Final Report

May 2014

Impact Assessment of Roof-top Rainwater Harvesting Structures (RRWHS) under Coastal Area Development Programme (Phase I) in Coastal Districts of Gujarat

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Submitted to:

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Pratul Ahuja

Inclusive Development Partnerships

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1 Introduction

1.1 Background

One of the critical issues observed in the coastal region is availability of safe drinking water at household level. With increased salinity intrusion, ground water becomes saline and rural communities have to depend on distant water sources in absence of piped water supply from the government. Although the annual average rainfall in coastal areas of Gujarat is about 600-800 mm, the natural recharge is low. Therefore, roof-top rain harvesting structure (RRWHS) is one of the well accepted solutions across coastal areas. CSPC, under the Kharash Vistarotthan Yojana (KVY) initiative started this intervention in 2003 which was later scaled up by the government. However, it has also been observed that due to the high capital investment, weaker sections of the society do not get benefit from this programme and still need to depend on alternate sources which are not only vulnerable but also insufficient to meet the basic needs of drinking as well as domestic water.

Keeping in view the drudgery of weaker/marginalised communities, CSPC in 2013 undertook a pilot project with four partner organisations – Ambuja Cement Foundation (ACF), Aga Khan Rural Support Programme-India (AKRSPI), Mahiti and Vivekananda Research and Training Institute (VRTI) - to cover 400 families across 12 villages in coastal districts of Gujarat.

1.2 Aim and objectives of the study

The present study aims to understand the impact of availability of improved service delivery mechanism in the form of RRWHS and issues relating to accessibility, usage pattern, social and economic aspects, health and hygiene benefits etc.

The objectives of the study are as under:

i. To undertake an impact assessment of water facilities developed under the project by providing RRWHS to poor and marginalised communities.
ii. To assess the reliability and availability of water at household level and how it impacts the households in terms of saving in time, reducing drudgery of women/adolescent girls/men, improved productivity, socio-economic benefits, health and hygiene benefits, overall impact (direct or indirect) on livelihood aspects etc.
iii. To identify key trigger (disabling and enabling) factors to influence rural communities in coastal villages to adopt or not adopt such structures.

iv. To assess the household level decision making process for construction and use of RRWHS.
v. To assess households' ability and willingness to pay for the RRWHS and the role of subsidy.
vi. To assess the water usage patterns by each household post construction of RRWHS.
vii. To assess role of NGOs in mobilising households for RRWHS.
viii. As water and sanitation go hand in hand, one of the components of the assessment is to look at the current sanitation and hygiene practices of the households including water purification at point of use.

1.3 Methodology

As part of the study, both primary and secondary data collection was undertaken during Feb-Mar 2014. Primary data and information for the study was collected using the following quantitative and qualitative assessment tools:

a. Household-level questionnaire and
b. Discussions with ISA staff

The draft household level questionnaire was shared with CSPC and was finalised after incorporating comments and suggestions received. Primary household level survey was undertaken across 12 villages of the 3 coastal districts of Ahmedabad, Amreli and Kodinar in Gujarat. The final selection of the 12 villages for the assessment was made in consultation with CSPC and the concerned ISA in each district. As part of primary data collection, a total of 140 sample households were surveyed using questionnaire method. These included:

i. 100 beneficiary households (average of 25 households per location) who have constructed Roof Top Rain Water Harvesting Structures (RRWHS) in their houses and;
ii. 40 control households (average of 10 households per location) who do not have an RRWHS in order to compare the nature and extent of impact with beneficiary households.

Table 1-1 Details of household-level questionnaire survey

	ISA name	Location	Total no. of project HH	No. of villages	Beneficiary sample	Control sample
1	AKRSPI	Mangrol, Dist. Junagadh	100	3	25	10
2	ACF	Kodinar, Dist. Junagadh	100	3	25	10
3	VRTI	Rajula, Dist. Amreli	100	3	25	10
4	Mahiti	Dholera, Dist. Ahmedabad	100	3	25	10
	Total		**400**	**12**	**100**	**40**

During selection of beneficiary households, special note was taken of poor and marginalised families which have benefitted from the RRWHS. The key areas of enquiry while undertaking household-level questionnaire surveys included:

- Reliability and availability of water at HH level
- Saving of time and resultant improvement in productivity
- Drudgery reduction for women
- Socio-economic benefits
- Health and hygiene benefits
- Key triggers or factors for enabling/preventing rural communities to adopt/reject RRWHS
- Decision-making processes at household level influencing adoption and use of RRWHS
- Water usage pattern of HH post construction of RRWHS
- Willingness of HH to pay for construction and the level of subsidy requirement
- Role of NGOs in encouraging HH to adopt RRWHS
- Current situation of sanitation and hygiene practices of HH

As part of primary data collection, discussions were also carried out with ISA staff in each of the field locations. The key areas of enquiry during these discussions included:

- Capability of ISA to work on issues of RRWHS such as chlorination and post construction maintenance
- Challenges faced during implementation of project
- Scope and potential for scaling up the initiative in their project geographies

Secondary data and information included pre-feasibility studies undertaken for selection of villages by implementing organisations, baseline reports and other relevant reports generated by the implementing partners.

2 Pre-RRWHS situation assessment

2.1 Water availability and quality

In terms of the situation of water availability during summer, monsoon and winter seasons before the construction of the RRWHS, all of the surveyed families of ACF depended on the community hand pump or water tap in the village for their drinking water requirement. Even for water for domestic use, 88% of ACF families reported getting water from the community hand pump or water tap while only 12% got it from the village pond or *talav*.

In the case of AKRSPI, for drinking water as well as water for domestic use, there was complete dependence on the community hand pump or water tap in the village and this situation remained the same during summer, monsoon and winter seasons.

In Mahiti, variations were observed in water collection across all three seasons. Figure 2-1 shows that during the summer season, 48% of households took drinking water from the community hand pump or water tap in the village, while 52% took it from outside the village, which had significant implications in terms of loss of time and productivity (discussed in greater detail in subsequent section). However, during monsoon, with the filling up of the village *talav*, 25% of families shifted to this source for their drinking water requirements, reducing the need to go out of the village. During winter, the dependence on the community hand pump or water tap went up again. With some water still remaining in the village *talav* post monsoon, some families continued taking drinking water from the *talav* while the rest went out of the village to fetch water.

As far as availability of water for domestic use was concerned, the village pond remained the predominant water source during all three seasons as can be seen from Figure 2-2.

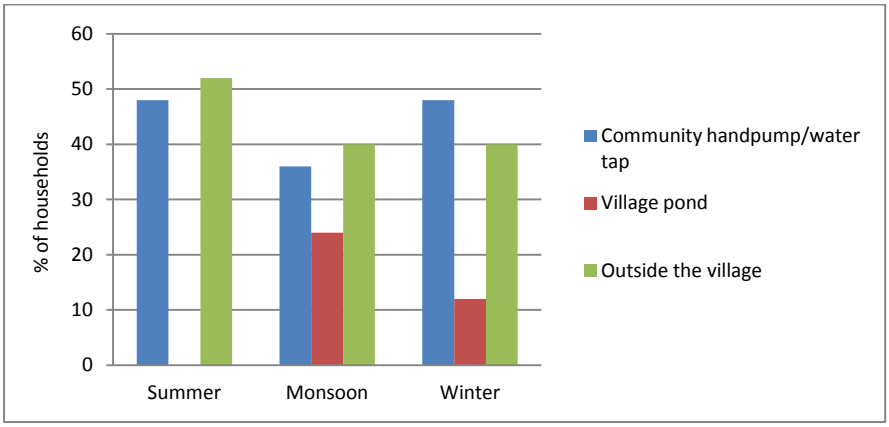

Figure 2-1 Seasonal variation in drinking water source dependence in Mahiti

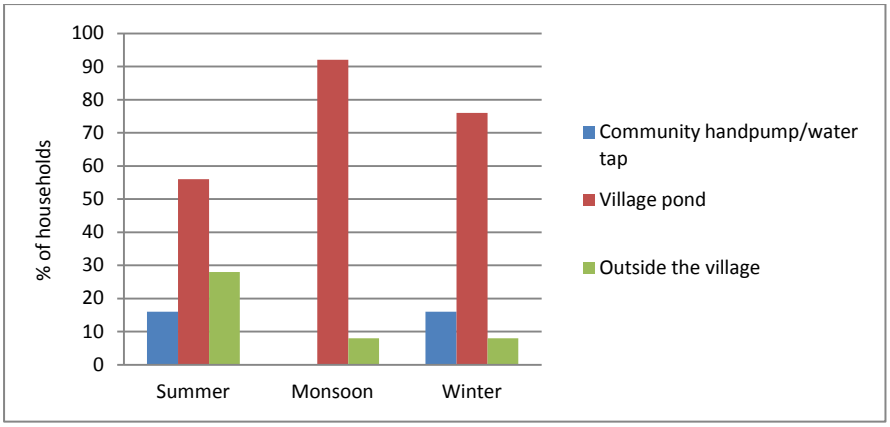

Figure 2-2 Seasonal variation in domestic water source dependence in Mahiti

In VRTI, the community hand pump or tap in the village fulfilled drinking and domestic water requirements of a majority of households during summer, monsoon and winter seasons although a few families had to go out of their village to fetch water as shown by Figure 2-3 and Figure 2-4. Despite the existence of a village pond, none of the surveyed families reportedly depended on it for drinking water needs owing to its poor water quality. Also, less than 10% of households took water for domestic use from the pond.

