



IMPROVING HEALTH BY MITIGATING DROUGHT

Gravis

MISEREOR

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A qualitative research study on drought & health

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Improving health by mitigating drought

2012

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ISBN 978-81-966767-0-4

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FOREWORD

Droughts have long lasting impact on community health. People living in rural areas of desert environments have to cope with droughts and consequently with impoverished and diminished health. The Desert of Thar in North-West India is an area where droughts and poor health have a long history of co-existence. Particularly vulnerable in Thar are women, children and elderly.

GRAVIS, a leading NGO in the region, has focused a great deal on drought mitigation over the years. Our efforts have ranged from community capacity building to enhancing water and food security. Community health is a critical aspect of our work in mitigating droughts by emphasizing on medical care, training and awareness generation. This qualitative study focuses on understanding the links between improving health status and drought mitigation.

We are thankful to our long standing partner MISEREOR and people of Germany for their support to this study. A special word of thanks goes to Ms. Shweta Chooramani for leading the study and to GRAVIS field staff for their support, Last but not the least, the rural community of Thar deserve a word of appreciation for their contribution and active support.

Dr. Prakash Tyagi
Executive Director, GRAVIS

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AUTHOR'S NOTE

In more recent times, Rajasthan has experienced severe and frequent spells of droughts than any other region in India. Rajasthan has two-third of its area as desert and it receives scanty rainfall and this presents a serious risk to poverty eradication and sustainable livelihoods. The adverse impact of drought is more severely felt by poor people who are more vulnerable than rich. Appropriate policy responses can strengthen adaptation and help build the resilience of communities and households to mitigate impact of drought. Though many aspects and implications of drought have been well researched in the literature, this study recognizes that there is much to be learned about drought and its impact on public health of the Thar residents. There is an immense need to identify linkages between health and drought, so that appropriate resources are apportioned to improve public health during or after drought episodes in vulnerable areas like Western Rajasthan.

A reduced income is one impact of drought that result in less capacity to purchase an adequate food supply which then alter the daily diet and ultimately affect the health of each member of those farming families. Reduced income can also result in fewer preventative health behaviors, such as regular visits to the doctor specially among women, which result in poorer health in the long term. The vicious cycle among women starts among from malnutrition in early childhood, poor hygiene during adolescent years, early marriage, poor antenatal/post natal care.

Indirect impacts, on the other hand, exert their influence by changing one or more of the factors that determine health. Living in a state of heightened stress for a long period of time is known to also contribute to an increased risk of perceived health problems, which in turn, often results in the development of actual health problems. Drought brings compromised quality and quantity of potable water, compromised food and nutrition, diminished living conditions (as they pertain to air quality, sanitation and hygiene), mental and behavioral health, vulnerable populations (migration leads to risk of HIV/AIDS) and increased disease incidence (for infectious, chronic, and vector borne diseases).

Having established the strong links between drought and health through this study, it is now possible to consider the role that the GRAVIS CDMT Project sought to play and actually played, in reducing the negative impacts of drought on the communities that participated in this project. However, it must be remembered that the CDMT Project was not only a public health project. Rather, it was a comprehensive drought mitigation strategy which focused on the social welfare of drought affected communities and the individuals living in these communities through water security, food security, enabling social networks and promoting health.

In future, the steps to promote public health through main streaming of demonstrated drought mitigation interventions by NGOs into sustainable development by community based organizations may potentially deliver better results when combined with adaptive management of natural resources.

For completing this study, special thanks go to Dr Prakash Tyagi for his patience, guidance and support throughout the process. For managing the study on field, collecting data and supervision, contribution of Mr. Rajendra Kumar Project Coordinator, CDMT Project deserves special mention along with his team.

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1. INTRODUCTION

Rajasthan is geographically the largest state in India with two-third of its area as Thar desert. The entire State receives scanty rainfall. Thar Desert in western Rajasthan is characterized by low and erratic rainfall, high air and soil temperature, intense solar radiation and high wind velocity. Context-specific interactions of these factors not only give rise to frequent droughts and famines, they also make local livelihoods highly vulnerable.

Rajasthan covers an area of 34.22 million hectares, i.e., 10.5 percent of the country's geographical area, but shares only 1.15 percent of its water resources. The estimated annual, per capita water availability in the state during 2001 was 840 m³ and it is expected to remain 439 m³ by the year 2050, against the national average of 1,140 m³ by 2050 (see ref.20). Out of 237 blocks in Rajasthan, only 49 are safe in terms of ground water while 101 are critical and semi critical and 86 are over exploited. State dependence on ground water is 91% for drinking water. About 21,190 villages/habitations suffer from the problem of excessive salinity, 23,297 villages/habitations suffer from excess fluoride problem and 20,659 villages/habitations suffer from excess nitrate problem (Khanna, Rahore, 2008). Based on the WHO guidelines for drinking water quality about 56% of the water sources are un-potable.

While the overall stage of groundwater development in India is 58%, Rajasthan has already reached 125 to 135%. Groundwater being the primary source of fresh water in Rajasthan, consumption is faster than it is naturally replenished. This is causing serious decline in Water tables (Sharma, 2009). The effects of drought on health include deaths, malnutrition (under nutrition, protein-energy malnutrition and/or micro nutrient deficiencies), infectious diseases and respiratory diseases (Menne and Bertollini, 2000). Drought diminishes dietary diversity and reduces overall food consumption, and may therefore lead to micro nutrient deficiencies. A study in southern Africa suggests that HIV/AIDS amplifies the effect of drought on nutrition (Mason et al., 2005). Malnutrition increases the risk both of acquiring and of dying from an infectious disease. A study in Bangladesh found that, drought and lack of food were associated with an increased risk of mortality from a diarrhoeal illness (Aziz et al., 1990).

