

Social Inclusion: A Study on the Rajasthan Integrated Fluorosis Mitigation Programme in India

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Brief biography: (These five master degree students have come together from India, Canada, Norway and the U.S.A. to research the extent of social inclusion in the Government of Rajasthan's project on Fluorosis Mitigation. A final paper on the findings was presented in early August 2008 at a UNICEF workshop in New Delhi.)

Scholarly Abstract

Fluorine is a chemical contaminant that is present in water, and depending on the amount that is ingested, it can be either beneficial or detrimental to a person's health. Over-consumption of fluorine over long periods of time can cause a disease known as fluorosis. This illness can lead to irreparable damage to the body such as permanent staining of teeth and frequently crippling disfiguration of bones. Fluorosis also poses non-skeletal threats such as constant diarrhea, stomach pains and loss of appetite that can ultimately lead to dehydration and malnutrition. Fluorosis is of growing interest in the field of water sanitation and medicine, and governments around the world have made efforts in its prevention. This paper presents and explores the efforts of the Rajasthan state government of India in tackling the problem of fluorosis and, furthermore, ensuring that project objectives touch all segments of the population including the Dalits. The Dalits are considered the lowest caste individuals in Indian society, and have frequently held the lowest social and economic position in society.

Fluoride contamination in ground water affects mostly the Indian states of Andhra Pradesh, Gujarat and Rajasthan. The state of Rajasthan contains almost half of the villages that have the highest levels of fluoride in the country. Most of the children living in these communities have yellow, stained teeth and their elders are mostly crippled. After the success of the UNICEF pilot project using domestic defluoridation units (DDUs) at household levels, the Government of Rajasthan in 2005 adopted this technology and implemented a similar project throughout the state called the Rajasthan Integrated Fluorosis Mitigation Programme (RIFMP).

The present study explores the aspect of social inclusion in the implementation of RIFMP Phase I. The team employed several participatory research methods that included focus group discussions, village mapping, transect walks and semi-structured interviews to collect qualitative data. Quantitative data was collected from structured interviews and existing statistics from a variety of sources. Though the project was successful in reaching most of the households considered to be below the poverty line, there were questions regarding the criteria that defined which families lived below or above the poverty line. In most instances, Dalits and Untouchables were members of the low-income quintile, but this was not always the case. In communities where social awareness activities began before the

distribution of DDUs, such as wall paintings, information sessions and skits, families regardless of caste group appreciated and utilized the DDUs. Areas farther from the home of a local animator, or defluoridation expert were less likely to understand the proper use or function of the DDUs. Such communities seemed misinformed, even suspicious, insisting that the DDU project was a government ploy to sterilize village women and prevent pregnancy. Conversely, our study found that the villages located geographically closer to an animator had comparatively well-maintained DDUs because they frequently had their filters tested and regenerated. Remote villages were not frequently visited, and random checks of these filters during field research revealed that these people were still drinking fluoride-affected water despite the use of DDUs. Overall we found that the intervention was touching people of all social levels and that DDUs were a good vehicle to provide defluoridation services given the circumstances.

Author's Note

Text: John Hustedt is a Master of Public Health student at Emory University, and is interested in issues of minority/child health; writing, working and traveling extensively in Africa and Asia. Some of his recent studies have included access to health care for minority victims of Agent Orange in central Vietnam, and health of international labor migrants from South-East Asia.

Natasha Mistry is from Canada and is currently completing her Master degree at the School of International and Public Affairs at Columbia University in New York City. Prior to returning to study, she worked at the United Nations Development Programme (UNDP) for seven years. She began her development career promoting volunteerism at the United Nations Volunteers programme in Bonn, Germany. She then went on to join the UNDP in Albania and immensely enjoyed working with rural communities on governance, decentralization and social inclusion issues. She hopes to return to the development sector upon graduation.

Anne-Line Sandåker is from Norway and is about to complete her Master degree in Asian and African Studies at the Center for Development and Environment at the University of Oslo. She has specialized in environmental issues in India, and her Master thesis is an evaluation of the compliance of environmental policies by Scandinavian companies working in India. She has been to India several times both to study and to do field work and wants to work there in the future.

Sakshi Saini completed her dissertation on the "Assessment of Water and Sanitation Facilities in a resettlement Colonies" for her Masters degree at Delhi University. She has a keen interest in the area of water, sanitation and hygiene initiatives. She had previously worked as a Project Associate with The Vigyan Vijay Foundation, an NGO that works on environmental issues at the grassroots level. She is currently working as a Research Fellow with the Institute of Home Economics on "Gender Specific Impact of Climate Change on Household Water Poverty," a project funded by the United Nations Framework Convention on Climate Change.