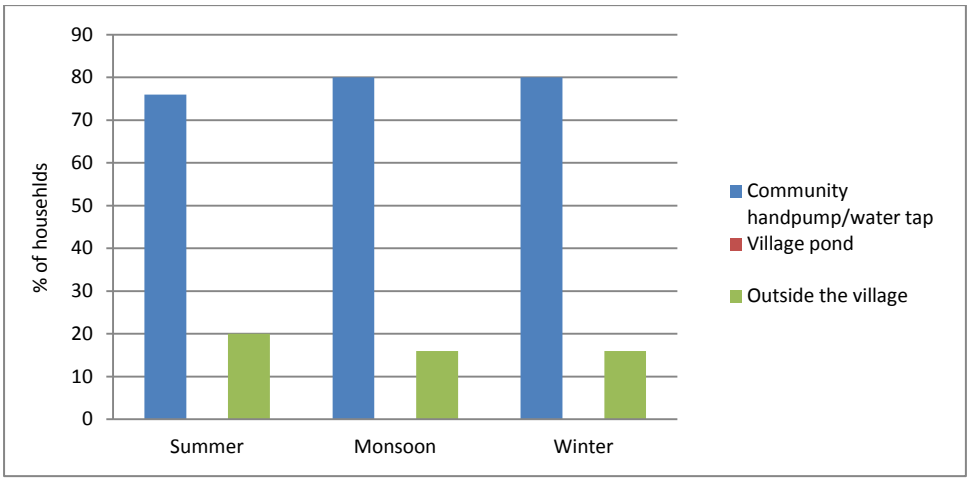

Figure 2-3 Seasonal variation in drinking water source dependence in VRTI

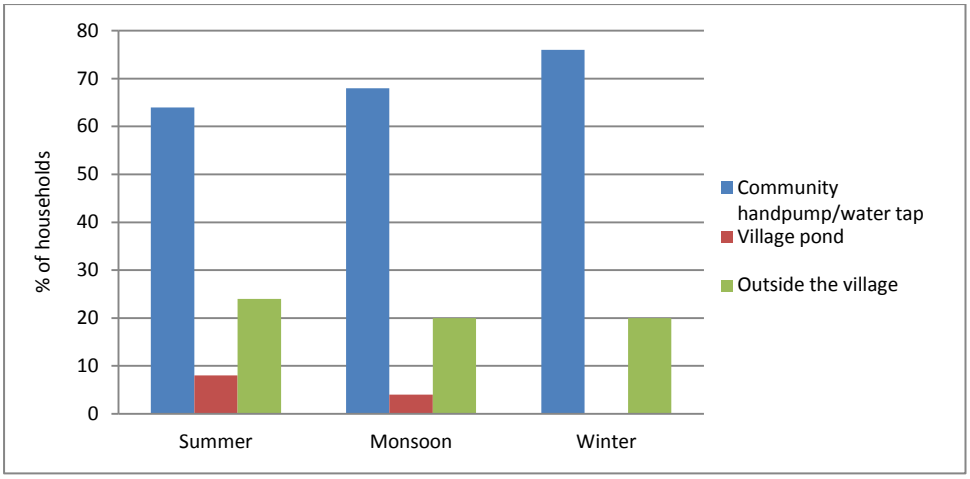

Figure 2-4 Seasonal variation in domestic water source dependence in VRTI

An analysis of data from control households on seasonal variation in water source dependence shows a trend similar to that shown by sample households, especially in the case of ACF and AKRSPI where a majority of families depend on the community hand pump or water tap in the village for their drinking as well as domestic needs (see Figure 2-5 and Figure 2-6).

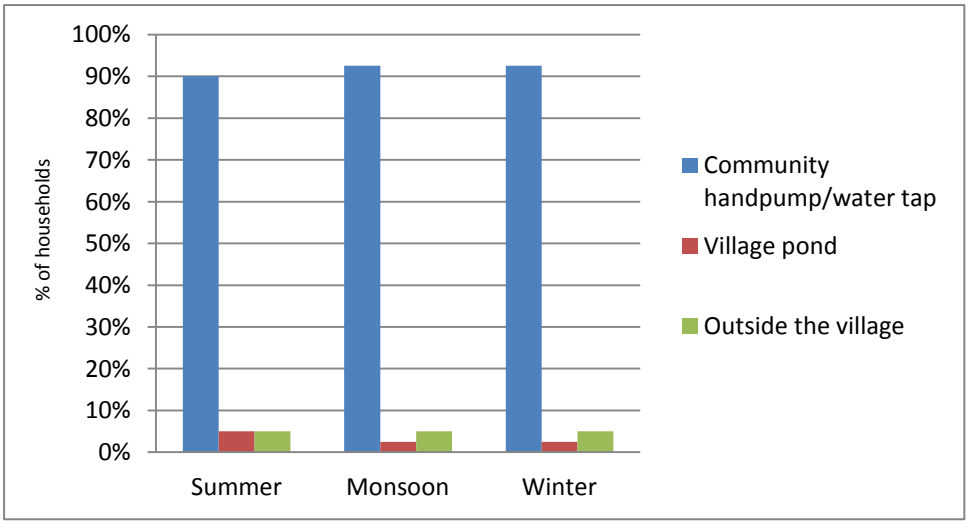

Figure 2-5 Seasonal variation in drinking water source dependence in control sample

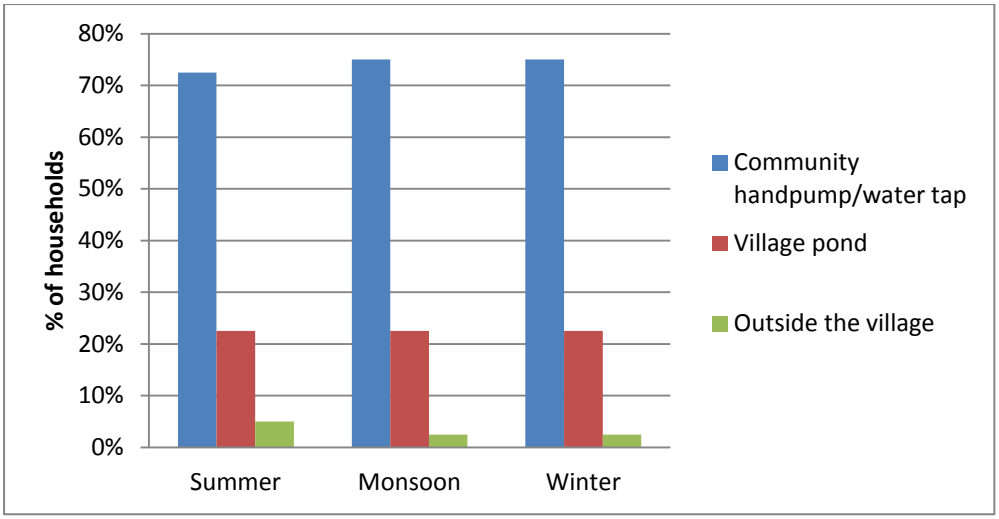

Figure 2-6 Seasonal variation in domestic water source dependence in control sample

In terms of availability of piped water infrastructure, less than 35% of total sample families reported having a water tap as can be seen from Figure 2-7. Even though nearly half of the surveyed households in ACF and AKRSPI reported having piped water infrastructure, this was not a guarantee for supply. For instance, in ACF villages, piped water was available for barely 45 minutes to an hour each day and even this supply was irregular. In the case of AKRSPI, water pipes in Chhatroda village were still being laid at the time of survey while in other villages, supply was intermittent. Mahiti households similarly reported irregular water supply while in VRTI, only a meagre 4% of families had the facility of piped water infrastructure. Charges for piped water supply were in the range of Rs. 100/- per month in each of the survey locations.

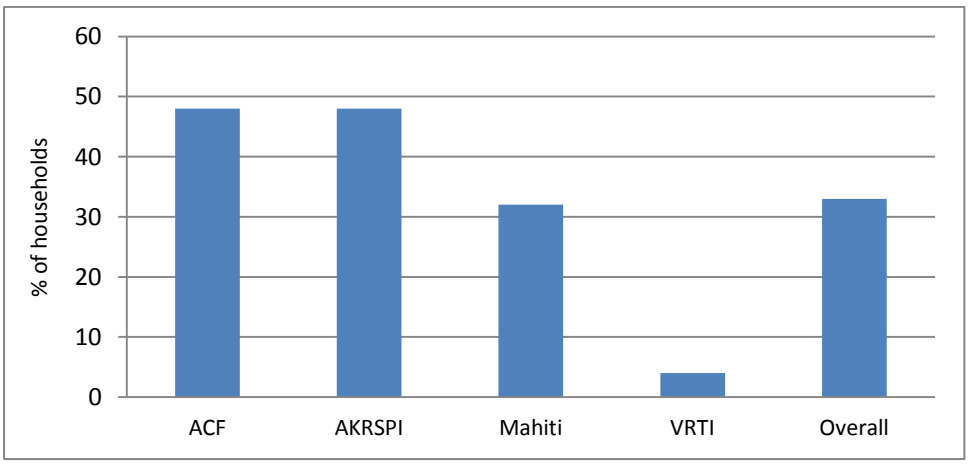

Figure 2-7 Percentage of sample HH having piped water infrastructure

In terms of the quality of water collected from various sources, nearly all households in AKRSPI and VRTI areas felt that the collected water was of 'medium' quality. However in ACF, 40 per cent of the households felt that water was of medium quality while 20 per

cent said it was of poor quality. In Mahiti, 72 per cent of the households felt that water was of medium quality while 24 per cent said it was of poor quality.

Thus, it can be seen that across summer, monsoon and winter, most of the families in AKF and AKRSPI were dependent on the community hand pump or water tap in their village for drinking and domestic water needs. In the case of Mahiti and VRTI, while dependence on the community hand pump or water tap remained, water source outside the village became an important source of drinking water for the families. Also, for collection of water for domestic use, the village pond emerged as the predominant source in Mahiti but not in VRTI. The quality of collected water was perceived by most households to be medium to poor. Piped water infrastructure, though available in many locations did not ensure regular or reliable supply of water.