According to a study on micro nutrient deficiency status among women of desert areas of western Rajasthan published in Public Health Nutrition Journal (2008) found majority of the women (85%) anaemic. Anaemia was higher among pregnant and lactating women (80.7 %). Consumption of pulses and legumes was low besides leafy vegetables. Average intake of nutrients showed deficiency of protein and energy, iron and folic acid and vitamin A deficiency. Anaemia and iodine deficiency disorder were found to be inversely proportional to education and income. Studies in desert based rural populations in Rajasthan have consistently shows high prevalence of hypertension. National Family Health Survey, 1998-99, IIPS shows that percentage of women having anaemia in Rajasthan is around 50% and percentage of children having anaemia is as high as 80%. The reports from Central Bureau of Health Intelligence



(2000-2001) tells that the infant mortality rate of Rajasthan (79%) is much higher than the national average(66%).

In the context of National Population Policy, 2000 goal of 90 percent institutional deliveries, availability of labour room is a critical facility for the PHC. However, only half of the PHCs in Rajasthan have a labour room. In PHCs where women are expected to get services like antenatal and postnatal checkups, delivery, sterilization, and abortion the need of at least trained human resource is crucial.

With limited resources, often raised by mortgaging assets, when drought hit communities seek medical assistance the poor infrastructure at government facilities, absenteeism among health staff, non-functioning equipments drive them to seek services from private practitioners. This collectively raises the cost of treatment and makes it a luxury commodity not to be availed by every member of the family; rather it's rationed with working men and children receiving the priority.

Keeping above context in view, the Community-led Drought Mitigation Project in Thar (CDMT) was implemented by Gramin Vikas Vigyan Samiti (GRAVIS) and MISEREOR to attain a common goal of mitigating drought and consequently poverty in the most remote areas of Phalsoond region of Jaisalmer district through enhanced water and food security, empowering women, improving health and hygiene and capacity building.

1.1 Purpose of the study

This research study seeks to establish linkages between the drought mitigation activities led by the community and their direct or indirect impact on community health. Drought inevitably has short term and long term implications on human health and assessing its linkages with drought mitigation activities can be a key for the better preparedness in future during drought prone seasons. Since the project attempted to address drought mitigation through a holistic approach involving water security, food security, capacity building of community leaders, awareness generation on health issues, advocacy at policy level; it's absolutely pertinent to assess the efficacy and impact of all these interventions for improving health and hygiene. The findings of research are significant to identify best practices for replication and scaling up in other drought hit areas of Rajasthan.

1.2 Background

The project area *Phalsund* Panchayat, is situated in south eastern part of *Pokharan* Block, *Jaisalmer* District, which is a part of the Great Indian Thar Desert. The terrain around, within a radius of about 60 kms is stony and rocky. The underground water level is very low and there is no perennial river in the district. The CDMT project covered 2,100 households comprising of about 12,000 population spread across 12 villages namely *Shyampura*, *Danasar*, *Parvatsar*, *Prabhupura*, *Padampura*, *Sohanpura*, *Jethnagar*, *Pirasar*, *Manasar*, *Khumarsar*, *Bhujgarh* and *Netasar* of the total population covered around 10% population belonged to SC/ST or other



backward classes. The direct benefited beneficiaries were about 2,000 by physical intervention and around 10,000 indirect beneficiaries benefited by the processes of capacity building, training and other community-level interventions. Direct beneficiaries mainly comprise of socially marginalized groups including scheduled castes, scheduled tribes and minorities and great focus was laid on benefiting women.

To achieve the overall goal of the CDMT project following objectives were affirmed:

- a. Enhance water security through construction of rainwater harvesting structures and through imparting trainings on water conservation.
- b. Increase availability of food in the project region through promoting rain-fed agriculture, horticulture and seed conservation.
- c. Increase the family income and secure the livelihood of the village inhabitants.
- d. Improve the status of health and hygiene through health education and service delivery.
- e. Advocate for sustainable and long-term drought mitigation through women self help groups, village development committees taking part in networking and dialogues at block/district/state level.

1.3 Scope of study

This study attempts to analyze and correlate responses from the project beneficiaries, service providers and community based structures broadly on the criteria of efficacy/linkage, impact, sustainability and best practices.

Efficacy : This will measure the extent to which an activity has achieved its objectives. How beneficiaries were socio-economically affected by drought, what was their coping mechanism, awareness level, health seeking behavior before and after the implementation of CDMT project respectively?

Impact : The positive or negative effects resulting from the development intervention activity of the project. What has happened as a result of the project? What real difference has the activity made to the beneficiary? What was the impact of these interventions on their daily living and improved health?

Sustainability : This will measure whether the benefits of the activity will continue even after the project period is over. Have the beneficiaries acquired ownership or participated in the health related activities of the project? What is the role of GRAVIS, stakeholders and local institutions in continuing the activities and how can the project activities can get integrated with existing government systems?

Best Practices : The CDMT project had implemented innovative practices, systems or mechanism of management. How we can formally establish that the benefit received by the community / stakeholder is attributed to that particular innovation. The lessons learned from the implementation of the project would help in improving future course of action.



2. METHODOLOGY

The research methodologies used for the study were in-depth interviews and focus group discussions with key categories of respondents beneficiaries, service providers and community based structures. The beneficiaries group comprised of the head of the household (men /women) who received services from CDMT project within one year. The service provider comprises of Village Health Workers from the CDMT project and Auxiliary Nurse Midwife from the project area respectively.

The community based structure consisted of the Village Development Committee and Self Help Group of women, formed under the project respectively. Detailed interview and focus group discussion guides were initially developed in English and then translated into Hindi.