Aji John is from Kerla, India. He is a recent graduate of Social work from Veer Narmad South Gujarat University in Surat, Gujarat. He has experience in teaching and has conducted a study about the social isolation of institutionalized Leprosy patients and the effects of multi-

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Keywords: Fluorosis, Fluoride, Rajasthan, Social Inclusion, Water

Acronyms

AA	Activated Alumina
APL	Above the Poverty Line
BPL	Below the Poverty Line
CCDU	Communication and Capacity Development Unit
DDU	Domestic Defluoridation Unit
F	Fluorine
FGDs	Focus Group Discussions
HPDFU	Hand Pump Defluoridation Units
IEC	Information Education Communication
IHMR	Institute for Health Management Research
GoI	Government of India
GoR	Government of Rajasthan
HPDFU	Hand Pump Attached Defluoridation Units
mg/l	milligram per liter
NDWM	National Drinking Water Mission
NGO	Non Governmental Organization
NRDWQM&SP	National Rural Drinking Water Quality Monitoring and Surveillance Programme
PHED	Public Health Engineering Department
RGNDWM	Rajiv Gandhi National Drinking Water Mission
RC	Regeneration Centres
Rs-	Indian Rupees
RIFMP	Rajasthan Integrated Fluorosis Mitigation Programme
SARITA	Society Affiliated to Research and Improvement of Tribal Areas
SC	Schedule Caste
ST	Schedule Tribe
SWACH	Society for Women and Children's Health
OBC	Other Backward Castes
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Social Inclusion: A Study on the Rajasthan Integrated Fluorosis Mitigation Programme in India

This paper will analyze efforts of the Rajasthan state government in tackling the problem of fluorosis and will explore the extent that the project has reached the most marginalized segments of the population including women, children, low-income families, the Dalit and untouchables. The paper will then explain the development scenario related to fluorosis and will examine the extent of the problem found in the communities in northern India, in the state of Rajasthan. Then, there will be a description of the project plan, its implementation and monitoring and evaluation aspects. It is also necessary to determine the actors involved and examine their relationships. The paper will then identify strengths and weaknesses of the project and will recommend ways on addressing the challenges.

Background

Fluorine is a chemical contaminant that is either naturally found in ground water in certain areas around the world, or it is supplemented to drinking water in many countries across the globe. Depending on the amount that is ingested it can be either beneficial or detrimental to a person's health. The World Health Organization (WHO) labels up to 1.5 mg/l as a safe limit of fluoride in drinking water for human consumption (UNICEF). The Bureau of Indian Standards permits 1.0 mg/l. Over-consumption of fluorine over long periods of time can cause a disease known as fluorosis. This illness can lead to irreparable damage to the body, such as the permanent staining of teeth and frequently crippling disfiguration of bones. It also poses non-skeletal threats such as constant diarrhea, stomach pains and loss of appetite that can ultimately lead to dehydration and malnutrition. Fluorosis is of growing interest in the field of water sanitation and medicine; and in areas with high fluoride levels, governments are taking preventative measures to protect the health of citizens.

There are however positive benefits to the intake of low amounts of fluoride. The widespread use of fluoride has been an important factor in the decline of dental caries and tooth decay in the United States and other developed countries (CDC). Countries, such as the United States, Australia and Brazil, add fluoride to the public drinking water supply and also to toothpaste. Many consider fluoridated drinking water as a cost-effective public health measure since it provides successful results at low costs (CDC). There are ongoing debates as

to benefits of fluoridated water since some scientists argue that humans are able to absorb the needed amounts naturally through the intake of other foods rich in fluoride such as tea, coffee, and certain types of nuts for example (Wellsphere).

In regions of the world, such as in Northern India water is a scarce resource and people's dependence on it, even if highly fluoridated, outweighs their concern about fluorosis and other water-borne diseases. Ground water fulfills this need but the water that villagers drink leads them to develop fluorosis. The Government, local non-governmental organizations and intergovernmental organizations like the United Nations Children's Fund are taking measures to find affordable ways for the poor to protect their health.

Caste Groups and Marginalization

Indian society has a deeply rooted caste system that dictates whether an individual has the advantage of being higher or lower on the ladder of social stratification. Membership of a certain caste is determined at birth. The four major castes are Brahmin (clergy), Kshatriya (warriors), Vysya (traders), and Shudras. According to Manu, the Brahmin is lord of this whole creation because he is produced from the purest part of the Supreme Being, namely the mouth. The Shudras are the outcast or untouchables. Caste has a complex set of taboos by which the superior castes try to preserve their ceremonial purity. Each caste develops its own sub-culture. Thus, there are restrictions of feeding and social intercourse among castes, and rules are laid down with regard to the type of food that is acceptable to be eaten by a person from varying castes. The Indian constitution refers to Shudras or lower castes as scheduled castes and scheduled tribes, although a common term used is 'Dalit'. The word Dalit loosely means oppressed. Though the word is no longer used in government documents, it is still used widely to represent scheduled caste and scheduled tribes.

