional efficiency and economic empowerment, ILGs pursue a much larger vision of creation of a equitable society based on the ethos of social justice and harmony. Because of this vision, ILGs focus more on leadership development, advocacy, and awareness on rights and entitlements. ILGs prepare generations of women and girls to take charge of their lives in all spheres of life, while SHGs largely focus on financial empowerment savings and credit, and thereby promoting self reliance among women. While all community based groups address critical local needs, ILGs, lead the way by focusing on creating conducive environment for realisation of women's needs and promoting their aspirational life goals.

Impact on personal lives: Membership of ILGs and participation in meetings and discussions of ILGs leaves a lasting impact on the lives of women and girls. Not only they become more aware about their surroundings, their own life goals and potential role in community development. Invariably all the members report enhanced confidence in expressing their opinions at home and in the community, which was not the case in the past. Women and girls were able to articulate their needs and aspirations in a much better way, which eventually resulted in improved financial independence and access to resources. In addition to the personal and family spheres, women and girls found themselves equipped to play a greater

role in discussions and decisions in village level affairs and local governance.

Women and girls who were members of ILGs reported that they are also able to apply the learnings from the ILG in their personal lives, their skills in decision making in financial matters have improved and they are able to assess financial situations in a much better way than before. In addition to financial matters, their in child care and ensuring heir education has also got qualitatively improved because of the skills and exposure that they got from the ILG interactions. Women are much more aware about the good health practices, better nutrition and other such healthy routine elements that ensures better health not only form themselves and girls in the family, but all the family members too including older people.

Empowering impact of ILG membership is the most valuable contribution to the society in rural Thar. Women and girls who are members of ILGs in this region, are able to overcome age old social and economic barriers that prevent them from exploring their potential and leading a fulfilling life. They are now in much better position to make their heard and influence decision making in family and community matters.

2.2.2 Tradition and technology

GRAVIS has firm belief in the importance of local wisdom. It always tried to enhance local knowledge with modern techniques and sciences. The above has been very effective in organization of a large number of field-based interventions in the areas of water security, agriculture, environment education, training and animal husbandry.

Continuous engagement and involvement of the community in drought mitigation endeavours cannot be ensured until the proposed solutions are in alignment with the local needs, customs and knowledge systems. GRAVIS ensured that the WSDT project addressed the most urgent community needs and factored in local customs and traditions within the project design and its implementation. Festivals and community events and gatherings were utilised as most suitable occasions for community outreach and communicating the messages related to water conservation, and good health and hygiene practices. The project ensured that the local cultural preferences in terms of food habits are particularly considered while suggesting nutrition related practices. However, the most critical component of the WSDT project was consideration of the restrictions and barriers that women and girls face in the rural areas of the Thardesert. As women's interaction is not encouraged in the project villages and they're not allowed to travel long distances, it was ensured that the mobilisation activities were conducted close to their homes. Formation of women's groups helped overcome the challenge of keeping women involved in social interactions, sustained community approval and women's interest in the endeavour.

For example the age old community water harvesting system was one of the major focus of WSDT project. Nadis are usually community-managed, and maintenance is traditionally undertaken through local cooperation. Their location and size often reflect the village population and livestock needs. Many nadis getsilted or become non-functional due to neglect. Without regular desilting and protection of catchment

areas, their usefulness declines. GRAVIS has been supporting the therevival of nadis by desiliting for addressing water related needs of the community. They represent a climate-resilient, low-cost solution aligned with the desert's ecological conditions. In short, nadis exemplify the traditional wisdom of water conservation in arid zones and are gaining renewed attention in the face of increasing water stress in the Thar Desert. GRAVIS not only ensured that nadis are revived but also gave revived the tradition of these nadis by the community.

Importance attached to traditional wisdom and respect given to elderly in the community, are integral parts of rural lives. Involvement of older people in the discussions that led to identification of local solutions, their involvement in decision making with regard to allocation of benefits, all helped getting community support and approval for implementation of a range of drought mitigation measures. Each proposed intervention was assessed by juxtaposing it to the traditional practices and it was ensured that none of the interventions were inconsistent with local culture. Desert peoples' local ingenuity offers food security solutions despite the drought.