2.1 Approach

These guides focused on the following general themes:

- * Affect of drought & practices after drought mitigation activities : Preferences and practices during and after drought mitigation CDMT project interventions and its affect on water security, agriculture, daily living, hygiene, livelihood and health. Common disease during drought, access to health care, knowledge about services provided, health seeking behavior, their utilization, impact and demand among beneficiaries. Financial implication due to illness.
- * Social support and sustainability : Identifying source of information, knowledge about government run welfare schemes, role of community based structures such as village development committee, women self help groups and sustainability of these initiatives.

2.2 Sampling

- * To collect the data focus group discussions and in-depth interviews were conducted in 6 villages. The villages were selected through purposive sampling. A script for focus group discussion and in depth interview was prepared in conformation with the scope of the study. To corroborate the activities of the project over a period of time with respect to health services, desk review was done by reviewing monthly performance reports, case studies, meeting with key informants and NGO staff.

A total of 6 focus group discussions and 12 in-depth interviews were conducted:

Target Group	Sample Size @ Village	Total Sample Size
Beneficiaries Men & Women	1 Focus Group Discussion @ Village	6 Focus Group Discussion (3 Men, 3 Women)
Service Providers Village Health Workers ANM at PHC/SC	3 In-depth Interview @ 3 Village 3 In-depth Interview @ 3 Village	6 In-depth Interview
Community Structures Village Development Committee Self Help Groups	3 In-depth Interview @ 3 Village 3 In-depth Interview @ 3 Village	6 In-depth Interview



3. RESEARCH FINDINGS

3.1 Effect of drought and practices after drought mitigation activities :

Drought is a recurrent phenomenon and is characterized by chronic poverty due to paucity of water, poor agriculture produce leading to food insecurity, insufficient diet leading to malnutrition, poor health status, conflict over shared water resources, migration to other places and debt on account of expenditure of running household and paying for private health services.

A) Water security : Poor water resource management → Unhygienic practices → High out of pocket expenditure for securing drinking water

With the persistent drought conditions, water is available in low quantity and the collection of water become challenging task. That is often carried by women. The villages where government ground level water reservoir is available, the women have to travel 1km to 5 km to collect water. But in some villages its as far as 10-15kms. In most of the cases, the women take the help of camel cart water tanker that carries water to their homes and charges enormous amount of money from them. The amount varies from Rs 500 to Rs 1,000 depending upon the distance travelled by the cart.

Taanka is constructed in a circular or rectangular shape, normally on bare ground where surface runoff can be diverted to the *taanka* by creating a clean catchment around it. Women group share that “a traditional *taanka* constructed with lime plaster and thatched with bushes has a life span of 3-4 years. With the decomposition of brush wood, falling of leach ate and entry of foreign material sometimes reptiles and cattle fall in through the covered thorny bushes”. During one of the focus group discussion with women beneficiaries, the respondents said “we have no option but to drink water from the *taanka*. If goat or sheep falls into the *taanka* we stop consuming water for drinking purpose”. If the *taanka* is contaminated by dung of some animal, falling of birds, reptiles; people continue to use water from the same source as the water from the government supply is not enough. Participants showed concern about the unhygienic condition of *taanka* as it's highly prone to breeding of mosquitoes leading to malaria.

The ANM and Village Health Workers shared that the consumption of water from open *taanka* lead to frequent outbreak of vomiting, diarrhea and stomach ache among children in the drought hit villages. Kesar Bai, one of the respondent shared that most of the villagers filter water with the help of cotton sieve and use it for drinking purpose. “We don't boil the water; just sieve it through cotton when we see any reptile or small birds in the *taanka*”. Women respondents said that mostly they are the one who come to know about such contamination as they only fetch water for consumption.



Traditional *taanka* covered with thorny bushes.



They take help of men in the household to clean the dead body of animals from the *taanka*. “We usually avoid sending elderly people and children close to the *taanka* as its risky”. Since construction of concrete tanks is expensive, a cost effective way is to share. But due to high cost of construction involved, casteism and severe paucity of water, people in Thar avoid sharing water resources. In times of severe drought there are two ways villager gets water by tractor tankers: free supplies from Government agencies or procure tanker on payment. One government tanker supply is sufficient for a cluster of 20-30 households for a week. Procuring water from private tankers costs on an average of Rs 800 and can go upto Rs 1,000.

Construction of *taanka* : Improved water security → Training and awareness on hygienic practices → Increased supply of drinking water → Less vulnerability to water borne diseases → Less financial burden due to improved water security & improved health

GRAVIS sponsored construction of pakka *taanka* for the below poverty line beneficiaries. For selection of a needy beneficiary belonging to below poverty line, the decision was taken by the village development committee constituted under the CDMT project to ensure effective implementation. The VDC were given guidelines to identify the neediest and criteria were laid down to administer such selection. The family, who has no source of water within nearby 1.5 km area, has been selected by VDC.

A concrete *taanka* provides clean drinking water for 4-8 months in a year. Ensures taste, cleanliness and quality of water and thus prevents water borne diseases. Prevents people from drinking saline water and saves money and time spent on fetching water. Respondents said that under the project they received information on how to keep the *taanka* clean, “Now we know that bleaching powder and Temphos are water disinfectants and help clean the stored water from mosquitoes and thereby malaria”.



Pakka Taanka after GRAVIS' intervention

One of the interviewed ANM asserted that they have been given training on the exact quantity and measure of disinfectants to administer. She shared that “The Temphos should be sprinkled around the periphery of the *taanka* and water from that sources should be consumed only after half an hour”. However, she also said that most of the time “We are scared while administering the disinfectants because the shady covers of *taanka* have poisonous reptiles and there is a risk of falling in the *taanka* as there is no boundary wall. Therefore, we couldn't administer it the way it should be due to occupational hazard. Ideally we have to sprinkle disinfectants in 60 *taanka* per week, but we could do only 15”. ANM shared that “due to raised awareness now the people themselves come to us and ask for the disinfectants. We tell them the exact measure because administering unequal amount of Tempohos can cause vomiting



and dysentery on consumption of water from the *taanka*". After the awareness drive from GRAVIS some of the women shared that now they know boiled water is safe for drinking and Alum is used to purify water before consumption.