In Hindu tradition, Dalits are often associated with their ritually impure occupation such as butchering, removal of dead animals, scavenging and leather work. About one million Dalits work as scavengers cleaning sewers and latrines by hand. These activities are considered by the society as polluting, and deem them 'contagious'. Hence they were not allowed to mingle with other sections of society. They were denied education and other human rights. They were asked to stay outside the village and not allowed to enter the temple or other public gatherings for a long period of history.

Among the marginalized population in India, Dalits are the most prominent group. Others include women, children, disabled, poor migrants, people living with HIV/AIDS, and

homosexual individuals. In societies with a highly patriarchal order like India, women are expected to adhere to strict gender roles. They have little control over resources and decision making. The conditions of the Dalits have not changed much since independence. Despite all the policies and programmes introduced by the government, many still remain as poor and illiterate as before. Scheduled Castes and Scheduled Tribes constitute 24.39% of the total population of India (Census India, 2001). In Rajasthan, they make up 31.35% of the total population.

Development Situation

Fluorine is the thirteenth most abundant element found in the Earth's crust and can easily react with other particles and/or chemicals to form fluoride (Development Alternatives 5). Ground water near fluoride rich rocks get contaminated as the water surrounding it easily absorbs fluoride. Fluoride contamination in ground water is endemic in the states of Andhra Pradesh, Gujarat and Rajasthan (UNICEF). Rajasthan in particular, possesses more than 51 percent of the total number of Indian villages affected by fluoride (Development Alternatives 4). Rajasthan also encompasses the highest levels of fluoride discovered in the country; with people in several districts in Rajasthan consuming water with fluoride concentrations up to 24 mg/l (UNICEF). There is water shortage in Rajasthan since it is made up of arid land and is largely a desert. It also experiences low levels of rainfall during monsoon season. For this reason the demand for water exceeds supply, and with a state that is largely dependent on agriculture and animal husbandry, ground water is overexploited, causing levels of water supply to fall, and leading to an increase in the concentration of fluoride in the remaining ground water reserve.

Fluorosis not only causes physical damage to the body but also renders the victim socially and culturally crippled. Communities living with the problems of fluorosis face social consequences. It causes problems in the selection of potential brides and grooms. People living in other villages shy away from selecting brides and grooms from fluorosis affected villages, due to the stained teeth or problems experienced with joints and curved bones. Women from other villages do not wish to marry men from fluoride-contaminated villages because they hear about the problems resulting from the drinking water and worry about their own or their potential mate's deteriorating health.

Fluorosis primarily affects the most vulnerable populations such as children, pregnant mothers, lower caste groups and low-income families. Often the families that live below the poverty line (BPLs) are unable to afford suitable filtration systems and have improper nutritional intake. Children are, in fact, more vulnerable to getting Fluorosis as their teeth are in the process of development. Skeletal fluorosis may occur more severely in children since their bones are growing and developing (UNICEF). There is also some non-substantial research exploring the negative effects of fluorosis in destroying brain tissue. For example, in an interview with a Head Master of the Upper Primary School in Unkhaliya village pointed out that the performance of children with fluorosis is poor in school and they tend to have lower IQ levels than those students that come from villages with low levels of fluoride in the drinking water (Interview Head Master).



Boy with Skeletal Fluorosis

Description of Implementing Agencies

A survey conducted by PHED of Rajasthan in 2001 identified over 23,000 hamlets¹ with fluoride levels above 1.5 mg/l (Development Alternatives 7). PHED is the local government body that oversees water construction (via pipelines and water pump installations) as well as water sanitation issues. The results of the survey led to government discussion over developing piped water supply networks throughout the state. However, the large-scale infrastructure project would take years to plan and implement, not to mention the large amounts of funds it would require to carry out such an endeavor. UNICEF stepped in to

take interim measures by initiating a small-scale project in one district of Dungarpur in 2001 where it provided all families, regardless of caste or economic class, a DDU² at an affordable cost of around 200 Rs. In the past, UNICEF had initiated a number of programs aimed to meet the challenge of helping the Government of India maintain safe drinking water, and ensure the supply of potable water. The organization had especially focused on water quality monitoring systems, facilitating research and development of water treatment systems such as the AA³ based DDU.

The NGOs were responsible for the installation, water testing and regeneration services of DDUs in all BPL households and those APL households who purchased DDUs. NGOs were responsible for organizing IEC activities such as wall paintings, slogans and dramas. The NGO appointed a local facilitator, called the animator, to establish and maintain the DDUs, ensuring its use by motivating villagers, undertaking water testing, and regenerating exhausted AA in approximately five hamlets. The animators were supposed to check the water quality in each household periodically, and replace any AA that had been exhausted. PHED engineers and UNICEF officials do random checks of the villages to make sure that the NGOs and animators are providing services accordingly (Development Alternatives, 6).

Evidence of the pilot project's success was evident in monitoring the bone structures of young children. To expand UNICEF efforts, PHED together with support from UNICEF and non-governmental organizations (NGOs) launched several initiatives that ultimately led to the state-wide Rajasthan Integrated Fluorosis Mitigation Programme (RIFMP) in 2004 (Development Alternatives, 6).