2.2 Drudgery involved in water collection

The drudgery involved in collection of water had a number of dimensions. Firstly, a large proportion of families, especially in Dholera and Rajula had to make more than 3 trips a day for collecting water (see Figure 2-8 and Figure 2-9). Even in the case of ACF and AKRSPI, a majority of households had to make at least 2-3 trips per day to get sufficient water for their requirement. A look at the number of trips made by control households (Figure 2-10) for drinking as well as domestic water collection also revealed more than 50% of households making more than 3 trips a day. Figure 2-

Khun village, Dholera

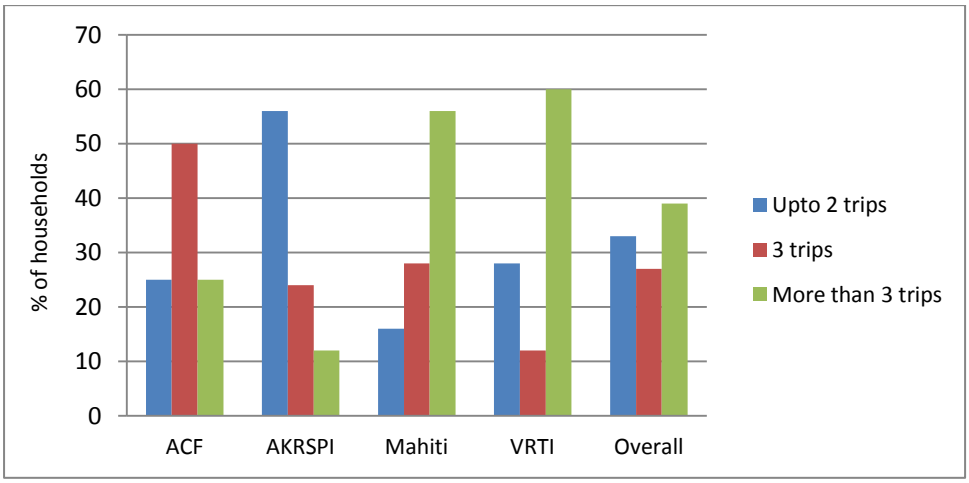

Figure 2-8 Number of trips for drinking water collection by sample HH

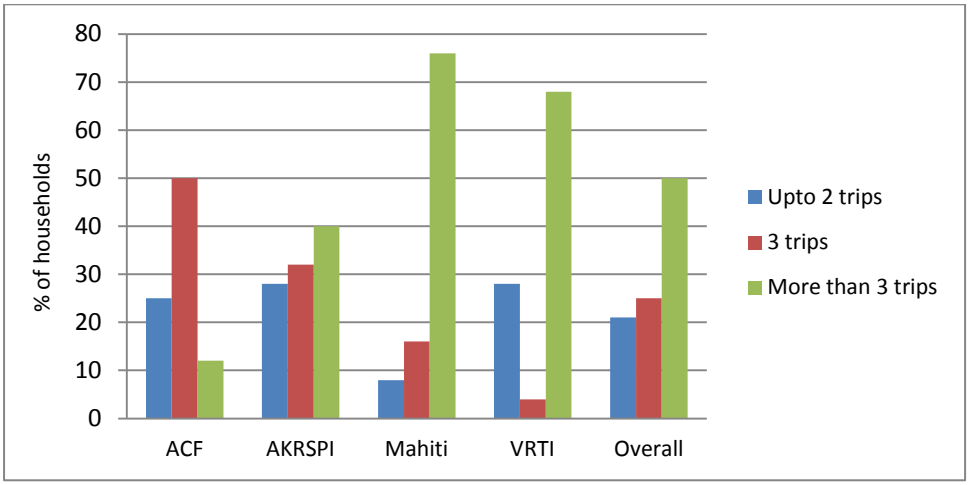

Figure 2-911 Number of trips for domestic water collection by sample HH

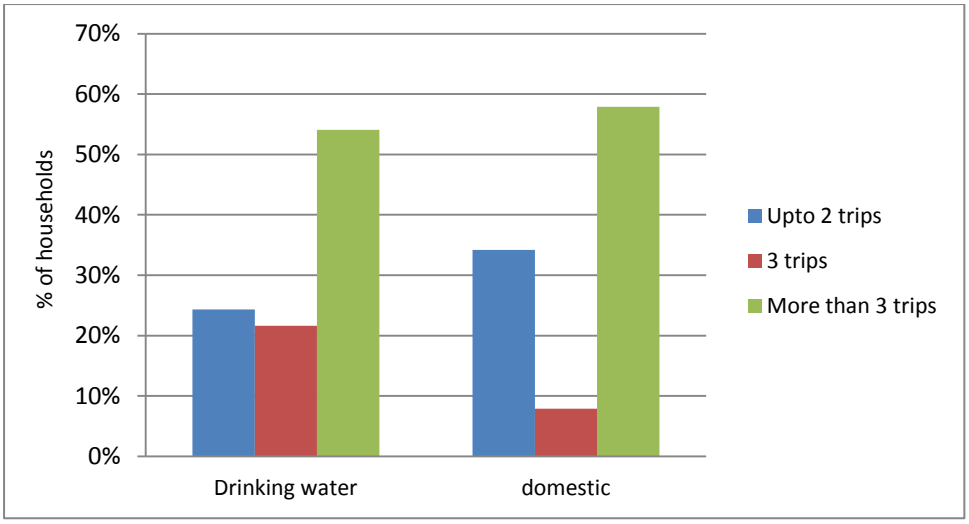

Figure 2-12 Number of trips for drinking and domestic water collection by control HH

Secondly, it was observed that each member of the family had to carry a huge amount of weight of at least 2-3 *bedas*[1] per trip, with each *beda* containing approximately 10-15 litres of drinking water. Water for domestic use was collected in larger 20 litre cans or barrels as can be seen in the pictures below.

Khun village, Dholera

Kanjotar village, Kodinar

[1] Vessels or pots for carrying water

Gogla village, Dholera

Figure 2-13 below shows a comparison of daily water collection by sample households across different ISAs. From the figure, it can be seen that on an average, households collected a higher quantity of water for domestic use as compared to drinking water. This fact is also borne out by control sample data as shown in Figure 2-14. Also, families in ACF and AKRSPI's operational areas collected lesser amount of water for drinking and domestic use as compared to their counterparts in Mahiti and VRTI.

The figure highlights the fact that households in Dholera and Rajula faced greater water scarcity before construction of the RRWHS, necessitating collection of higher amounts of water per trip as well as more number of trips for collecting water.

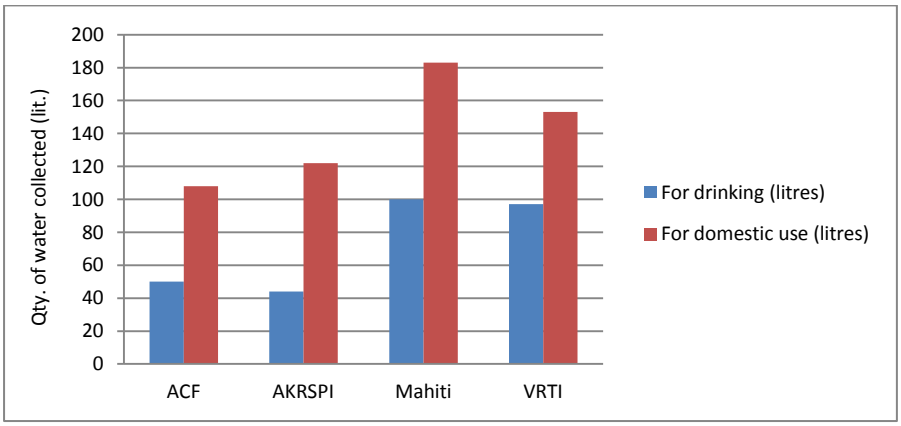

Figure 2-13 Quantity of daily water collected per sample HH

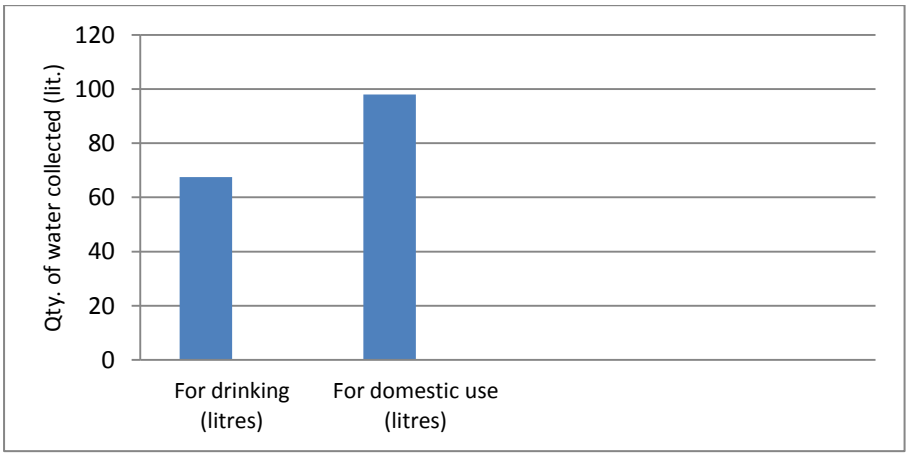

Figure 2-14 Quantity of daily water collected per control HH

The third dimension of drudgery related to the distance travelled by families to collect water. Figure 2-15 and Figure 2-16 show that 84 per cent and 64 per cent of families in Mahiti and VRTI respectively had to travel more than half a kilometre to get water for drinking and domestic use. In fact, in the case of Mahiti, not even a single household reported being able to get water within 250 meters (the lowest distance considered for analysis) and 4 families reported travelling upto 6 to 8 kilometres outside their village in order to collect drinking water.