2.2.3 Gender responsive approach

Gender responsive orientation of the project has remained at the social transformation ushered in through WSDT project. Gender mainstreamed and gender responsive approach has manifested in improved educational attainments in formal education for girls in the project area. Completion of school education for greater number of girls have inspired other girls also to complete their education, has given them confidence and the community is a step closer towards a gender just society. The ripple effects of empowerment of women are being seen in all the arena of family and community lives, which will have a persisting force even in the times to come.

Most taanka beneficiary women fall within the age bracket of 25–50 years, which is the age they carry the responsibility of organising water for family's need in the most rigorous way. Without a taanka within their premises, they were spending 2 to 4 hours on an average everyday, which is now saved because of the construction of taanka.

Both SHGs and ILGs were used as vehicles for social and economic empowerment of women and girls. They were further utilised as carriers and movers of all water, food and nutrition security initiatives as part of the project. These women led groups ensured that women get their due through various interventions. Provision of water at the doorstep liberated women from everyday labour of water fetching and time saved was put to use for social mobilisation, interactions and capacity building of women and ensuring continued education for young girls. This way both water security and empowerment interventions complemented each other.

WSDT project is women-centric project that aims to ensure that women and girls gain economic, social, and decision-making power. Leadership of women was enhanced through formation and strengthening of SHGs

and ILGs that in turn encouraged women's participation in decision-making related to water management, agriculture, and financial activities.

Women were also trained in livelihood activities through vocational training, such as poultry farming, goat farming or sewing. Income generation activities such as horticulture,climate-smart farming, and financial literacy to achieve economic independence, also targeted women. Special health education sessions organised as part of the project also focused on maternal health, menstrual hygiene, and nutrition, ensuring better well-being for women and girls. Women are now being actively involved in rainwater harvesting projects, making them key stakeholders in ensuring water security for their families and communities. The project ensured that women are not just beneficiaries but active change-makers in their communities.

SHGs at the core of action: Mobilising women into self help groups (SHGs) was another very important strategy adopted by WSDT project. Time saved from water fetching duties after the construction of taankas at household level, was efficiently channeled to generate momentum towards development initiatives among women and formation of SHGs in the target villages was the first step towards that goal. Members of SHGs meet atleast once a month and engage in savings and loaning related activities. These SHGs are used to inculcate livelihood skills and entrepreneurship among women in the identified villages. Women are trained and their skills are built through financial literacy and awareness sessions, in which they are told about the importance of understanding numbers and money matters, ensuring that they do atleast small savings to secure their future. Women also learn about profit making ventures and processes involved on collective purchasing and selling of goods.

Women, who have been members of these SHGs discuss a range of benefits that they get from membership of SHGs. In addition to the skills gained through a series of meetings and trainings women are able to access loans for loans for business and household needs. They report improved financial security and reduced dependence on moneylenders, who use to resort to exploitative measures in the past when no support was available to families in case of urgent need of cash. With the loaning facilities available through SHGs, women can have easy access to money in emergency situations. These groups of women also extend social and emotional support to members, as women discuss several issues that effect them personally. In stark contrast to what the life that was laden with isolation and drudgery, women find themselves in the company of supportive social circle they can lean on for emotional support too.

Structured training sessions on various aspects of managing groups and conducting their business, and tasks such as conducting meetings, book keeping, minutes recording, and doing basic maths, have helped women gain all the relevant skills in a professional way that are already helping them gain direct benefits. Skills learnt thus will always contribute to their overall development interaction with the outside world and negotiation for gainful transactions.

Among vocational skills, women got professional training in sewing, poultry farming, goat farming, soap

making, etc, that could help them start their own small scale profit making ventures. Many women got actively engaged in these vocation after receiving requisite trainings and skills along with the initial capital to start such endeavours. These enterprises have become sources of improved financial stability for women and their families. In addition to meeting their routine expenses, women are also able to do savings. As women contribute toward financial wellbeing of the whole family, they also gain enhanced level of respect and their due place in decision making processes, which is an important market of development and wellbeing of women, eventually increased self-confidence and love for life. In terms of other benefits, most women members reported improved financial management at home and skills in generating additional income for the household, resulting in more long term financial gains and prosperity for families, enabled by women.

Its heartwarming to know that women are not keeping these skills and learnings only to themselves. Most of them are sharing insights gleaned from the training, meetings and other interactions with the young generations and those members who are not members of the SHGs yet. This gesture is ushering in a silent revolution in the Thar region where most women are becoming aware of their rights and learning about financial management growth.A movement towards empowering women by building leadership and decision-making skills and providing opportunities for economic independence has strengthened their ability to raise issues that concern them and demand their rights.