B) Agriculture and livestock : Low productivity in agriculture → Limited dairy/ food availability → Low nutrition → Prone to deficiency diseases

Phalsund is a rural area with agriculture as main occupation. The majority of the participant for the group discussion comprised of the farmers or daily wage labourers who keep livestock as a means of livelihood. The respondents revealed that with the persistent drought conditions, water is available in low quantity and at first destroys the crops and makes livestock vulnerable. In dry season, stormy sand winds leads to depletion of the soil and the sowed seeds are also wasted in the process. Participants from the discussion revealed that due to scarcity of water, there is less agriculture produce and fodder for the cattle. The situation becomes so bad that the farmers either have to buy fodder from other places paying exorbitant amount or sell away their livestock due to unavailability of fodder and water.

Participants asserted that crops are wasted during drought, milk producing animals don't produce any yield, the villagers have to shell extra money to meet the daily food requirement for which they either reduce the amount of food intake. Some of the women respondents asserted that poor dietary intake often leads to malnutrition among children, pregnant and lactating women apart from aged. Limited availability of dairy products, green leafy vegetables, grains often devoid the Thar residents of the essential nutrients in their diet.

Construction of *khadin* (Ghora Paali) : Improved water retention in fields → More yield → Availability of fodder → Better livestock management → Availability of dairy products → Improved nutrition → Improved health status

Khadin is a runoff based farming system constructed for individuals or a group of farmers. The run-off from a large catchment is intercepted against a 2-3 meter high wall and crops are raised in the run-on area. The shape and size of a *khadin* depends on average rainfall, catchment area, slope and soil type. Respondents from the beneficiaries groups praised the initiative "*khadin* improved the fertility of the soil due to water retention and therefore we can produce more fodder for the cattle". The respondents shared the trainings organized by GRAVIS for farmers were of immense use and it was mentioned in several group discussions. The respondents found the training was helpful in learning the correct technique of farming and appropriate timing of doing so. The information about storing fodder for livestock was also appreciated by the farmers' respondents.

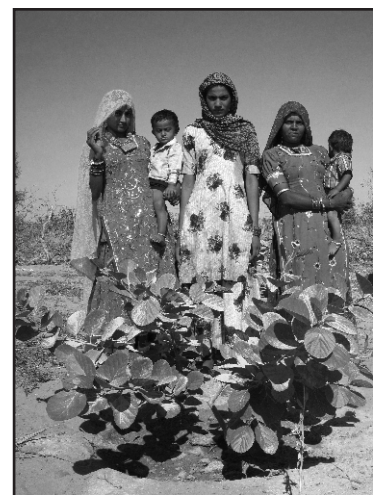
Horticulture units and Seed banks : Low water consumption technique 'pitcher system' In-house Source of food for household consumption → Less expenditure on buying seeds, vegetables, fruits → Food security → Improved nutrition → Improved health



RESEARCH FINDINGS

In the current project, the beneficiaries were selected by the discretion of VDC preferably from the below poverty line, backward and marginalized income group with limited income and water resources. Under this intervention, GRAVIS distributed 20 plants to those people who have limited source of water. Beneficiaries were helped in setting up of a plot near their house and its fenced with wire mesh with the use of stone slabs to protect the unit from entering children and grazing animals. To irrigate the plants, pitcher drip system was introduced in the horticulture unit to ensure plants gets adequate moisture. However, some respondents shared that they have removed the pitcher from their horticulture units because of the termites. Participants shared that from the 20 grafts they received, around 15-18 grafts survive the dry winds and arid climatic conditions.

Respondents received the grafts of fruits and vegetables like Pomegranate, Berry, Gum and Eggplant for plantation in their horticulture unit. These plants give fruit within six months after plantation making fruits and vegetables available for the household to make curry, pickle and sauce for edible use. The yield from the horticulture unit is used for the daily cooking meals. Apart from improvising the horticulture units, seed banks were also established by GRAVIS. Good quality seeds of locally grown crops such as pearl-millet, mustard, barley and moth are stored in the seed bank. These seed banks avoid the rush and expenses the farmers would otherwise make in the search of seeds. The CBOs, especially SHGS, maintain the banks.



Horticulture unit

Renovation of *Naadis*: Desilting of *naadis* → Source of employment → Natural source of water water availability for daily use and livestock → Less dependency on artificial source of water (tankers) etc.

Naadi or digout village pond is an oldest and still prevalent rainwater harvesting and water storage structure in Rajasthan. *Naadi* also act as source to groundwater recharge through seepage and deep percolation. The stored water in *naadi* is generally used for drinking by human and livestock. The site was selected by the villagers based on an available natural catchments and its water yield potential. Water availability from *naadi* would range from two months to a year after the rains. Many villages were originally established near areas that could easily be made into a *naadi*, which would often serve as the only source of drinking water. GRAVIS works continuously to revive the *naadis* by promoting the desilting and repairing of old *naadis*, as well as the construction of new *naadis* where possible with the help of VDC. In some of the villages *Panchayat* also starts renovation of *naadi* through the help of MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act), where the villagers working as labour for the renovation of *naadi* gets 100 days employment.