Intervention

National Water Sanitation and Fluorosis Programmes

The "Rajiv Gandhi National Drinking Water Mission (RGNDWM)" initially began under of the name of the "National Drinking Water Mission" (NDWM) in 1986, but was consequently renamed in 1991 and given three key objectives that involved; assisting local communities to maintain sources of safe drinking water, and ensuring the supply of potable water to Scheduled Castes and Scheduled Tribes. There have been more than four million hand pumps and 200,000 piped water schemes in rural areas (Indian Planning Commission).

As there was an increase in the coverage of water sources, the quality of water decreased, with India ranking 120th out of 122 countries in potable water quality. In 2005, a Central Pollution Control Board countrywide survey found 66 percent of samples had unacceptable organic value, while 44 percent has coliform, occurring generally from feces. 80 percent of governments supply is dependent on ground water which is increasingly getting chemically contaminated. (The Hindu) The National Rural Drinking Water Quality Monitoring and Surveillance Programme (NRDWQM&SP) is a large-scale programme under RGNDWM that was started in 2006 to provide greater community access to clean drinking water. The main objectives included a decentralized monitoring and surveillance of all drinking water sources in the state by the community; creating awareness among the rural people about the water quality issues and problems related to water borne diseases by involving Zila Panchayat and Block Panchayat and building the capacities of the Panchayats to use the field test kit and take up full Operation and Maintenance for water quality monitoring of all drinking water sources in their respective Panchayat Raj Institutions area (National Planning Commission).

UNICEF Facilitated Dungapur Pilot Project

Following the objectives of the NRDWQM&SP, UNICEF has initiated a number of programs aimed to meet the challenge of helping the GoI maintain safe drinking water, and ensure the supply of potable water. They have especially focused on water quality monitoring systems, facilitating research and development of water treatment systems as the Activated Alumina based DDU. In 2001, Dungapur was picked as a site for a pilot project on defluoridation. The project covered eight villages in Aspur block. It was implemented by two NGOs, SARITA and SWATCH.

The key components of the pilot program included a baseline survey; pre and post-monsoon water analysis; awareness generation and development of IEC; Pre and post-intervention clinical examination of patients; field testing of defluoridated water, as well as monitoring; cost sharing by users; constitution of “Pani Panchayats” and their active involvement to ensure sustainability; and distribution of Nalgonda defluoridation containers sets and AA filters, along with the chemicals required, as well as training on their use (UNICEF).

Project Intervention

RIFMP's mission is to provide safe drinking water to the community using four successive components. First, animators that represent the local NGOs would carry out several activities in rural areas raising awareness about the dangers of fluorosis and teaching about preventative methods. Secondly, the awareness would be coupled with trainings on health and nutrition management. Thirdly, animators would discuss and encourage villagers to use alternative/traditional water collection methods such as rainwater harvesting, since those were natural techniques in getting access to defluoridated water.



Domestic Defluoridation Unit (DDU)

Finally, families would then have DDUs installed into their homes for use. RIFMP provided free DDUs to families living below the poverty line (BPLs) and charged a small fee for DDUs to families living above the poverty line (APLs). The project would use the Indian national poverty line criteria to identify these groups. Local government officials who were represented by the Surpanch and Panch's⁴ of the communities were responsible to carry out the exercise in identifying BPLs based on government criteria.

The Programme is being implemented in three phases based on the levels of fluoride found in the local water supply. Phase I was ended in February 2008 and included areas with a level of fluoride in the drinking water above 5.0 mg/l. Phase II, which is now in process, focuses on the affected villages and hamlets where the concentration of fluoride ranges from 3.0 to 5.0 mg/l, while Phase III will work in communities with fluoride levels from 1.5 to 3.0 mg/l.

RIFMP Phase I started in March 2005 by covering 500 hamlets with a population of less than 100, and fluoride level more than 5 mg/l. In May 2006, the program was extended to 2,143 villages (regardless of size) in 12 districts. In Phase II of RIFMP, an expected number of 5,056 villages and hamlets will be covered (Development Alternatives, 6).

Methodology

The team studied the RIFMP intervention in terms of social exclusion in four main areas of economic status, caste groups, geographic location and level of awareness:

- ***Economic status:** refers to the APL and BPL families division by the project;*
- ***Caste Group:** refers to the SC, ST, OBC and General groups;*
- ***Geographic location:** refers to those villages isolated and distant from district centers;*
- ***Awareness level:** refers to the access to information about fluorosis, defluoridation techniques and other related project information.*

Based on this definition of social exclusion the team determined the research objective should be to document the outputs of the project in terms of awareness, access, quality, and delivery of services. In order to do this, the team came up with several key research questions. The first was has RIFMP been a socially inclusive project, and if exclusion exists then what areas need to be fully addressed to achieve inclusion? Secondly, how has the project equally benefited all economic segments of society? Thirdly, is there a difference in access to Domestic Defluoridation Units and services between the ST, SC, OBC and General? Fourthly, does the geographic location of a village have an impact on inclusion? Lastly, is there a difference in the level of awareness between the ST, SC, OBC and General community?