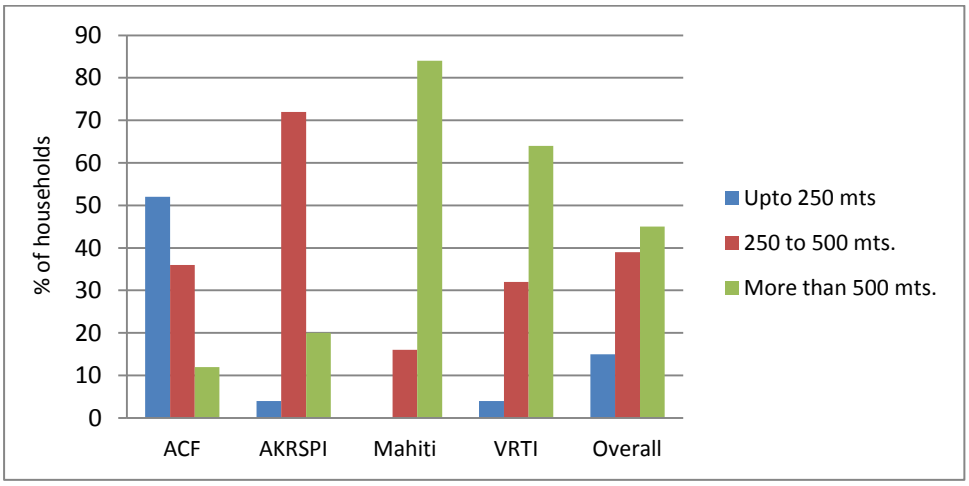

Figure 2-15 Distance travelled by sample HH to collect drinking water

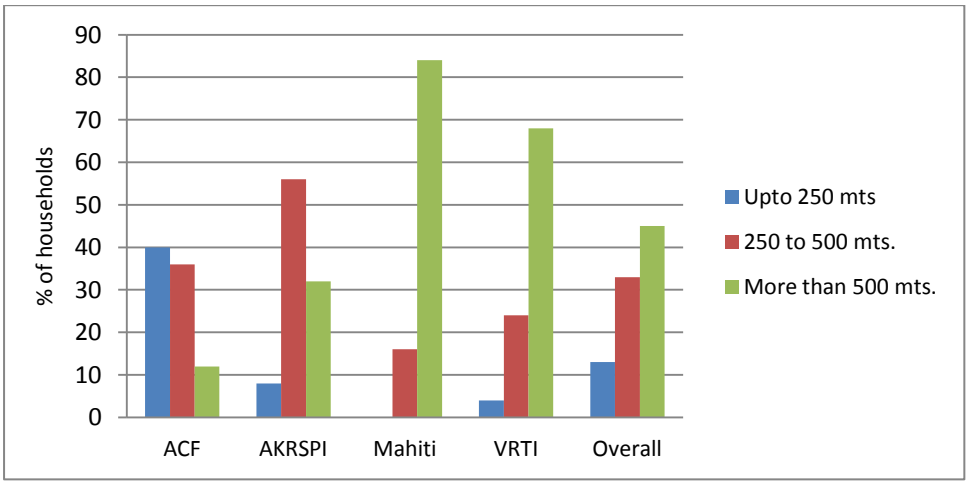

Figure 2-16 Distance travelled by sample HH to collect domestic water

An analysis of control sample data (Figure 2-17) also confirms the finding that a majority of households have to travel more than half a kilometre for getting water, with 85% of control households claiming to travel farther for drinking water as compared to 55% for water for domestic use.

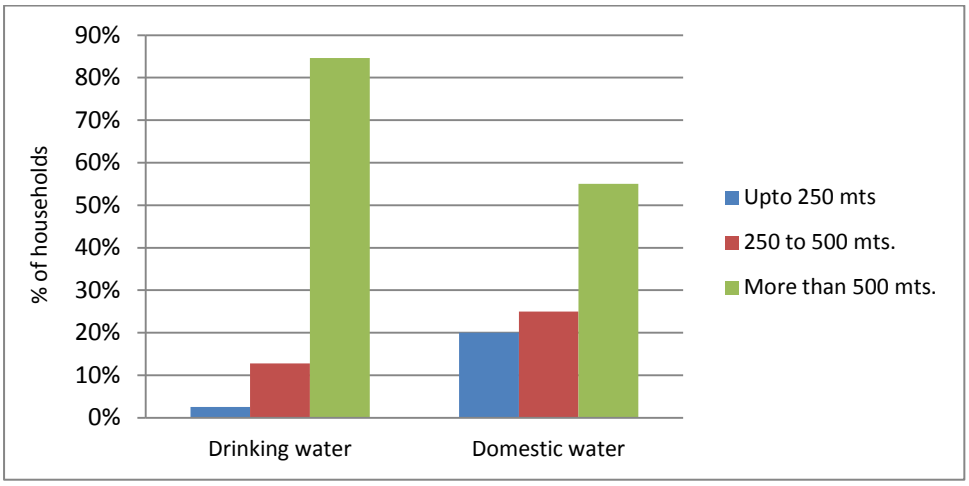

Figure 2-17 Distance travelled by control HH to collect drinking and domestic water

As if the number of trips involved in collection of water, the weight of water containers carried and the distance travelled was not enough, the drudgery involved in collection of water got further aggravated by the fact that a huge amount of time got wasted in water collection. Figure 2-18 shows that 61% of sample families spent upto 3 hours a day to collect water for drinking and domestic use including waiting, filling and travel time. Another 19% of households spent upto 5 hours a day and 7% spent more than 5 hours a day (in some cases upto 8 to 10 hours) on collection of water. This situation was confirmed by control sample data where 67% of control households reported spending upto 3 hours a day on water collection (Figure 2-17).

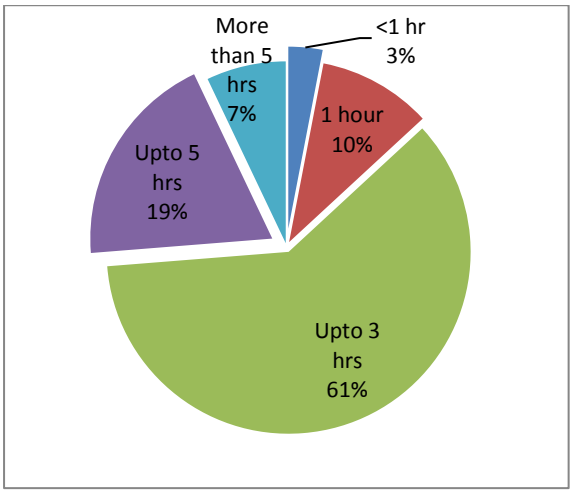

Figure 2-18 Total time taken for water collection by sample HH

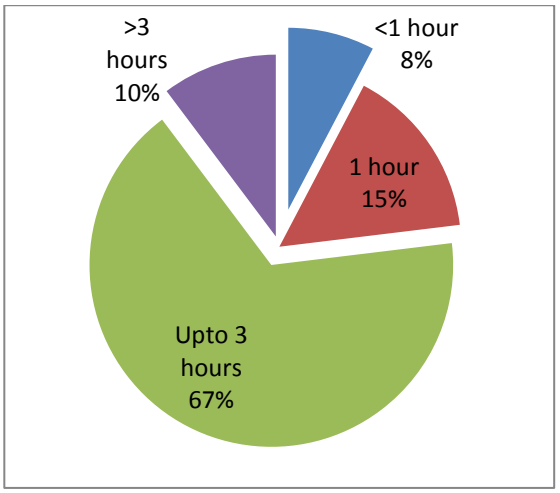

Figure 2-17 Total time taken for water collection by control HH

2.3 Socio-economic costs

The direct economic costs involved in collection of water included rent for rickshaw, *chhakda* or bullock cart for transporting the water which ranged from between Rs. 50-

200/- per day with rent generally going up in summer as water demand surged. 72% of ACF households, 76% of AKRSPI households, 48% of Mahiti households and 52% of VRTI households reported that both the husband (head of household) and wife shared the responsibility for water collection. The fact that a majority of families spent at least 3 hours a day in collecting water meant that one person in every household had to lose a day's wages (Rs. 150-200/-) on account of water collection.

Indirect economic costs associated with water collection included higher school dropouts in case of girls as 72% of girls below the age of 18 years were involved in collection of water as compared to just 7% of boys in the same age group. Also, those households who could not afford to hire a means of transporting water, did so on their bicycles or on foot. This resulted in regular maintenance costs of the bicycle or health costs due to swelling in legs on account of the long distances travelled etc.

Kamatalav village, Dholera

Due to the difficulty in getting potable water, a high incidence of water-borne diseases like jaundice, typhoid, diarrhoea etc. before the construction of RRWHS was also reported by households. Figure 2-18 shows that the average yearly health expenditure borne by households on treatment of water borne diseases varied from Rs. 1280-2100/- per household.

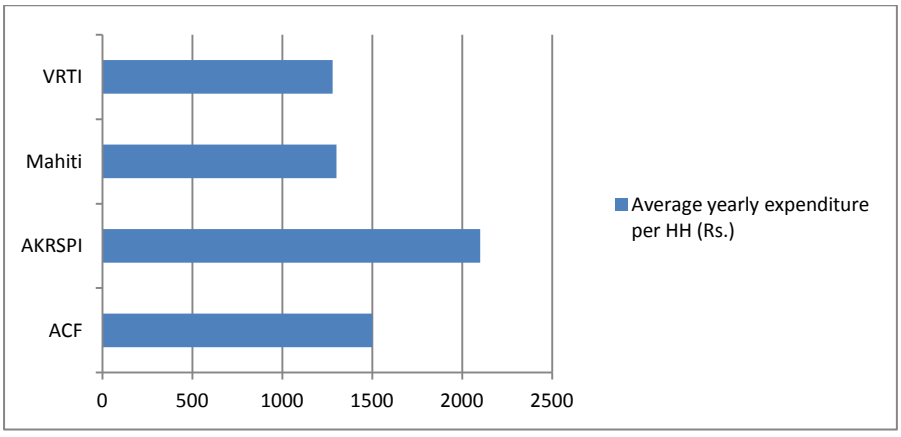

Figure 2-18 Expenditure on treatment of water-borne diseases

3 Project implementation

3.1 Design and construction of the RRWHS

Although the designed capacity of the RRWHS under the project was 7,000 litres, most people in reality constructed much larger underground tanks with capacities of upto 30,000 litres in some cases (Table 3-1 Capacity of RRWHS). While factors like household size, available space and affordability played an important role in their decision to construct larger tanks, it was generally seen that people were willing to contribute more money and labour for the structure since they saw it as a one-time investment.