C) Water consumption for daily use: Poor hygiene and sanitation conditions

As stated in previous sections, in the event of unhygienic condition of *taanka* and scarcity of water, consumption of water from the private tankers comes with a price. This forces the person of Thar to judiciously use water for survival first and then for basic hygiene practices such as bathing, washing clothes and sanitation. For every liter of water used there is a cost associated and with the above stated condition of water insecurity, poor agriculture yield and depleting livestock health, hygiene and sanitation takes a back seat. Almost all the respondents agreed that normally a Thar resident takes bath as well as washes clothes once a week. Sometimes due to severe scarcity of water the clothes are washed once in 15 days. Even within the household the water is allocated with the preset priorities. For cooking food, the soft water is used while for bathing, washing clothes and washing cattles, hard water is used. To improve the efficiency of water usage within the household “people stand in a tub while taking bath, so that the water collected beneath can be used for cattle for drinking and for washing clothes etc”.

The discussion with the female group members revealed that they are well aware of the adverse effect of drinking contaminated water for drinking and cooking food but the scarcity of water is so severe that they are often left with no choice. Women groups were worried that since the source of water is generally a *taanka* which is open, its prone to defecation from the domestic animals.

The women group revealed that itching is the most common disease among children. Due to lack of water, the basic sanitation practices are compromised in Thar and therefore, urinary tract infections are common among women of reproductive age group apart from other sexually transmitted diseases. The women beneficiaries group revealed that most often they receive complaint from children for having stomach ache, skin allergy, diarrhea, and cramps in abdominal areas among others. The dryness of the skin can also be attributed to the lack of fluid in the body and limited quantity of water and fluid intake.

Awareness generation on safe hygienic practices : Promotion of clean hygienic practice like purification of water boiling, use of alum → Hygienic practices like washing hands before having food minimize intake of contaminated water or food → Less vulnerability to water borne diseases less morbidity → Improved health

The availability of water for cleaning, sanitation, and hygiene is directly linked to the reduction or control of numerous diseases. Drought conditions create the need to conserve water, but these conservation efforts should not hinder proper sanitation and hygiene. People may feel the need to conserve water in ways that can increase health risks, such as reducing or eliminating hand washing. Personal hygiene, cleaning, hand washing, and washing of fruits and vegetables can be done in a way that conserves water, while at the same time continues to promote these healthy behaviors.



The VDC group members shared that they have organized sessions for keeping the source of water clean by the use of alum, keeping it covered with a lid, boiling water before consumption and not to use water for drinking from *taanka* after reptiles/animals fall into it. As part of drought mitigation intervention, the beneficiaries were educated to keep their water source clean by constructing a fence around the *taanka*. This helped the water source being safe from defecation of livestock.

After the awareness generation drives, beneficiaries ensure that the water source is kept clean and away from cattle. The women folks were well aware of the hygienic practices they should follow but expressed their inability to do so because it tends to increase their water consumption and ultimately expenditure in procuring water. This increased expenditure is often linked to increased debt from the local money lender for procuring water and for attending illness episodes in the family.

D) Livelihood : Migration, Unemployment

Unemployment, starvation and shortage of drinking water goes hand in hand at the time of drought crisis. The adverse shift in income does not take place only because of the rise in food prices but also because drought destroys employment. Depending on when the rains fail, droughts abort the production cycle in agriculture. A partial failure aborts subsequent operations such as transplanting, harvesting, threshing, winnowing, transport and marketing. All these result in a fall in rural employment. For the rural landless folks drought spells starvation as they live each day on their earnings of the previous days. Drought disrupts this daily cash flow. Loss of livelihood that is caused due to drought, loss of agriculture, livestock results in large scale migration in the Thar region.

Although many of the folks work in stone mines on daily wages, a significant number of them migrate to the far of places in search of employment. People generally migrate to industries in Jodhpur to work on daily wage labours leaving their family behind in the village or sometimes they migrate to neighbouring states like Punjab, Haryana and Gujarat in search of employment. The men folks shared during the discussion that the earning members migrate to Jodhpur, Ganga Nagar, Soorat, Ahmedabad, Pune, Mumbai, Punjab or Haryana often at meager wages insufficient to address the needs of a family. Working as migrant labour in the industries away from partner for long duration, often make the male members of the family susceptible to HIV/AIDS and back home women are at a risk of getting infected.

Livelihood creation: Renovation of traditional water structures → Linkage with NREGA → Lesser migration → Consistent source of income apart from agriculture → Financial stability → Food security → Better health

To be effective in reducing the vulnerability of rural communities, especially in the times of disasters, it is vital that people have the capacity to take up livelihoods and provide sufficient



income and allow at least a little to be saved on a regular basis. Though GRAVIS drought mitigation activities towards construction of water bodies do employ local folks but its not enough. Even under the under NREGA there is limited work for people to get employment. Reason being the unemployment is very high due to limited opportunities.

However, the construction of *khadin* has increased the wages option for the community. Approximately 35 - 40 people got the wages at each *khadin*. Under MNREGA, 100 days of guaranteed employment is given to beneficiaries belonging to below poverty line. Those who want employment get registered and are given a card which checked off whenever they work. Workers are paid minimum wage of the state in which they live, with equal pay for men and women for equal work. Local government officials run the scheme and the Act demands a separated village monitoring committee. However, it is open to corruption; as people do not know their rights, many don't get their full allowance. GRAVIS informs people of their rights and entitlements under the government welfare scheme and link eligible folks with such development projects.

E) Health status in drought hit areas : Exposure to contaminated water → High susceptibility to water borne diseases → Poor nutritional intake → High morbidity → Poor health seeking behaviour → Poor health status

Withstanding the water crisis throughout drought period, the residents of Thar are prone to the dual burden of diseases. Firstly consumption of contaminated water results in frequent illness due to water borne communicable diseases. Secondly, food insecurity aggravates poor dietary intake leading to nutritional deficiency and malnutrition. Further, adequate food intake alone does not ensure nutritional status. Illness episodes, severity and duration of illness, treatment received, and care during and after the illness episode all these exercise an interrelated effect on health status. Because of undernourishment, recovery from illness becomes a longer process.