The team began preparing for work on the case study by formulating a three-stage approach to complete the work. The first stage involved a desk review of existing material as well as preparation of field research activities. The second stage included a ten-day field visit to several hamlets in Bhilwara district. The third stage included an analysis and review of data and report writing. In stage 1 the team gained an understanding of the intervention by interviewing the PHED chief engineers in charge of RIFMP, as well as by reviewing secondary data found within project documents, evaluation reports, and doing Internet research. During the second stage the team visited 5 villages over a course of 10 days to conduct focus group sessions with community members, undertake interviews with key actors and completed household questionnaires. The third stage involved transcribing interviews, creating data sets using SPSS statistical software and analyzing the findings collected from the field. Quantitative and qualitative methods were used to collect the data for our study.

During the 10 days of fieldwork, the group visited a total of five habitations including Rathwalo Ka Kheda, Balapura, Unkhaliya, Prahaldi Ka Badia and Devipura. The blocks and habitations were chosen using stratified random sampling technique from a list of the villages that met the following criteria: Implementation of RIFMP Phase 1 (2004-2008), participation of PHED and UNICEF through NGOs, sizeable BPL population (based on the number of DDUs), Considerable population of SC/ST/OBC, geographic location (far distance from district center).

The meetings and Semi Structured Interviews with NGO and PHED were done at the district level while in the villages the data was collected data using observation, semi-structured interviews, house hold interviews and focus group discussions.

Findings and Analysis

Project Strengths

There are several positive attributes to the project. The first line of attack is to reach out to the most isolated and smallest communities. This is unusual for government programs to start assistance in isolated hamlets, since most programmes want to reach results more quickly. Secondly, by assisting families that live below the poverty line the government has been successful in helping marginalized segments of society since the most poor such as the Dalit, untouchables, women and others usually fall within the lower income classifications.

More importantly the nature of the project encourages dialogue and collaboration between local government and local NGOs. RIFMP is the first project that has brought together two different stakeholders that under normal circumstances would engage in a hostile relationship. UNICEF's participation in the project has strengthened this once unlikely relationship.

Project Challenges

There are numerous challenges that face the project, among these include the identification of APL and BPL families, geographical isolation, the lack of information in some villages, the need to strengthen sustainability and gaining local government support for the project.

i) Above Poverty Line (APL)/Below Poverty Line (BPL) Divisions

As with many government-run programmes in India, there are special efforts made to reach out to the poor families of the community. RIFMP follows the same principal by installing DDUs free of cost for BPL families, whereas APLs are subsidized for the Activated Alumina and are left to pay only for the container of the DDU. Although APLs were provided with varying types and costs of DDUs it was found that still some APL families, particularly those who were closer to the BPL economic status, felt that these costs were unaffordable.

While APLs receive DDUs at a subsidized cost, they were required to pay the full cost of regeneration of Rs. 20. As per the project design, BPLs have been given an advantage over the APLs in terms of free DDUs and free regeneration service.

In a meeting with the Chief Engineers at PHED, it was said that less than 1% of APLs actually bought the DDUs. In probing to the reasons why this occurs, the PHED officials said that APL families do not understand the value of the DDUs so they do not purchase the containers. They further emphasized the need for increasing the social awareness and social marketing of the project. A few APL families also wait before purchasing the DDUs because they feel that the government might offer it to them for free. In an interview Bhavani Singh, the Ward-Panch of Unkhaliya, claimed that “the villagers are willing to pay to visit the doctor for pains from fluoride but they are unwilling to pay for a filter as a preventative cure.”