Table 3-1 Capacity of RRWHS

	Name of ISA	Capacity of RRWHS constructed (lit.)
1	ACF	7,400-10,000
2	AKRSPI	7,543-14,320
3	Mahiti	7,000-30,000
4	VRTI	7,326-10,586

In terms of design, while the RRWH structures in ACF and AKRSP were circular in shape, those in Mahiti were rectangular while in VRTI, they were a mix of rectangular and circular designs. Due to the clayey soil in Dholera, the CC lining in the tank had to be covered with a layer of brickwork to prevent cracking of the CC due to expansion and contraction. This problem was however not faced in other locations. In Kodinar, Maliya, Mangrol and Veraval, RRWH structures were made using the locally available *bela* stone. Even in Amreli, structures were made of either *bela* masonry work lined with cement plaster or RCC. Pipes installed to collect roof water and direct it to the underground tank were made out of PVC.

Kanjotar village, Kodinar

Khun village, Dholera

Construction of a filtration chamber, toilet and bathroom along with the RRWHS was emphasised since the beginning itself by each of the ISAs. However, the degree of emphasis varied across different organisations. Thus in Mahiti, toilet construction along with the RRWHS was compulsory, without which the payment instalment was not released. However, this was not a requirement in ACF which felt that benefits should be given to the community without any pre-conditions. AKRSPI's experience showed that despite making beneficiaries aware of its advantages, most of the filtration chambers constructed by people ended up being used as garbage bins. Thus, even though 70% of AKRSPI's beneficiaries installed a filtration chamber, the ISA did not actively encourage its construction.

3.2 Role of ISA

The ISA played a vital role in making people aware of the need to adopt the RRWHS to find a lasting solution to the persistent water problems faced by them. 81% of sample households reported that it was the ISA which initially encouraged them to adopt the RRWHS. At the start of the project, beneficiary selection was undertaken by the ISA with due emphasis on inclusion of BPL, SC, ST, landless, small and marginal farmers, widows and differently-abled in consultation with the village community.

Khun village, Dholera

Besides selection of beneficiaries, the ISA provided training and demonstration on point-of-use water purification methods such as use of chlorine tablets as well as post construction maintenance issues like underground tank cleaning and keeping water protected from sunlight. In addition, the ISA played an important role in facilitating construction of toilets and bathrooms by RRWHS beneficiaries as well as in assisting with procurement of construction material where required.

Chhatroda village, Veraval

A cash subsidy of Rs. 20,200/- was also provided by the ISA for construction of the RRWHS which was released as per the following schedule:

i. 1st instalment: 40% on digging of pit and laying of concrete base
ii. 2nd instalment: 30% on completion of masonry work and plastering
iii. 3rd instalment: 30% on installation of tank lid, handpump and pipes.

Beneficiary households also contributed towards construction of the RRWHS through cash and labour. While cash contributions ranged from Rs. 4,000-30,000/- depending on the size of the underground tank, people also provided 25-30 mandays (the average time taken for construction of an RRWHS) of own labour.

3.3 Challenges faced by ISA in implementation

Ambuja Cement Foundation

In the beginning, it was difficult for ACF to select beneficiaries for the RRWHS structure as there were competing demands from various sections of the village community. Those who were aligned with/close to the Water and Sanitation Committee members or Sarpanch put pressure for including their name in the list of beneficiaries. Final selection was however done on the basis of the BPL details duly signed by the Sarpanch. ACF also took a declaration from the beneficiary that the RRWHS is being constructed on his/her own land, which was signed and stamped by the Sarpanch and *Talati*.

Aga Khan Rural Support Programme – India

One of the implementation challenges faced by AKRSPI was to ensure timely completion of RRWH structures. Since beneficiary families contributed their own labour during construction, this sometimes caused delays since the beneficiaries - especially poor families who were daily wage workers – dug according to their priority and available time. The ISA felt that a clear 6-month period for construction before the start of the monsoon season was therefore necessary to ensure that the RRWH structures could be completed in time.

Another challenge faced by AKRSPI was the lack of godown or storage facilities for keeping construction material safely.

Mahiti

One of the key challenges faced by Mahiti during implementation of the RRWHS initiative was that due to the clayey soil type in the area, access to villages was greatly

hampered and no construction work could be carried out during the monsoon or post-monsoon period. Once conditions became drier closer to winter, there was not enough water left for watering the RRWHS structure during its construction to set the cement.

Another challenge faced was that the RRWHS beneficiaries were reluctant to install a hand pump to pull the water from the tank due to perceived problems in its long-term servicing and maintenance. This issue required a lot of convincing on the part of the ISA to explain why installing a hand pump was necessary to enable old people and pregnant women to use the tank, upon which the beneficiaries agreed.

People generally also had issues with installing a filtration chamber due to the extra expense involved. However, this problem was also resolved by the ISA after discussions.

Vivekanand Research and Training Institute

During implementation, VRTI faced pressure from influential sections of the village community to include their name in the beneficiary list.

Another challenge was to ensure timely release of payment instalments to people for construction of the RRWHS. For instance, people were extremely unhappy about the fact that they had already dug the pit for the RRWHS tank but the 1st instalment had not been released. This delay sent discouraging signals in the community regarding adoption of RRWHS. VRTI felt that timely payment linked to the different stages of construction of the RRWHS should be given priority.

4 Impact of RRWHS

Figure 4-1 highlights the key enabling factors that have influenced the adoption of the RRWHS by the rural community. While the major factors reported by beneficiaries for adoption include the ability to store water, saving of water collection time and improvement in water quality, wider socio-economic benefits and improvement in the sanitation and hygiene of the community are other equally important impacts of the RRWHS.

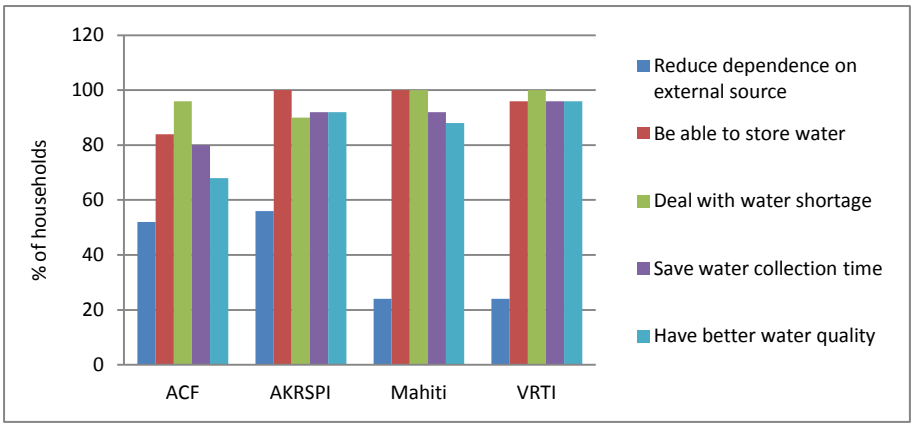

Figure 4-1 Reasons to adopt RRWHS

4.1 Providing storage of water

One of the biggest advantages of the RRWHS has been that it has provided beneficiary households the ability to store water, thereby giving them drinking water security. The structure has become an "asset" for families with the underground water tank providing them huge peace of mind. As Meenaben Valjibhai Radhani of Khun village in Dholera puts it, "God has come to the village in the form of the *taanka*". Also, since many households have constructed larger tanks and are able to store greater quantities of water, they have also started using this water for other purposes such as bathing, toilets and house or utensil cleaning as can be seen from Figure 4-2.

Kadiyali village, Rajula

Families are now in a much better position to deal with water shortage or higher water need when they have guests or a social event. Also, seasonal dependence on different sources of water has reduced since people are able to store water. 16 per cent (ACF), 32 per cent (AKRSPI) and 56 per cent (Mahiti & VRTI) of beneficiary families claimed that the RRWHS water was not sufficient

to last them until summer. In such cases, where piped water supply is available, people fill the underground tank with this water. Else, they get a water tanker to fill the underground tank which usually costs Rs. 400-500/- for 10,000 litres. In absence of storage facilities for water before the RRWHS, this would not have been possible.

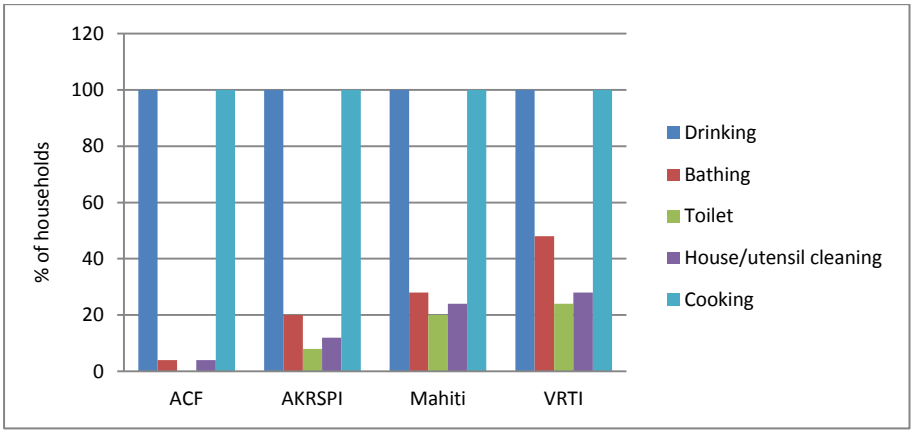

Figure 4-2 Needs fulfilled by RRWHS

4.2 Saving water collection time

Besides significantly reducing the drudgery of undertaking frequent trips, carrying water containers and travelling long distances, adoption of RRWH structures has enabled beneficiaries to save considerable time which was earlier spent on water collection. While 61% of sample and 67% of control households had earlier reported spending upto 3 hours on collection of water, Figure 4-3 highlights that around 70 per cent of families in ACF, AKRSPI and VRTI and 56 per cent families in Mahiti reported saving at least 2-3 hours every day as a result of construction of the RRWHS. In fact, time savings to households in the case of Mahiti and VRTI have been even more significant considering that they had to travel longer distances to get water earlier.