2.3 Project design and implementation

2.3.1 Decentralised model

Decetralised implementation model that involved working actively and directly with the communities was an integral part of WSDT implementation methodology. GRAVIS involved communities in every aspect of the project – including planning, implementation and monitoring, with a belief that active community involvement is a key to community ownership, sustainability and scalability. SHG and ILG members who were drawn from the local community played a key role.

The Gandhian philosophy of "Sarvodaya" - all rising, but the last person first - is another unique aspect of GRAVIS' vision and mission that informed the design and implementation of WSDT project as well. Accordingly, the project focused on the collective ascension of men, women, and children, regardless of economic situation, caste or religion. Addressing the situation through the empowerment of rural communities, GRAVIS also adheres to another Gandhian notion, "Gram Swarajya", or village self-rule, when implementing its efforts. Thus WSDT project also involved enabling village ownership and control over its environment, institutions, and relations.

Participation of people from the conception of the project was the fulcrum of the rest of the project activities. GRAVIS held initial discussions in remote villages of Jodhpur and Pali Districts where the project was to be implemented. Community leaders were consulted with and GRAVIS team identified the key concerns and working methodologies. A detailed analysis of problems and potential solutions was

undertaken through a baseline survey.

In addition to utilising the organisational strengths, GRAVIS also drew from its collaborations with specialised resource agencies for ensuring technical soundness of the interventions, specially those that involved construction. Inputs from technical experts, along with senior staff of GRAVIS informed the implementation process on a regular basis. GRAVIS' head office in Jodhpur City led the project while the field centres in project areas implemented the project through a field team. GRAVIS senior team provided all necessary guidance and technical support. Such as decentralised functional model lent efficiency and efficacy to the project implementation and ensured that the challenges encountered at the field level are resolved in a swift manner.Almost four decades of experience of engaging with the communities in the rural areas of Thar, understanding of local institutional structures, familiarity with the community challenges, expertise on relevant issues such as public health , gender issues in the Thar, rainfed agriculture, sustainable farming practices, and rainwater harvesting techniques, etc., all the strengths of GRAVIS, value added to the WSDT project implementation.

2.3.2 Coherent set of activities

WSDT project aimed to reach out to the most marginalised of the families in rural areas of the Desert with a vision to transform their lives. Provision of all the support for water, food and nutrition security and financial well-being, cumulatively contributed to their overall wellbeing and improved their quality of lives. This strategy not only ensured provision of sufficient water, food and nutrition for girls, but also had girls specific outcomes. Girls did not have to spend time and energy fetching water, and having their own bicycle, an asset that they could call of their own and use as they wished. At individual intervention level, AHUs that provided much needed nutrition complemented the food security achieved through khadin. Similarly, provision of water through taanka was further augmented by provision of water filters that ensured safety of water for the rural population, who otherwise had no choice but to drink unsafe water from village ponds. Deprivation from basic amenities is a common attribute of most rural communities located remotely in the Desert. Along with water crisis, project villages also yearn for regular electricity supply which is always elusive.

Although, the rural areas of the whole drought affected region is vulnerable to drought, this vulnerabilities become multi-fold when seen with the lens of social identities too. Marginalisation has gender, caste and ethnicity related facets that not only increase the challenges for specific groups, but also prevents them from accessing solutions owing to social exclusion from the development processes. WSDT project placed special emphasis in ensuring that the most weaker sections of the society that include women, young girls, older populations, scheduled castes and scheduled tribes, all have equitable share in the local processes and the ensuing progress.

The project is inclusive and focuses on marginalized communities in several ways. First and foremost was the provision of clean and safe water for all, especially women, older people, children, and marginalized

groups. Age groups that are susceptible to disease were prioritised and provided with clean water through bio sand water filters that could used to treat and use water from taankas and renovated nadis. Outreach medical camps that catered specifically to elderly individuals, malnourished children, and underprivileged groups, ensured health support to all these groups which is inaccessible otherwise. It was ensured that all such groups get the information about these outreach activities and supported to access the services whenever plausible.

Considering the comparatively higher degree of hardships being faced by the Scheduled Castes (SCs) and Scheduled Tribes (STs) communities in the desert, livelihood support was extended with a focus on SC and ST communities by the way of offering technical trainings on water, farming, and SHG leadership, allowing these communities to enhance their economic stability. Conducting health education sessions and climate resilience trainings, ensuring that vulnerable groups are aware of their rights, health risks, and sustainable practices, enabled improved awareness on health and wellbeing especially among women and girls.