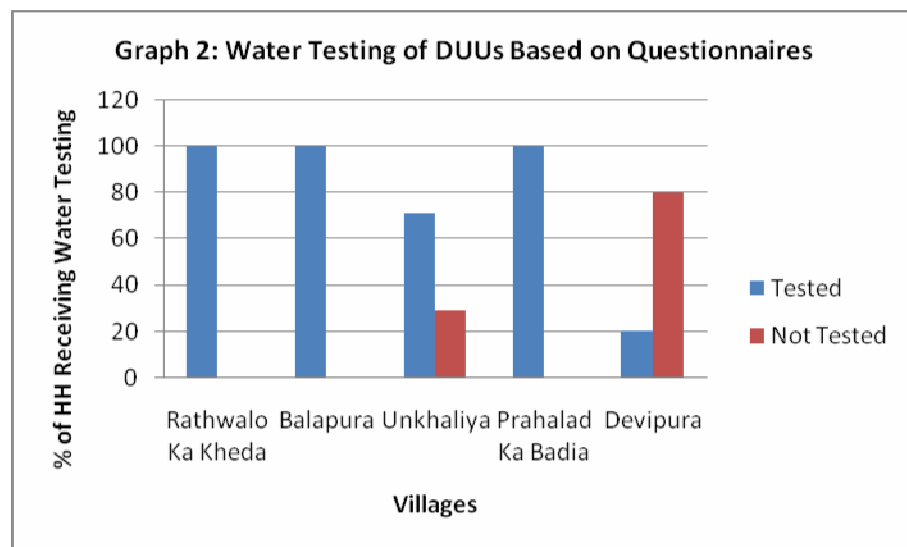
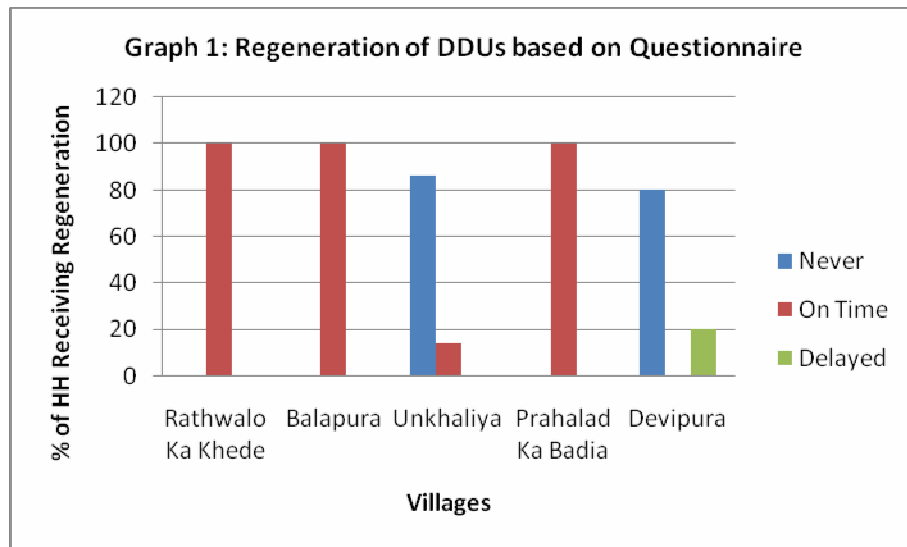
By providing the DDUs free of cost to BPL families, it dissuades the APLs from paying a cost. In a focus group discussion in Balapura, community members called for a common approach to distribution of the fluoride filters, one that promotes equality and reaches out to all members of the community. Furthermore, some APLs were reluctant to pay for DDUs since they believed that they may get it free as next time they may be classified as BPL the next time the government assessed family's incomes. This assessment is done once every five years and is based on a series of questions that measure the economic capacities of each family. The poverty line measure in India is a debatable one and social activists and development specialists are continually disputing its criteria.

The categorization of some APL families based on national poverty line criteria may not be an accurate classification considering that many of those families interviewed were observed to be closer to the lower strata of the APL line and were simply too poor to purchase a DDU. Those interviewed have repeatedly stated that the poverty line criteria is unfair and can be biased since it is a decision that involves local government officials such as the Panch and Sarpanch of the communities.⁵ Their decisions are subjective, influential and biased in certain cases.

It was also found that some BPL families did not appreciate or value the DDU filters as if they would have paid for it. Some DDUs were kept in poor condition. The animator of the village in Balapura, Ratan Lal, stated that, “some people place their DDUs on a shelf and never use it. The best solution is to make everyone pay a little bit, this will ensure that they will take good care of it and will have ownership over it and use it daily.”

ii) Geographical Exclusion

Geographic exclusion existed in terms of the distance between the animator’s home location and the distance from the closest regeneration center. The further away the village was from the animator and the regeneration center⁶, the less attention it would receive in terms of domestic water being tested regularly and receiving regeneration whenever required. The animator covers all villages within a radius of 10 kilometers. All the villages within the animator’s area are supposed to be followed up as often as necessary, but the villages geographically close to the animator and regeneration center were found to be tested and regenerated more frequently than those located further away. It is easier for these beneficiaries to be in contact with the animator, and the NGO, if they need to replace broken parts or have any other restrain/constrains. It is more difficult for the animators to work in the villages further away from their home village and some of the animators expressed difficulties with the practical logistics of the task. Many of the villages are in remote areas so it was difficult for the animator to travel. They also have to several new bags of AA (each weighing up to 4kg) and bring back the exhausted ones, which can be heavy and difficult to manage on a bus by one person. To compensate the animator has a supervisor that regularly comes to visit and check-up on the project. If the animator has not visited the remote village for a while, the supervisor will take him there on a motorbike. Unless villagers are visited frequently, it is difficult for them to get in contact with the animator or NGO as they have no formal contact number or system to voice their concerns. Villagers are dependent on the Animator for assistance and must wait until the next visit to take care of problematic DDUs. Animators are key to the sustainability of the project. This is easily shown in Graph 1 and 2 where the villages that had animators residing in them (Rathwalo Ka Keda, Balapura, and Prahalad Ka Badia) were able to better access services than those without (Unkhaliya and Devipura).