Despite the prevailing higher levels of morbidity and under-nutrition among women, they receive less health care than men do. Gender discrimination in food allocation and health go hand in hand and tend to reinforce each other. Women's use of health care services is determined by (i) the need, i.e., the extent of ill health among women; (ii) permission, i.e., social factors that condition women's chances of seeking health care outside the home; (iii) ability, i.e., economic factors involved in meeting the costs of health services, and the opportunity cost involved; and (iv) availability, i.e., the extent to which health services are available for women (John, Lalita 1995).

Morbidity status : During the times of drought the most common diseases or symptoms among children are pneumonia, jaundice, diarrhea, malaria, itching, gastrointestinal infections, malnutrition and vomiting. ANM members shared that children comes in contact



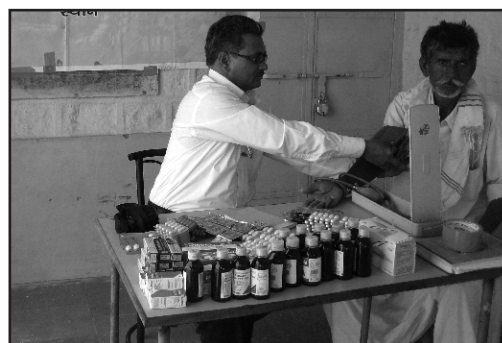
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with the contaminated water more often while taking bath or playing and get skin infections very easily as their skin is very sensitive. Within minutes to days after using contaminated



heart has become strong like a stone”. This is quoted during one of the discussion with self help group members explaining the dilemma a women has to go through in Thar region often neglecting her health and comfort for the family. The excessive burden of completing the household work and securing water to attend basic needs often leads to anxiety, fear, fatigue, weakness and malnutrition.

Access and availability to healthcare services : Rajasthan is one of the biggest states in terms of geographical area and have population density of 165 persons/km², which is almost half of the national average of 364 persons/km². This means irrespective of the availability of healthcare providers in Thar region, a person has to travel longer distance as compared to other parts of the country to access basic healthcare services. This is marred by vacant positions in nearest SC/PHC/CHC.



Medical Camp

After the accessibility issue, comes the issue of availability of adequate materials and human resource at these facilities. Frequent staff turnover, vacant positions, absenteeism among available staff and establishment of private practices work as obstacles for delivery of free health care services to the residents of Thar. In the context of setting priority for seeking health care almost all the groups came on the consensus that first preference is given to children followed by earning male member, older men/women and at last women in the household, respectively. Women, ANM and SHG members asserted that it's pertinent to do so because of resource constraints. Further, respondents shared that from their village the sub-centre doesn't function because there is no ANM so they have to travel to the primary health centre at Chabba which is 12-16 kilometers. For secondary services, they have to go to Phalsund community health centre at a distance of 20-25 kilometers from their village respectively. For seeking tertiary medical care, residents travel all the way to 160 kms to Ummed Government Hospital or Mathuradas Mathur Hospital, Jodhpur respectively. All the respondents during discussion demanded the need for a dedicated village level health care provider so that the preventive health care needs such as ANC, immunization, common infection are addressed on regular basis.

Choosing healthcare provider : The discussion on choosing the healthcare provider revealed that irrespective of debt and high out of pocket expenditure, people prefer Private Medical Practitioners (PMP). All the respondents showed great mistrust in the quality of treatment offered at government PHC or CHC. Even when they visited government facilities, they would hardly find the doctor. So, they prefer to go to the residence of the doctor, where doctors mostly see patients for a fee. Those coming from remote villages said that since they had to return home, they preferred to go to private practitioners instead. It was mentioned at



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most of the discussions that, the attitude of the doctors posted at the government institutions was not very sympathetic during duty hours. Similar perceptions were shared regarding the Para-medical staff posted in the remote villages, as well as the PHC and CHC villages. However, after duty hours, the doctors continue to see patients at their private clinics for a fee, during which, their attitude towards the patients is more sympathetic.

This was also true during the home visits of doctors in the CHC and PHC villages and of the Para-medical staff in the sub-centre villages and villages without any health facilities. In some of the remote villages, the female participants reported that some ANMs charged them for supervising delivery at home. Another reason for the popularity of PMPs is their sympathetic attitude towards the patients, and their willingness to listen to the patients, and in some cases, deferring of the payment to a later date, a facility not available in the case of government health services.

Financial burden due to illness episodes : The frequent bout of infection among children, maternal treatment for women and general illness among men approximately costs between Rs 15,000 to Rs 20,000 (USD 300 -400). This money was often given by a money lender with as high as 25% rate of interest. The majority of the expenditure in this allocation goes only in transportation as the working facilities are located far from the hamlets, followed by purchasing medicine, OPD fees among others. For an occurrence of disease at least Rs 500 (USD 10) are shelled by a Thar resident.

Preventive & curative services : Organizing health camps at village → Appointment of VHW, training → Improved access to basic Primary Health Care → Awareness generation → Informed community → Better health Seeking Behaviour → Safe Practices.

Village health workers : The demand for dedicated village personnel trained in preventive health services is made evident during the discussions. The concept of VHW is widely popular throughout the CDMT project area as it has immensely helped the residents to attend their health needs. These VHWs were selected with the help of VDC. To address the need of an additional local support for the community to provide basic health services and educate the community on preventive aspects of health care, GRAVIS has organized training workshops for village health workers. The VHW were trained to generate awareness on immunization, hygiene and sanitation, common diseases, nutrition, women and children's health issues and family planning. Among the VHWs, few were trained as traditional birth attendant (TBA) as the maternal health is worst hit in the project area. These TBAs have received training on various safety measures, ensuring early initiation of breast feeding (colostrum) and proper post natal care to reduce chances of obstetric infections. The services are provided free of cost with available treatment for first aid and minor illnesses.