Regular solidarity meetings and their culmination in the solidarity convention, the project promotes inter-community cooperation, reducing discrimination and building a sense of unity among different social groups, and promoting social harmony in the region, thereby making the weaker sections too an equitable partner in development. By addressing the specific needs of these groups, the project ensures that no one is left behind in the development process.

The WSDT project stands out for its holistic approach that integrates women's leadership development with water security, food security, health improvement, improving agricultural practices, and climate resilience. By empowering women through SHGs and ILGs, the project ensured that women play a central role in managing water resources, improving agriculture practices, and enhancing community health. Additionally, the focus lies on rainwater harvesting structures, bio sand water filters, sustainable farming techniques and on SHG vocational trainings. These are strengthening the environmental sustainability and improve the overall livelihood and the well being of marginalized communities. This multidimensional strategy makes the project sustainable, inclusive, and transformative in addressing the core challenges faced by poor and marginalized women and girls. WSDT project turned out to be a package of coherent set of support interventions that address most critical problems of rural poor communities. The project has been evolving to identify and respond to any other issues that might dampen the efforts to achieve the vision of advancing girls education, and empowering women in the Thar Desert.

2.3.3 Sustainability of interventions

Unlike many other community development project, sustainability of the project interventions in could be seen well within the timeframe of the project implementation. The project provides one time support to all the selected households. Assets are created in the form oftaankas, khadins, and AHUs. Once constructed, taankascontinue to provide water security for rural families for their whole lifetime, and even generations if they are able to maintain them well. In a similar way, khadins address the problem of food insecurities for

long time as the farmers continue to grow sufficient quantity of food grains and other item. Once the farmers make use of khadinand understand its utility, they continue to use it in their farms to reap the benefits. Fruit trees and vegetable plants too keep providing nutritional security for a long time. However, the most important factor is the knowledge that they acquired about useful techniques for rainwater harvesting, sustainable agricultural practices, and horticulture, which is a perpetual reason for their improved quality of life. Improved health, elevated financial situation and access to more assets and productive resources accelerates their movement towards prosperity. Achieving these long lasting transformations through only one time interventions with the families is the hallmark of the project.

The project utilised local, low cost, sustainable and environment friendly techniques for generating maximum outputs. Traditional rainwater harvesting systems were innovated by blending them with the simple scientific technologies for amplifying their overall impacts. Taankaas well as khadinare the most cost effective rainwater harvesting systems for water needs at household and in the farm. BSFs, that are based on simple technique, is assembled locally with the raw material easily available within the area. People from the community get involved in assembling the filters and hence are generally equipped with the methods of installation,maintenance and service too. As the filters do not need electricity, these are most suitable for rural context. The cost of their construction was further subsidised by contribution of labour for construction related work by the respective family members themselves or the other community members.

Sustainability is a major issue for community-based programmes. Very often withdrawal of project or end of project duration also means end of the support available to people and thereby absence of any long term impact on the lives of people. GRAVIS takes important initiatives to make the programmes sustainable and self-reliant in coming future. This aspect is a very important strand of methodology of implementation. Strategies are developed to raise contributions from the communities and generate community support to organize different activities. Rainwater is an important factor in the project, which is a renewable and sustainable resource. Water harvesting structures (taankas and khadins) served the community for a long period of time. Filters, AHUs and seed banks will continue functioning over a long period as well. The impact on health and on gender equality will be long lasting. The ILGs and SHGs will remain functional over years to come. GRAVIS as a local organization will remain connected with the communities and will continue its guidance and support. Local knowledge and culturally appropriate practices further ensured that solutions are context-sensitive and durable.

2.4 Environment friendly and climate change adaptive interventions

Thar Desert is not only challenging in terms of its climatic conditions, climate change makes the situation even worse for the population. WSDT took note of the these challenges and made sure that the interventions were not only environment friendly buy climate change adaptive too.