iii) Information, Education and Communication Activities

There is no social exclusion among the different caste groups when it comes to social awareness activities implemented in the field. All castes within a village or hamlet are equally aware or unaware of Fluorosis and the benefits that a DDU will bring. There is greater usage and value placed on the DDUs in areas where there are higher levels of social awareness activities. Moreover, APL families tend to purchase more DDUs in areas where there are



Wall Painting in Bhojpura

numerous awareness activities. In hamlets with few or no awareness activities it was observed that villagers would rarely use the DDU's and lack the understanding about the benefits the filters bring. For example in the hamlet of Unkhaliya several households and even in a discussion with the Sarpanch it was discovered that many families felt

uncomfortable with using the DDU's because they had a misconception about its function. People believed that the DDU's were part of a Government scheme to sterilize and decrease the fertility among women of the community. Other reasons for not adopting the use of the filters included arguments that by drinking the fluoride water people would develop a natural resistance to fluorosis.

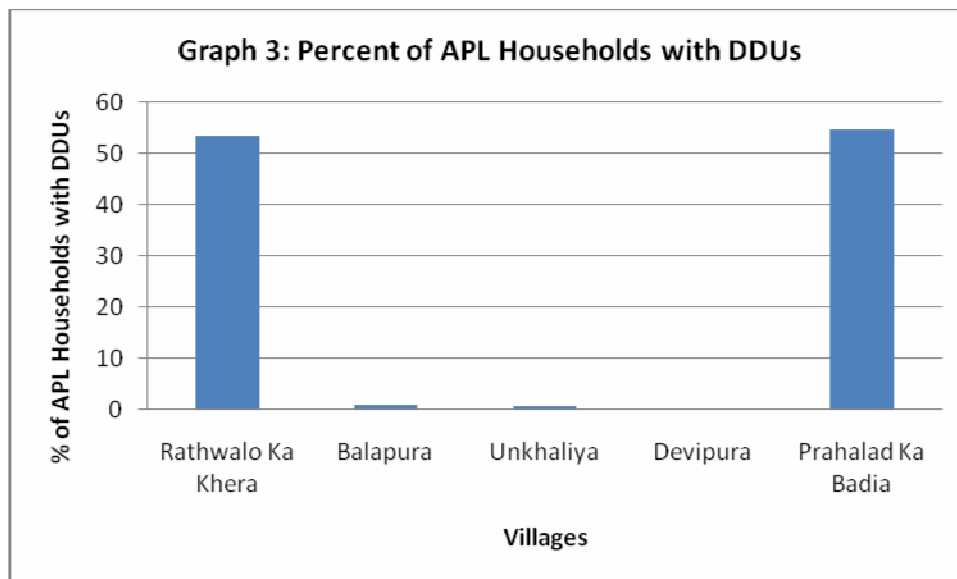
iv) Sustainability

The ending of Phase I on 15 February 2008 and transition to Phase II halted several of the project's functions in many of the villages. The closing down of the regeneration centers and ending of contracts for the NGOs and the animators had a negative impact on the smooth running of the programme for the beneficiaries. This raises a question of sustainability that is required from the transition period from Phase I to II. Nevertheless there have been villages and hamlets where NGOs have continued to work on voluntary basis and provide services to people. Greater local ownership may ensure the project's sustainability between Phase transitions and after the project has completed.

v) Local Government Support

It is believed that the Sarpanch and Panch's (local government representatives) opinion of the project is very critical in terms of its acceptance in the community. If the Sarpanch/Panch is supportive and believes in the value of the project, then the people of the community will follow suit and will see the importance and significance of using the DDU's. In the case where the Panch is unsupportive and does not take interest in the project then the community does not find the project of much use or value the DDU's. As shown in graph 3

villages that had local government support (Rathwalo Ka Khera, and Prahalad Ka Badia) had more APLs purchase DDUs.



Recommendations

The following are recommendations directed towards policy makers:

RIFMP has reached out to the marginalized communities.

- ❖ Recommendation: The RIFMP project should be used as a model for future government projects, since it targets small isolated habitations in remote areas of the district and reaches out to the poorest and marginalized persons of these communities.

Those villages that are located far from the animator's home receive fewer visits on water testing and regeneration.

- ❖ Recommendation: Having an animator located within the village will help beneficiaries to keep on top of all necessary check-ups for the DDUs. If it is not feasible for the project to recruit more animators, then provide them with incentives so they are motivated to increase the number of water quality checks and regenerations. Also, this will motivate them to visit distant villages.

Some BPLs do not value the benefits of the DDUs, so they do not use it.

- ❖ Recommendation: Charge BPLs a small fee for the purchase of DDUs. This will ensure that they will value and take care of the device.