Special emphasis is given on educating the village residents on preventive care like safe drinking water, hygiene of self/water/food, sanitation, motivation to complete immunization



routine and ante natal checkups. While majority of the respondents were satisfied with the services of VHW, few of them shared their concerns; like absenteeism and non-replenishment of medical kits. There were also suggestions to train more village health workers, in case the existing worker is not able to perform.

Health camps : The discussions across all the groups appreciated the initiative of organizing free health camps near the village. The availability of VHC attended the basic needs and referred the patients to attend the medical camp for further treatment. The availability of a doctor without having to spend on transport is most liked facility among all the respondents. Though, ANM provides iron and folic acid tablets along with nutritional supplements and during the health camps women were encouraged to undergo antenatal checkups.



GRAVIS Hospital

However, there was a great demand among the participants that the health camps should be organized every month or frequently as per seasonal diseases with free distribution of full course of medicine. On the continuity of health camps by GRAVIS, there was a mixed reaction. While some said a basic user fee can be charged for continuing services on regular basis, majority felt that it should be completely free at higher frequency with distribution of full course of medicines, even for higher order diseases like cancer, TB etc.

Linkage with Self Help Groups : The SHGs formed under CDMT projects received a positive response. The SHGs had given a platform for women to come together and become financially viable through monthly collections. Also, the SHGs were found supportive for discussion of women's health and other domestic issues. Now, group members have started mobilizing village women to access health services and in case they face any problems, the group members take action to ensure that services are available. She shared few examples



VHW training

where the group members have raised issues with the service providers. She recommended that the experience of working with SHGs is positive and they can monitor women's access to services and function as a support group at the village level. During the discussion with Chamunda SHG, Padampura Village it was revealed that they had given loan for a women to get treated. Few others received loans from SHGs to start petty shops for livelihood.



Awareness about government schemes & entitlements : The CDMT project had acted as a convergent agent in bringing together the synergy between the existing health systems and inducing new personnel through VDC, SHG, and VHW as community monitors. The collective efforts made for bridging the critical gaps in health services like availability, access and affordability contribute to a family's overall well being by reducing financial burden among others. When asked about the institutional delivery, majority of the women as well as men mentioned about the *Janani Suraksha Yojana*. This government scheme gives financial incentives for delivering in government institutions and has led to substantial increase in the proportion of institutional deliveries. However, a few men folks were unhappy as the cheque is given in the name of women, who most of the times don't own a account. Thereby, delay in receiving payment.

3.2 Sustainability of Drought Mitigation Activities

Most of the districts in Rajasthan are prone to recurrent drought and it needs a cohesive effort at all the administrative level to contain its adverse consequence. The management of drought programmes often requires a lot of resources as it impact natural resources and have serious socio-economic and health implication on the community. In resource constraint settings largely dependent on agriculture, it's absolutely necessary to lay attention on the sustainability of drought mitigation activities taken up by government or non-government organizations. This implies that efforts should be made to ensure that the institutions supported through projects and the benefits realized are maintained and continue after the end of the project.

To sustain initiatives for mitigating drought, ownership should lie with the community. In the CDMT project, when respondents were asked about the sustainability of GRAVIS supported initiatives, a large majority expressed the need for continuum. With the social security net laid out by CDMT project, the respondents were confident than ever to cope with the adverse affects of drought. With formation of VDC under CDMT project, GRAVIS promoted accountability and decision making for key issues in the times of crisis. The representation of women, marginalized castes and backward community demonstrated a democratic body with no vested interest. Most importantly, the representation of backward classes ensured the beneficiaries chosen to receive financial or in-kind support belong to below poverty line.

Women SHG formed under the project gave a sense of financial stability and life skills to manage crisis situations. The usefulness of vocational training provided by Dr S S Kalla in livestock management was recognized during the discussions. The capacity building of women over training in health, hygiene, financial literacy, monitoring programmes and liaisoning with panchayat members were found pertinent. This involved awareness about government



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schemes too for utilizing existing resources in the system.

The issue of continuity of project after exit of CDMT project received mixed response specific to the services. For the health services like deployment of VHW and organizing health camps, all the groups came on a consensus that they should continue. While there was a disagreement over the idea of introducing nominal user charge. Surprisingly, women groups expressed the need to introduce small charge unlikely men group who insisted for free camps. Some discussions revolved around the continuity of VHW and how they can be incentivized. This demonstrates the sense of ownership and pertinence of the introduced concept. For monitoring, facilitation and networking with Panchayat and government officials GRAVIS holds a key position in the community.



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4. LESSONS LEARNED & RECOMMENDATIONS

Drought is a slow-rise event that can affect any area of the country at any time. Unlike some natural disasters that occur unexpectedly and necessitate intense public health response activities (like earthquakes and hurricanes), drought is a condition that can be anticipated well before it becomes a threat to the health of a community. Both preparing for and responding to drought require local, block, district and state public health professionals to work collaboratively with other stakeholders and to communicate effectively with the communities they serve.

While the state is responsible to devise prudent policies and action for mitigating the impact of drought through early response and monitoring system, it's equally pertinent to take charge of best practices at the community level on a continuous basis. This study has helped us to identify those linkages which can be strengthened for improving health status of the community vulnerable to drought.