Baarpatoli village, Rajula

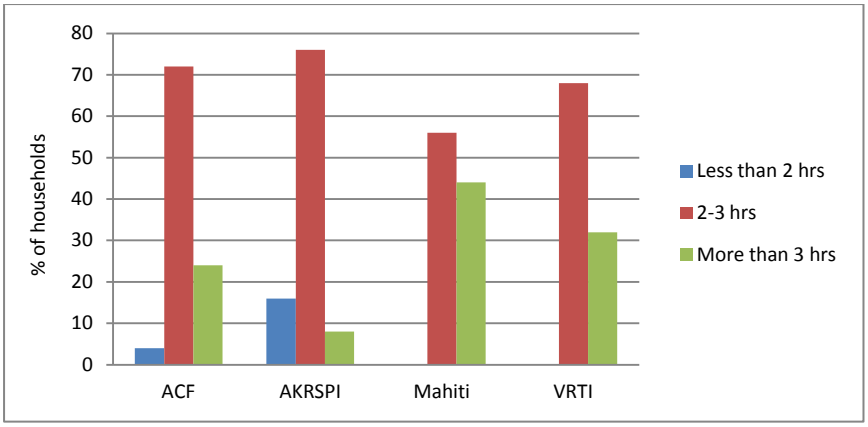

Figure 4-3 No. of hours saved by RRWHS

4.3 Socio-economic benefits

The construction of the RRWHS has resulted in a number of direct and indirect economic as well as social benefits for the community. Direct economic benefits include saving of water transportation costs to the tune of upto Rs. 200/- per day and potential to earn an equal amount as daily wage for labour work due to saving of time on collection of water. Indirect economic benefits include lower medical treatment expenses as a result of reduction in the incidence of water-borne diseases in the community post the construction of the RRWHS.

Social benefits of the RRWHS include improvement in school attendance levels, especially of girls who were earlier involved in collection of water. For the women of the household, the time saved on collection of water is now being used not only on household chores and to give greater attention to their children's education but also on going out to seek labour work, thereby improving the overall economic condition of the household. 82% of sample households also reported change in their social status post construction of the RRWHS. Another significant social benefit to the beneficiaries has been an improved sense of belonging to the community since people are now able to give more time to activities and social events in the village.

4.4 Improving water quality

The RRWHS has provided people with much better quality of water than they were previously getting from different sources. 100 per cent of sample households across all locations perceived water quality post the RRWHS to be good with not even a single household reporting medium or poor quality water. This was also confirmed during the survey where the research team

Khun village, Dholera

tasted water from the underground tanks in each location and found the water to be sweet tasting.

Families purified this water further using a variety of water purification methods. While 82% of sample households used chlorine tablets, 9% of the households used a fine cloth for filtering the water before drinking. Instances of using lime to keep the water clean and odourless were also reported in a few cases. In one case, a family in Kodinar put fish in the tank for keeping water clean.

4.5 Improving sanitation and hygiene

As discussed in Part 3 of this report, the ISA encouraged construction of toilets and bathrooms along with the RRWHS. Previously, people used to bathe in the compound of their house and go to the fields in order to relieve themselves. This was especially difficult for women and adolescent girls who had to wait until it got dark in the evening as also for the elderly and differently-abled. Construction of toilets and bathrooms as well as availability of water at home post the RRWHS has thus provided much needed relief to the community.

Rahtalav village, Dholera

Chhatroda village, Veraval

Along with increased use of toilets, people have also started maintaining better hygiene by washing their hands and bathing regularly as can be seen from Figure 4-4. This behavioural change, which can have lasting positive health impact on the community, is seen across all locations.

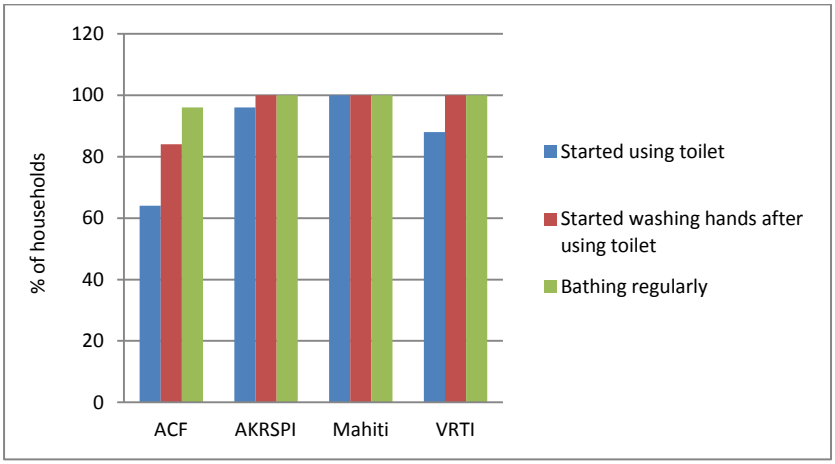

Figure 4-4 Improvement in health and hygiene practices

5 Potential for scale up

5.1 Unmet demand in existing villages

Discussions with the ISAs revealed that there is huge unmet demand for the RRWHS not only in newer areas but also in existing villages where all potential beneficiaries could not be covered due to funding constraints. Also, as awareness about the benefits of the RRWHS spread with people starting construction, other people who were initially reluctant or unwilling to join started showing interest.

An analysis of control sample data on the reasons for households not adopting the RRWHS shows that not even a single control household reported easy availability of water from existing source as a reason for not adopting the RRWHS. While high cost and lack of space to accommodate the structure were the two key reasons, at least 20 per cent of the control households in each location reported that they had either gone out for work at the time of beneficiary selection or the required number of beneficiaries from their village had already been enrolled. These can be the potential beneficiaries of the next phase of RRWHS provision.

5.2 Willingness to contribute

Families which have not been able to construct the structure are willing to do so, for which they are also ready to take an interest-free loan, if offered by the ISA. In terms of the amount of beneficiary contribution required for construction of the RRWHS, control households in AKRSPI were willing to pay between Rs. 3,000-5,000/-; in Mahiti between Rs. 2,000-10,000/- and in VRTI, between Rs. 4,000-9,000/- while in the case of ACF, no specific amount was mentioned. However in general, control households were willing to pay whatever cash contribution was required for construction along with their labour. This willingness to pay is proof of the huge benefit that people perceive from adoption of the RRWHS.

6 Findings and recommendations

1. The most significant impact of construction of the RRWHS is that it has provided a means for people to store water, thereby giving them drinking water security. People are now able to better address water shortages - whenever water levels dip in the underground tank, people now have the option of filling up the tank with piped supply or with water bought from the market – an option which was unavailable previously.

2. The RRWHS has been able to reduce the drudgery previously faced by beneficiaries in undertaking frequent trips, carrying water containers and travelling long distances for collection of water. Most importantly, this has led to huge savings in terms of time spent on water collection, which earlier ranged from 3 to 5 hours a day. There have also been a number of economic and social benefits of the RRWHS which include saving of water transportation costs of upto Rs. 200/- per day, potential of earning wages (between Rs. 150-200/- per day), reduced medical costs (upto Rs. 2,100/- per year) due to lower incidence of water-borne diseases, improvement in school attendance levels of girls, availability of more time for the woman to spend on household chores and with children, improvement in social status and greater participation in social events of the village.

3. Construction of toilets and bathrooms along with the RRWHS was encouraged by ISAs under the project. This was done keeping in mind the challenges faced by women, adolescent girls, elderly and differently-abled due to lack of such facilities at home. As a result, in most locations, toilets and bathrooms have been constructed at the same time as the RRWHS. This initiative has therefore provided much needed relief to the beneficiary families and has gone a long way in promoting better health and hygiene practices in the rural communities.

4. Discussions with ISA staff and control households revealed a huge unmet demand for the RRWHS in existing villages where many families had been left out either due to funding constraints or because they were unavailable at the time of beneficiary selection. Control families also show a high degree of willingness to be part of the initiative and contributing cash and labour for the construction.

5. High cost of capital investment and lack of space to construct the RRWHS are the two key disabling factors reported by control households for not adopting the RRWHS. While options may be limited in terms of creating space to accommodate

the structure, a more important task will be to work out innovative financing mechanisms which can enable such households to join.

6. The possibility of replenishing the underground tank with piped supply or water bought from the market seems to be slowly taking away the motivation of people to harvest rain water, thereby sidelining the original objective of this initiative. This can be seen not just in the neglect of the PVC pipes of the RRWHS in a number of households, but also in the increasing willingness of people to pay for the high cost of private water tankers, whenever needed. Increasing income and affordability levels as well as the premium people attach to convenience in the current socio-economic scenario could explain such a trend.

7. The role of the ISA in motivating people to adopt the RRWHS has been widely appreciated by the beneficiaries. Beginning with the selection of poor and marginalised families; providing awareness and training on water purification and maintenance of the structure; offering technical assistance during construction to the timely release of cash subsidy as per the different stages of construction, the ISA has played a pivotal role in ensuring the success of this initiative.