Villagers claim that there is no contact person in case they need assistance or need their water tested. Also, after the completion of project (ending of phase III) or in the absence of an animator the project needs to be sustainable.

- ❖ Recommendations: Setting up grievance units like a suggestions/complaint boxes in villages that allow villagers to privately express their opinions about the project.
- ❖ Another suggestion is to build the capacity of local leaders or self-help groups about fluorosis and regeneration, so they can keep track of those with fluorosis, deal with social marketing of DDUs and regeneration of AA.
- ❖ Create a Self Help Group. This group will consist of trained local community members who can test the quality of water and determine the need for regeneration.

The following are some recommendations for local NGOs:

APLs have not purchased DDUs as they do not understand its worth.

- ❖ Recommendation: NGOs to work as facilitators and help the community to make correct decisions based on informed choices For example, when introducing DDUs to APLs emphasize the variety of costs and types of DDUs that can be bought as per their buying capacity. The animators should be given incentives for every DDU sold. This will motivate them to be more proactive in selling the DDUs.

Villages that have low levels of awareness activities do not understand the value of using the DDUs.

- ❖ Recommendation: There needs to be an increased focus on the level of social awareness activities. The project needs to emphasize the social marketing strategy in all areas where it is implemented.
- ❖ Recruit media/social marketing experts in the area to develop a social marketing strategy that will effectively target villagers in the community.
- ❖ Organize study trips for persons from villages at risk to meet with people that are severely affected.
- ❖ Encourage people who have benefited from the project to work as resource persons. For example, have other 'Fluorosed' patients from successful villages to speak to other communities (those villages at risk) on the benefits of using the DDUs.

Conclusion

Fluorosis continues to be an endemic problem. More and more areas are being discovered regularly that are affected by fluorosis in different parts of the country. Children in the age group of 0 to 12 years are most prone to fluorosis as their body tissues are in a formative/growth stage during this period. Expectant mothers are also to be protected, as there is a growing concern about the affects of fluoride on the fetus.

This case study was intended to look into aspects of social exclusion in RIFMP, a project implemented under a tripartite agreement between PHED, UNICEF and the NGOs, which aims to provide safe drinking water and improve the health of those that depend on ground water. In light of the scope of this research, it was found that RIFMP has been a socially inclusive intervention.

BPL families living in hamlets that were covered under Phase I of the Programme have received DDU's free of cost, irrespective of caste, color and creed. In this way the programme was successful in including the poorer communities of lower caste groups. Although the Government is subsidizing the cost of DDU's for APL families, some are still reluctant to purchase DDU's as they fail to understand the worth of purchasing them or have misconceptions about its use due to lack of awareness.

There is a direct relationship between the extent of awareness and the usage of DDU's. There is a positive correlation between those hamlets that have received high levels of social awareness activities and use DDU's. Hamlets that have had frequent IEC activities, such as documentary films, banners, wall paintings, and puppet shows. The beneficiaries from these villages use DDU's daily and moreover, APL families are more willing to buy DDU's.

The water testing and regeneration activities were more frequent in the hamlets where the Animator is located, whereas visits for water testing and regeneration were less frequent in villages that were far from the Animator's home.

Overall, the Programme has positively impacted the quality of life for the beneficiaries. DDU's have provided direct relief from stomach problems, and joint pains. The project has been successful in containing the spread of the fluorosis and especially, safeguarding the interests of young children and expectant mothers in the community.

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Notes

1. Hamlets are smaller in size than villages; they usually consist of less than 100 families.
2. DDU's have two containers made of plastic or stainless steel. The bottom container has a tap to drain out the filtered defluoridated water and the top container holds about 4 kg of Activated Alumina, kept in a nylon bag that is used to adsorb fluoride. The DDU can filter 8-10 liters per hour.
3. AA is highly porous and has tremendous surface area to weight ratio. Due to this it is a good adsorbent of arsenic and fluoride. It is non-toxic and the prolonged use of Activated alumina in adsorbing fluoride from water can reduce its adsorbing efficiency. This happens as more and more fluoride gets deposited onto its surface. Then it is said to be exhausted. Exhausted Activated alumina can be regenerated by a chemical treatment and can be used again. Regeneration is a process of treating the exhausted activated alumina by chemicals mainly sodium Hydroxide Na(OH), sulphuric acid and water (Yang).
4. The Sarpanch is the head of the village council that is composed of several hamlets or villages. The Panch is the head of a hamlet or village. Together they are part of the second tier of local level government and the one that is the closest to the people.
5. In India the local government structure involves the Panch who is the head of the village and elected by the community. The Panch works closest to the people in the habitations. Several Panches in neighbouring villages (generally consisting of 5 villages) form a council referred to as the Gran Panchayat. The head of this council is referred to as the Sarpanch and he/she is selected from its council members.
6. Regeneration Centers are safe places designated by the government to regenerate the Active Alumina used to filter fluoride. Most regeneration centers were located close to where animators live.