- a) Training traditional health workers from community
- b) Health camps with the contributions from the community
- c) Incentivizing village health workers
- d) Community Kitchens
- e) Nutrition Care Centres
- f) Children's Club: For awareness generation and health promotion
- g) Health Insurance (Rashtriya Swasthya Bima Yojna)
- h) Linkage with 108 Mobile Vans:
- i) Developing indigenous livelihood options
- j) Advocacy at district level for functioning of health facilities
- k) Registration of Village Development Committees



An analytical view of recommendations

Areas of Intervention	Key Performance Indicators		Linkages With Health Status		
	Before Intervention	After CDMT Intervention	Efficacy	Impact	
Water Security	<ul style="list-style-type: none"> -Debts on households for procuring water -Percentage of households without safe drinking-water supply 	<ul style="list-style-type: none"> -Expenditure on water and sanitation improvements -Number of un-served households provided with clean water supply per year 	<ul style="list-style-type: none"> -Equipping households to ensure water security through construction of <i>Taanka</i>, renovation of <i>Naadi</i> etc. -Awareness on water borne diseases and their prevention -Saving on out of pocket expenditure on private source of drinking water (<i>tanfers</i>) 	<ul style="list-style-type: none"> - Discontinue use of contaminated water for drinking from <i>taanka</i> -Administering water purification techniques like boiling water, use of disinfectants, boiling, alum etc. 	<ul style="list-style-type: none"> - Training to household members on safe drinking water practices - Promote use of water conservation -Co-funding model to promote construction of water bodies
Agriculture and Livestock	<ul style="list-style-type: none"> -Compromised food and nutrition due to poor agriculture yield 	<ul style="list-style-type: none"> -Infrastructure development and exposure of farmer to good practices of agriculture with water conservation 	<ul style="list-style-type: none"> -Awareness about nutrition deficiency diseases -Selection of crops with high yield and high nutrition value -Construction of <i>Khadin</i> leads to better livestock survival rate, better fodder production 	<ul style="list-style-type: none"> -In house production of fruits and vegetables for improved nutrition of beneficiaries - Higher yield from fields and livestock (dairy products) -Improved food security during drought 	<ul style="list-style-type: none"> -Training on horticulture units and development of seed bank -Exposure to best practices by specialists
Hygiene and Sanitation	<ul style="list-style-type: none"> -Lack of information on communicable diseases, hygiene, reproductive health 	<ul style="list-style-type: none"> -Education and training of community on preventive aspects of healthcare and hygiene 	<ul style="list-style-type: none"> -Awareness about consumption from hygienic water source, hand washing, cleaning -Methods for water purification 	<ul style="list-style-type: none"> -Increased demand among beneficiaries for Tempohos, Bleaching Powder and Alum 	<ul style="list-style-type: none"> -Training on preventive health measures -Simple practices to safe water consumption
Livelihood	<ul style="list-style-type: none"> -Probability of migration due to lack of employment 	<ul style="list-style-type: none"> -Availability of water for self and livestock leads to retention, no loss of wages 	<ul style="list-style-type: none"> -Renovation of water bodies leading to employment generation -Locally available source of income without migration leading to stable health -Awareness about MNREGA 	<ul style="list-style-type: none"> -Curb in forced migration, thereby, lesser vulnerability of family members otherwise left alone in drought hit areas -Aggression towards efficient implementation of MNREGA scheme 	<ul style="list-style-type: none"> -Creation of local employment avenues - Awareness generation about the existing government schemes



LESSONS LEARNED & RECOMMENDATIONS

Areas of Intervention	Key Performance Indicators		Linkages With Health Status		
	Before Intervention	After CDMT Intervention	Efficacy	Impact	Sustainability
Health Status	-Unmet need of health services due to distance, low affordability if close, low knowledge	-Improved health seeking behavior -Number of beneficiaries attended health camps -Received immunization, ANC - Number of village health workers trained	- Access to healthcare through organizing health camps in the Dhanis (village hamlets), saving on transportation cost -Affordable healthcare due to 'all free services', saving on out of pocket expenditure on private services	-Increased demand for village health worker among community -Dissatisfaction for those who don't provide good services -Demand for more camps covering more villages, higher frequency	-Village health worker chosen from the local village to address immediate health needs - Demand from respondents for placement of well trained personnel (some places) -No incentives (low)
Social/Community Development Structures	-Absence of coping mechanism system leading to financial instability	-Role of active village development committee Status of self help group	-Constitution of Village Development Committees	- Facilitates selection of beneficiaries	- The VDC are not registered (low) - SHGs are registered (high)

Efficacy : The efficacy measures the extent to which an activity attains its objectives. The effectiveness of interventions which improved the awareness level of beneficiaries.

Impact : The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. The change in practice

Sustainability : Sustainability is concerned with measuring whether the benefits of an activity are likely to continue after the funding agency has been withdrawn. The project activities need to be environmentally and financially sustainable.



5. ABBREVIATIONS

ANM	AUXILIARY NURSE & MIDWIFE
CBOs	COMMUNITY BASED ORGANISATION
CDMT	COMMUNITY LED DROUGHT MITIGATION PROJECT IN THAR
CHC	COMMUNITY HEALTH CENTRE
FGD	FOCUS GROUP DISCUSSION
GRAVIS	GRAMIN VIKAS VIGYAN SAMITI
MGNERGA	MAHATMA GANDHI NATIONAL RURAL EMPLOYMENT GURANTEE ACT
PHC	PRIMARY HEALTH CENTRE
PMP	PRIVATE MEDICAL PRACTITIONERS
SHG	SELF HELP GROUP
TBA	TRADITIONAL BIRTH ATTENDANT
VDC	VILLAGE DEVELOPMENT COMMITTEE
VHW	VILLAGE HEALTH WORKERS



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Gramin Vikas Vigyan Samiti (GRAVIS) or Center of People's Science for Rural Development is a non-governmental, voluntary organization that takes a Gandhian approach to rural development by working with the poor of the Thar Desert to enable them to help themselves. Since its inception in 1983, GRAVIS has worked with over 55,000 desert families across over 1,000 villages in Rajasthan reaching a population of over 1 million, and has established over 2,500 Community Based Organizations (CBOs). Through its dedicated field work, as well as its research and publications, GRAVIS has come to occupy a leading position amongst the voluntary organizations in the region.