2.4.1 Environment

Introduction and implementation of environment friendly activities and solutions was one of the hallmarks

of the WSDT project.Environmentally sustainable and safe interventions in drought mitigation are crucial for ensuring long-term resilience, protecting ecosystems, and safeguarding human health and livelihoods. These interventions help preserve natural resources by preventing the over exploitation of water sources, soil, and vegetation. For example, techniques like rainwater harvesting and aquifer recharge maintain groundwater levels without causing ecological damage.Such practices also enhance the adaptive capacity of communities, making them more resilient to the impacts of climate change. Promoting drought-resilient crops or agroforestry reduces reliance on high-input agriculture and helps communities better withstand climatic variability. In addition, safe and sustainable methods of water storage and use reduce the risk of waterborne diseases, while minimizing the use of chemicals helps prevent contamination of water and soil, thereby protecting public health. Its important to note that such interventions support local biodiversity and maintain essential ecosystem services such as water purification and carbon sequestration. This makes them integral to sustainable development strategies in drought-prone regions.

The WSDT project contributed to sustainable development in multiple ways. By constructing water storage tanks, renovating *naadis* (traditional water body structure) and installing bio sand water filters, it was ensured that clean and pure drinking water was available for households and for livestock. With relation to food security, *khadins,* community seed banks, and arid horticulture units along with climate resilient farming trainings promote sustainable agriculture, reducing dependency on erratic rainfall. The rainwater harvesting and climate adoptive agriculture practices mitigate the impact of climate change and ensure resource conservation for future generation that focus on water conservation, soil health and climate resilience. The practices that ensured long term environment sustainability, included rainwater harvesting such as construction of water storage structure *(taanka)*, *naadi* renovation and bio sand water filtration that helped in collecting and storing rainwater for drinking use. Construction of *khadin* structure (traditional runoff farming system) prevent soil erosion and helped in soil and water conservation. Nadis are located within the radius of 500 m to 2 km on average of the houses. Most of the people were not able to use the water from *nadis* because they were not desilted in a long time. After desilting, water is clearer, less muddy, and is available in larger quantum throughout the year. [People use it after necessary treatment for drinking, cooking, livestock, washing clothes, and irrigation. Not only these renovated *nadis* save time and effort in fetching water, they also help improve hygiene and health.

Availability of sufficient water with increased storage capacity of Jiyari Naadi

GRAVIS works with countless villages to ensure their water safety. In the Thardesert, water is scarce and the basic right of people to have access to water is limited. This doesn't "just" mean that they don't have enough drinking water. It leads to women having to travel huge distances in unbearable heat, girls having to fetch water instead of being able to go to school and thus, gender disparities growing. Moreover, basic hygiene practices can't take place because of the lack of water. Alternatively, villagers can buy water from tractor tankers, but this requires money- money that is very limited for the village population and could be invested in education or farming. The following case study highlights how a proposal of a Village Development Committee (VDC) has improved the water security of 650 families and 5000 animals.

A look into the overall situation:In the revenue village Bhailani of Gram PanchayatSangad, there is a JiyariNaadi. People from the nearby villages of Lakhmana, Sangad, and Bhailani, as well as their livestock and stray animals, depend on the water from JiyariNaadi. All in all, about 650 families and nearly 5000 animals depend on this water. However, that pond had not been cleaned since at least 8-10 years, making it impossible for the water in the pond to last more than 4-5 months. As a consequence, there was a water crisis affecting the villagers and their livestock as well.

Initiative taken by the VDC and GRAVIS:To combat this crisis, the VDC of Bhailani proposed the desiltation of the JiyariNaadi in the year 2023-2024. So, as proposed, GRAVIS began with the removal of silt and cleaning the Naadi under the WSDT project.

Outcome: As a result, the storage capacity of the pond has increased. On top of that, the clean water inlet improved the water flow. Now, the water in the JiyariNaadi stays for almost 10 months, which is sufficient for both the villagers and their animals.
To ensure that there will be enough drinking water for the livestock for the whole year, the villagers decided that no one would fill water tractor tankers from that pond when only one-third of the water remains.

2.4.2 Climate change resilience

Another important aspect of environmental sustainability was the emphasis on climate change resilient farming. Farmers were trained in drought resistant crops, organic farming, and efficient irrigation technique to sustain agriculture despite unpredictable rainfall. While perennial droughts have always been an issue that people living in deserts have faced, climate change has manifested in the unpredictability and shifts in the rainy seasons in recent years. Climate change in Thar Desert is an even more highly complex phenomenon. In the wake of climate change, not only the temperatures are rising, the raining patterns are altering too, making it difficult for the rainfed farming communities to predict rains and undertake farming related processes in a timely manner. Climate change aggravates food insecurity situation for rural communities by affecting the food production.WSDT kept the impact of climate change in the community in view while designing all the interventions. Multi interventions under the project strengthens community resilience against climate change by ensuring availability of water for people in all seasons, introducing and encouraging the farming community to resort to sustainable agricultural practices, facilitating soil conservation and preparing the community against any impending disasters.