8. A few of the ISAs which had constructed circular tanks were of the opinion that rectangular tanks are liable to develop cracks owing to the distribution of water load on the four corners of the tank as compared to a circular design in which the weight of water was distributed equally. This aspect needs to be verified so that a technically sound design of underground tanks can be adopted in subsequent phases of the project.

9. Mahiti felt that a ceiling of 7,000 litres capacity of the RRWHS tank as mandated by the project was unrealistic and a higher capacity tank (at least 10,000 litres) would have been ideally suited to meet an average household's water requirements. According to them, the decision on size of the tank should have been made based on beneficiary consultation, rather than fund availability. This suggestion is also corroborated by the findings of the study in which, space permitting, most households have gone for larger capacity underground tanks.

10. Another suggestion received regarding design was to use flexible pipes instead of PVC pipes since these could be rolled and stored away in case families migrated for work. It was felt that PVC pipes were inflexible, difficult to uninstall after monsoon and prone to wear and breakages due to exposure to the sun, thereby affecting their

useful life. This seems to be a good suggestion which could be looked into, subject to availability of good quality flexible pipes.

11. Beneficiary families contributed their own labour for construction, for which they had to take time off work and suffer possible wage losses. Since labour availability is both difficult as well as costly, own labour contribution works as the best alternative to getting hired labour for beneficiary families. Thus, in order to minimise loss of wages as well as to ensure timely completion of the structures, it is important for the ISA to make a realistic assessment of the time needed for construction in consultation with the beneficiary so that construction could be completed before the onset of the monsoon season and with minimum disruption to the livelihood of the beneficiary household.

12. Since ISAs generally offered assistance in procuring construction material in bulk so that beneficiaries could get better prices, one of the felt needs was to have a godown or storage facility - preferably in every village where RRWHS was being constructed - where this material could be kept safely.

13. Timely release of payment instalments to the beneficiaries based on stage of completion of the structure needed to be given greater priority since delays on this account could possibly de-motivate the community and undo the enormous effort that had been put into convincing people to adopt the RRWHS.

ફોર્મ નં.

પ્રાથમિક સર્વેક્ષણ પ્રશ્નાવલિ
ગુજરાતના દરિયાકાંઠાના છેવાડાના સમુદાયો માટે વરસાદી પાણીના સંગ્રહ માટેના માળખા (ટાંકા)
ના પ્રભાવ મૂલ્યાંકનનો અભ્યાસ

તારીખ: સંશોધન કર્તાનું નામ:

ગામ: તાલુકો: જીલ્લો:

વિભાગ -૧: કુટુંબ અને વ્યવસાય અંગેની વિગતો

1. ઘરની મુખ્ય વ્યકિતનું નામ:

_____

2. જાતિ: એસ.સી _____ એસ. ટી. _____ ઓ.બી.સી. _____

સામાન્ય_____

3. આર્થિક શ્રેણી: બીપીએલ _____ એપીએલ _____

4. કુટુંબમાં સભ્યોની સંખ્યા: પુરુષ _____ સ્ત્રી _____

છોકરાં _____ છોકરી _____

(૧૮ વર્ષથી નાના) (૧૮ વર્ષથી નાના)

5. મુખ્ય વ્યવસાય (ટીક કરવું)

i. ખેતી _____ ii. રોજ મજુર_____ iii. સ્વાયત ધંધો _____

iv. નોકરી _____ v. અન્ય (વિગતે જણાવો)_____

6. જો મુખ્ય વ્યવસાય ખેતી હોય તો, કુટુંબ કેટલી જમીન ધરાવે છે? (ઉત્તરદાતા જે પણ એકમમાં કહે તે એકમમાં લખવું)

_____

7. તમારી અંદાજિત વાર્ષિક આવક કેટલી છે?

_____

8. ઘરનો પ્રકાર (ટીક કરવું): કાચું_____ પાકું_____ આંશિક પાકું_____

9. કુટુંબની સંપત્તિ (એક કરતાં વધુ જવાબો પણ ટીક કરવાં)

મોબાઇલ_____ ટી.વી_____ ફ્રીજ_____ મોટર સાઇકલ_____

વિભાગ - ૨: માળખા (ટાંકા) પહેલાંની આકારણી

10. તમારા ઘરમાં પાણી માટે નળની વ્યવસ્થા છે? હા/ના

જો હા, તો માસિક ભાડું કેટલું છે?_____

11. માળખાંના બાંધકામ પહેલાં તમે પરિવાર માટે પાણી કયાંથી મેળવતા હતા? (ટીક કરો)

i. પીવા માટેનું પાણી

	સાર્વજનિક નળ/કુવા માંથી	ગામના તળાવ માંથી	બહાર ગામથી
ઊનાળામાં			
ચોમાસામાં			
શિયાળામાં			

ii. ઘરેલું વપરાશ માટેનું પાણી

	સાર્વજનિક નળ/કુવા માંથી	ગામના તળાવ માંથી	બહાર ગામથી
ઊનાળામાં			
ચોમાસામાં			
શિયાળામાં			

12. ભેગો કરવામાં આવતો પાણી જથ્થો, તે માટે કાપવું પડતું અંતર અને લાગતો સમય:

	ફેરાની સંખ્યા	ઉંચકીને લઇ જવામાં આવતા વાસણોની સંખ્યા	ભેગું કરેલું પાણી (લીટરમાં)	કાપવું પડતું અંતર	લાગતો સમય
પીવાનું પાણી					
ઘરવપરાશ માટેનું પાણી					

13. પાણી એકઠું કરવા તમારે કેટલાં વાસણો લઇ જવા પડે છે? _____

14. રોજે રોજ પાણી એકઠું કરવાની કામગીરી કોના દ્વારા કરવામાં આવે છે?

i. ઘરના મુખ્ય વ્યક્તિના પત્નિ_____ ii. દીકરી/દીકરાની વહુ_____ iii. ઘરની મુખ્ય વ્યક્તિ_____iv. દીકરો _____

15. શું પીવા અને ઘર વપરાશના પાણીના એકત્રિકરણ માટે કોઇ ખર્ચ થાય છે?

જો હા, i. પીવાના પાણી માટે દૈનિક કેટલો ખર્ચ થાય છે?_____

ii. ઘર વપરાશના પાણી માટે દૈનિક કેટલો ખર્ચ થાય છે?_____

16. કયાં-કયાં ઘરગથ્થુ કામો માટે પાણીનો ઉપયોગ કરવામાં આવે છે? (લાગુ પડતાં દરેક ઉત્તરોને ટીક કરો)

i. નહાવા_____ ii. હાજતે _____ iii ઘર/વાસણોની સફાઇ માટે_____

iv. રાંધવા માટે_____ v. અન્ય ઉપયોગ (વિગત જણાવો)_____

17. ટાંકા પહેલાં પાણીની ગુણવત્તા માટે તમારું શું માનવું હતું? (ટીક કરો)

i. સારી_____ ii. મધ્યમ _____ iii. ખરાબ_____

18. જૉંડિસ, ટાઇફાઇડ, ઝાડા, થાઇરોઇડ જેવાં પાણી જન્ય રોગ ઉપરાંત અન્ય કારણોસર તમે પાણી પાછળ આશરે કેટલો વાર્ષિક ખર્ચ કરતાં હતાં?

_____

_____

19. પીવાના પાણીને કેવી રીતે શુદ્ધ કરતાં હતાં? (ટીક કરો)

i. કલોરિનની ગોળી_____ii. આર.ઓ._____iii. યુ.વી._____ iv. કાપડના ગરણાથી_____

v અન્ય રીતે (વિગત જણાવો.)_____

વિભાગ –૩: ટાંકા ના અમલીકરણ બાદની આકારણી

20. બાંધકામ અપનાવવા માટેતમને કોણે પ્રોત્સાહિત કર્યા?

i. ઘરના મુખ્ય વ્યક્તિ _____ ii. ઘરના મુખ્ય વ્યક્તિના પત્નિ_____ iii. પડોશી_____

iv. એન.જી.ઓના કાર્યકર્તાઓએ_____

21. ટાંકા નું બાંધકામ પુર્ણ કરતાં કેટલા દિવસ લાગ્યા? _____

22. ટાંકાની ક્ષમતા કેટલી છે? (લીટરમાં) _____

23. માળખાનાં બાંધકામમાં તમે શી રીતે સહકાર આપ્યો?

i. રોકડ _____ (રૂ.) ii. મજૂરી _____ (કેટલાં દિવસ?)

24. ટાંકા માટે એન.જી.ઓ દ્વારા શું સહકાર મળ્યો? (ટીક કરો)

i. રોકડ _____ ii. મજૂરી_____ iii. જરૂરિયાત અંગેની જાગરૂકતા _____ iv. જરૂરી સામાન મેળવી આપવો_____

25. શું એન.જી.ઓનો સહકાર સમયસર મળ્યો હતો? હા/ના _____

26. નીચેમાંની કઇ જરૂરીયાતો હાલમાં માળખા દ્વારા સંતોષાઇ રહી છે? (લાગુ પડતાં દરેક ઉત્તરોને ટીક કરો)

i. પીવાની_____ ii. નહાવાની_____ iii. હાજતની _____ iv. ઘર/વાસણ સફાઇની_____

v. રાંધવાની_____ vi. અન્ય (વિગત જણાવો.)_____

27. હાલમાં તમે પીવા માટે કેટલાં લીટર પાણીનો ઉપયોગ કરો છો? _____

28. ઘરેલું કામ માટે હાલમાં તમે કેટલાં લીટર પાણીનો ઉપયોગ કરો છો? _____

29. કોઇ સિઝનમાં માળખા દ્વારા જરૂરિયાત પ્રમાણેના પાણીની માત્રા મેળવવામાં સમસ્યા ઊભી થાય છે?હા/ના

જો હા, તો મે. કરી વિગત જણાવો.:

i. ઊનાળો

_____

_____

ii. ચોમાસું_____

_____

iii. શિયાળો_____

_____

30. ટાંકા દ્વારા મળતા પાણીની ગુણવત્તા વિશે તમે શું માનો છો? (ટીક કરો)

i સારી_____ ii. મધ્યમ _____ iii. ખરાબ_____

31. પીવાના પાણીને તમે કેવી રીતે શુદ્ધ કરો છો? (ટીક કરો)

i. કલોરિનની ગોળી_____ ii. આર.ઓ._____ iii. યુ.વી._____ iv. કાપડના ગરણાથી_____

v. અન્ય રીતે (વિગત જણાવો.)_____

32. માળખાને અપનાવવા પાછળ કયાં કારણો જવાબદાર હતાં? (લાગુ પડતાં દરેક ઉત્તરોને ટીક કરો)

i. પાણીના બાહ્ય સ્ત્રોત ઉપરની નિર્ભરતા ઘટાડવા _____

ii. પાણીના સંગ્રહ કરવાની સક્ષમતા કેળવવા_____

iii. પાણીની તંગીના ઉકેલ માટે_____

iv. પાણી ભેગું કરવામાં લાગતા સમયની બચત માટે_____

v. પાણીની સારી ગુણવત્તા માટે _____

vi. અન્ય કારણ (મે. કરી વિગત જણાવો)

_____

33. ઉપર જણાવેલ કારણોમાંથી સૌથી મહત્વનું કારણ કયું હતું કે જેના કારણે તમે માળખાગત બાંધકામને પસંદ કર્યું?