Water availability, security and safety was ensured through rainwater harvesting structures such as water storage tanks, village ponds /naadirenovations, and provision of bio sand water filters ensured year-round water access, making communities less vulnerable to droughts. Climate-resilient farming techniques and the establishment of community seed banks helped farmers adapt to erratic rainfall and temperature changes. The use of khadinstructures prevented soil erosion and maintains soil fertility, ensuring continued and enhanced agricultural productivity. The project considered the need to diversify livelihoods as well for the drought and climate change affected communities. By promoting horticulture units and SHG vocational trainings, the project reduces economic dependence on rain-fed agriculture, making communities financially resilient.

Water scarcity, coupled with lack of financial resources, limits rural communities access to diverse fresh food and results in high malnutrition levels especially among the most vulnerable populations such as women, children and older people. Through project, families are supported to establish their own fruits and vegetable gardens. With saplings of drought and climate change resilient local varieties of fruits and vegetables, about 380 families have established these AHUs. With some guidance from the GRAVIS staff, families grow seasonal vegetables and fruits without much additional investment. Over a period of time tree such as desert plum and other local fruits start giving yields and vegetables address the nutrition needs of the families on a regular basis. On an average, depending upon the season and time since the AHU was established, each AHU in the project area has been a constant source 10 to 60 kilograms of fruits and a similar amount of vegetables in a month. All beneficiary family consume these fruits and vegetables at home and most of them sell the excess produce in open market. Ability to be able to consume an adequate quantity of fresh fruits and vegetables is a very important accomplishment for the families, as atleast one third of them were not able to consume those before they had an AHU. It was because they did not afford a variety of fresh fruits and vegetables in the past. Rest of the two thirds also reported that consumption of fresh fruits and vegetables was limited to only once or twice a week, as they either did not afford them, fresh

fruits and vegetables were not available close by and they had to travel long distance to a bigger market to get some which meant spending more time and money on travel.

How a small garden brought big change to Jatno's and her family's life

Jatno, a 34-year-old woman living in the remote village of Janra, about 54 kilometers from the main city of Jaisalmer, Rajasthan. She lives with her husband, and three children—two sons and a daughter. The family is completely dependent on rainfed farming for their survival. With a monthly income of that ranged between ₹7,000 and ₹10,000, which was barely enough to cover basic needs. Despite all the hard work, the

family struggled to afford fresh fruits and vegetables. This affected not only the children's nutrition but also Jatno's own health. Without a balanced diet, they were often tired, weak, and frequently fell ill—leading to high medical expenses that the family could hardly afford.

One day, Jatno accompanied her husband to a Village Development Committee (VDC) meeting organised by GRAVIS. There, she learned about the Arid Horticulture Unit (AHU)—a small garden setup designed to grow fruits and vegetables even in arid conditions. Intrigued and hopeful, Jatno expressed her interest in starting one near her home.After evaluating the family's situation, the VDC and GRAVIS team approved her proposal. Soon, GRAVIS staff helped Jatno plant a dryland horticulture unit in her field. They planted fruit trees like ber (Indian jujube), gunda (cordia fruit), and amla (gooseberry). In between the trees, they also planted a variety of vegetables to make the best use of the available space.

In just a short time, the garden started to produce fresh vegetables daily. Now, the family enjoys nutritious, home-grown food every day. The children are especially happy eating green leafy vegetables, and their health has improved. The fruits have also started growing, and the family loves making gunda pickles and eating seasonal produce.

The garden produces more than the family needs, so Jatno even shares the surplus with her neighbors, strengthening community bonds. With fewer people falling sick in the family, their hospital expenses have dropped, and they now use the savings to improve their children's education, clothing, and overall quality of life.

Jatno shares her gratitude :"Thanks to GRAVIS, we now have fresh vegetables at home,better health, and more happiness in our lives."

For over 40 years, GRAVIS has been working across Western Rajasthan, helping marginalised communities through initiatives like climate change resilient and environment friendly solution such astaanka construction, *khadin* and beri systems, arid horticulture, women's empowerment, healthcare, education, and promoting girls' education. Families like Jatno's are living proof that even small changes can make a big impact.