_____

34. ટાંકા ને કારણે રોજ કેટલાં કલાકની બચત થાય છે? _____

35. બચાવેલ સમયમાં તમે કયાં કામ કરી શકો છો?

i. અન્ય કામમાં વધુ સમય આપી શકાય છે _____ ii. ઘરના કામો_____ iii. પરિવાર સાથે સમય વિતાવી શકાય_____

iv. બાળકોના ભણતર_____ v. અન્ય (વિગત જણાવો.) _____

36. માળખાના બાંધકામ પછી તમારા સામાજિક મોભામાં કોઇ સુધારો થયો છે? હા/ના

જો હા, તો મે. કરી વિગતે જણાવો_____

37. માળખા દ્વારા તમારા ઘરની સ્વચ્છતા અને તંદુરસ્તીમાં શું ફેરફાર થયાં? (લાગુ પડતાં દરેક ઉત્તરોને ટીક કરો)

i. શૌચાલયનો ઉપયોગ કરવા લાગ્યા _____

ii. શૌચ બાદ હાથ ધોવા લાગ્યા _____

iii. નિયમિત સ્નાન કરવા લાગ્યા _____

iv. કોઇ ફેરફાર થયેલ નથી _____

38. શું તમે ટાંકા માળખાની નિયમિત સફાઇ કરો છો? _____

જો હા, તો કેવી રીતે?

_____

39. જો એન.જી.ઓ ભવિષ્યમાં ટાંકા માટે કોઇ સહકાર/રાહત ન આપે તો તમે પોતે કેટલો સહકાર આપી શકો છો? (ટીક કરો)

i. હાલની માફક (રૂ. ૭,૫૦૦/-) _____ ii. રૂ. ૧૦,૦૦૦/-_____ iii. રૂ. ૧૫,૦૦૦/- _____

40. શું તમે ટાંકા માટે એન.જી.ઓ માંથી વ્યાજ રહિત લોન લેવા માટે તૈયાર છો? હા/ના

જો ના, તો શા માટે?

_____

ફોર્મ નં.

કંટ્રોલ સર્વેક્ષણ પ્રશ્નાવલિ

ગુજરાતના દરિયાકાંઠાના છેવાડાના સમુદાયો માટે વરસાદી પાણીના સંગ્રહ માટેના માળખા (ટાંકા) ના પ્રભાવ મૂલ્યાંકનનો અભ્યાસ

તારીખ: સંશોધન કર્તાનું નામ:

ગામ: તાલુકો: જીલ્લો:

1. ઘરની મુખ્ય વ્યકિતનું નામ:

_____

2. જાતિ: એસ.સી _____ એસ. ટી. _____ ઓ.બી.સી. _____

સામાન્ય_____

3. આર્થિક શ્રેણી: બીપીએલ _____ એપીએલ _____

4. કુટુંબમાં સભ્યોની સંખ્યા: પુરુષ _____ સ્ત્રી _____

છોકરાં _____ છોકરી _____

(૧૮ વર્ષથી નાના) (૧૮ વર્ષથી નાના)

5. મુખ્ય વ્યવસાય (ટીક કરવું)

ii. ખેતી _____ ii. રોજ મજુર_____ iii. સ્વાયત ધંધો _____

iv. નોકરી _____ v. અન્ય (વિગતે જણાવો)_____

6. જો મુખ્ય વ્યવસાય ખેતી હોય તો, કુટુંબ કેટલી જમીન ધરાવે છે? (ઉત્તરદાતા જે પણ એકમમાં કહે તે એકમમાં લખવું)

_____

7. તમારી અંદાજિત વાર્ષિક આવક કેટલી છે?

_____

8. ઘરનો પ્રકાર (ટીક કરવું): કાચું_____ પાકું_____ આંશિક પાકું_____

9. કુટુંબની સંપત્તિ (એક કરતાં વધુ જવાબો પણ ટીક કરવાં)

મોબાઈલ_____ ટી.વી_____ ફ્રીજ_____ મોટર સાઈકલ_____

10. તમારા ઘરમાં પાણી માટે નળની વ્યવસ્થા છે? હા/ના

જો હા, તો માસિક ભાડું કેટલું છે?_____

11. તમે પરિવાર માટે પાણી કયાંથી મેળવો છો? (ટીક કરો)

iii. પીવા માટેનું પાણી

	સાર્વજનિક નળ/કુવા માંથી	ગામના તળાવ માંથી	બહાર ગામથી
ઊનાળામાં			
ચોમાસામાં			
શિયાળામાં			

iv. ઘરેલું વપરાશ માટેનું પાણી

	સાર્વજનિક નળ/કુવા માંથી	ગામના તળાવ માંથી	બહાર ગામથી
ઊનાળામાં			
ચોમાસામાં			
શિયાળામાં			

12. ભેગો કરવામાં આવતો પાણી જથ્થો, તે માટે કાપવું પડતું અંતર અને લાગતો સમય:

	ફેરાની સંખ્યા	ઉંચકીને લઇ જવામાં આવતા વાસણોની સંખ્યા	ભેગું કરેલું પાણી (લીટરમાં)	કાપવું પડતું અંતર	લાગતો સમય
પીવાનું પાણી					
ઘરવપરાશ માટેનું પાણી					

13. પાણી એકઠું કરવા તમારે કેટલાં વાસણો લઇ જવા પડે છે? _____

14. રોજે રોજ પાણી એકઠું કરવાની કામગીરી કોના દ્વારા કરવામાં આવે છે?

ii. ઘરના મુખ્ય વ્યકિતના પત્નિ_____ ii. દીકરી/દીકરાની વહુ_____ iii. ઘરની મુખ્ય વ્યકિત_____iv. દીકરો _____

15. શું પીવા અને ઘર વપરાશના પાણીના એકત્રિકરણ માટે કોઇ ખર્ચ થાય છે?

જો હા, i. પીવાના પાણી માટે દૈનિક કેટલો ખર્ચ થાય છે?_____

ii. ઘર વપરાશના પાણી માટે દૈનિક કેટલો ખર્ચ થાય છે?_____

16. કયાં-કયાં ઘરગથ્થુ કામો માટે પાણીનો ઉપયોગ કરવામાં આવે છે? (લાગુ પડતાં દરેક ઉત્તરોને ટીક કરો)

ii. નહાવા_____ ii. હાજતે _____ iii ઘર/વાસણોની સફાઇ માટે_____

v. રાંધવા માટે_____ v. અન્ય ઉપયોગ (વિગત જણાવો)_____

17. પાણીની ગુણવત્તા માટે તમારું શું માનવું હતું? (ટીક કરો)

ii. સારી_____ ii. મધ્યમ _____ iii. ખરાબ_____

18. જૉંડિસ, ટાઇફાઇડ, ઝાડા, થાઇરોઇડ જેવાં પાણી જન્ય રોગ ઉપરાંત અન્ય કારણોસર તમે પાણી પાછળ આશરે કેટલો વાર્ષિક ખર્ચ કરતાં હતાં?

_____

_____

19. પીવાના પાણીને કેવી રીતે શુદ્ધ કરતાં હતાં? (ટીક કરો)

ii. કલોરિનની ગોળી_____ii. આર.ઓ._____iii. યુ.વી._____ iv. કાપડના ગરણાથી_____

v અન્ય રીતે (વિગત જણાવો.)_____

20. ટાંકાનું માળખું ઊભું ન કરવા પાછળ કયાં કારણો જવાબદાર છે? (ટીક કરવું.)

i ઊંચી કિંમત_____

ii હાલના સ્ત્રોત માંથી સહેલાઈથી પાણીની પ્રાપ્યતા _____

iii અન્ય કારણો (મે. કરી વિગતે લખો.)_____

21. ઉપરોકત કારણો માંથી તમારે માળખાં (ટાંકા) ની જરૂરિયાત ન હોવા માટે સૌથી મહત્વનું કારણ કયું છે?

_____

22. ટાંકાની અનિવાર્યતા/ઉપયોગિતા માટે એન.જી.ઓના સભ્યો તરફથી તમને પ્રોત્સાહન સાપવામાં આવ્યું હતું?

_____

23. જો એન.જી.ઓ વ્યાજ વિના લોન આપે તો શું તમે ટાંકાના બાંધકામ માટે ઉત્સુક છો?

i. હા _____ ii ના _____

24. ટાંકાના બાંધકામ માટે તમે કેટલો સહયોગ આપી શકો છો?

_____