Vegetables and fruits grown in the AHUsare either used at home only, or if the production is excess, people sell it in market too. Those who sell these fruits and vegetable are able to earn some extra income to the tune of INR 1000 to 5000 in a month. It is to be noted that the families were not able to consume fruits in the past because of the affordability issues.AHUs support poor families in multiple ways - they help in improved nutrition, saving money, and generating additional income.

Onwards

The WSDT project by GRAVIS represents a robust, community-driven model for integrated rural progress in arid and drought-prone regions. By simultaneously addressing water security, food and nourishment, health, and gender empowerment, the undertaking created lasting impact and valuable lessons for replication in similar contexts across India and other parts of the Global South.A defining quality of the initiative was its sustainability model. Unlike many development interventions requiring long-term external assistance, WSDT made one-time investments in durable assets like reservoirs, small earthen dams, and agro-horticultural units while focusing on enduring conduct transformation and community skill-building. Local knowledge systems were incorporated into project planning, and community-based organizations like self-help groups and irrigation user associations are expected to remain functional and autonomous beyond the project's lifespan.

Community unity and social cohesion were encouraged through regular village meetings and a concluding solidarity convention. Nurturing mutual learning, shared accountability, and collective action, these interactions established a foundation for environmentally and socially inclusive sustainable development led by community members and prioritizing gender equality.The WSDT project prioritised environmental sustainability throughout its conception and execution. Traditional rainwater harvesting techniques were

modernized to boost productivity, while all agricultural endeavors promoted natural inputs and climate-resilient crops. These tactics addressed both immediate survival requirements and constructed adaptive ability for future droughts and climatic instability. Gender responsive nature of the project clearly stands out in the design, strategy and operational aspects of the project. Inclusion of women not as recipient of the benefits as catalysts in the development process both at household and community levels, are unique features of the endeavours undertaken under the aegis of WSDT project. Going forward the vision of creating of gender just society, that is inclusive in all aspects of human interaction and social development seems to be a reality of near future.

WSDT project successfully blended ancestral wisdom with modern technologies, empowered women as agents of transition, and facilitated inclusive and equitable access to essential services. Most significantly, it reworked lives—women who once spent hours collecting water are now entrepreneurs, leaders, and change-makers; girls who had constrained access to education are now aware of their rights and ambitions. Sustainable development in the Thar region calls for an integrated approach. There is a need to promote water conservation through traditional and modern techniques such as taankas, nadis, and khadins. Agriculture must be adapted to desert conditions with the use of drought-resistant crops and improved soil management. Strengthening rural infrastructure, expanding solar energy use, improving mobile connectivity, and enhancing education and vocational training will help create better opportunities and reduce migration. Additionally, encouraging eco-tourism and supporting local crafts can diversify the economy and bring in new sources of income.Thar region continues to struggle with entrenched development challenges that stem from its geography, climate, and historical neglect. Although government efforts have begun to make an impact, the region requires sustained, inclusive, and ecologically sensitive development models. Only through long-term commitment, local participation, and adaptive planning can the Thar overcome its vulnerabilities and unlock its full potential.

Learnings from the project, especially the successful strategies that have demonstrated their efficacy, must be documented and disseminated across the region for replication by other state and non state actors. Some of the interventions initiated as part of the project, need to be followed even after the completion of the project to take them to the logical conclusion. Social and behavioural change that is being ushers in through multiple training initiatives and demonstration is of particular importance to ameliorate the impact of consumption of clean and safe drinking water.

Acronyms

AHU	Arid Horticulture Unit
CBO	Community Based Organisation
GRAVIS	Gramin Vikas Vigyan Samiti
ILG	Inter-generational Learning Group
INR	Indian Rupee
SHG	Self Help Group
VDC	Village Development Committee
WSDT	Water Security and Development in the Thar

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GRAVIS is a leading Non-Governmental Organization working in rural India in the States of Rajasthan, Uttarakhand, and the Bundelkhand region of Uttar Pradesh. Since its inception in 1983. GRAVIS has worked in over 2,000 villages reaching a population of over 2.5 million and has established over 4,000 Community Based Organizations (CBOs). GRAVIS believes in participatory community development that blends traditional knowledge and modern sciences and promotes equality.

GRAVIS is registered under Rajasthan Societies Registration Act and under section 80 (G) and 12A of IT Act, 1961 of Government of India with tax exemption status.