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**HARVESTING RAINWATER :**  
**A MEANS OF WATER SECURITY TO RURAL**  
**SRI LANKA**

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## HARVESTING RAINWATER A SOURCE OF WATER 'SECURITY TO RURAL SRI LANKA

### Introduction

Sri Lanka is a tropical country with an average annual rainfall of 1400 mm. More than 70% of rural Sri Lankan population is without suitable drinking water even at the end of the water decade target<sup>1</sup> in 1995. This situation can be attributed to lack of funds, and cost of operation and maintenance water supply infrastructure. The government of Sri Lanka envisages to provide clean drinking water to rural Sri Lanka at least by the year 2010. As the traditional water supply option are having their own limitations due to administrative and location specific reasons, rainwater harvesting was thought as an low cost option, suitable to many rural villages where good drinking water is a major constrain.

### Community Water Supply and Sanitation Project (CWSSP)

In order to achieve water for all the government initiated the CWSSP in 1992 with World Bank assistance. The objectives of the CWSSP is to initiate and construct rural water supply and sanitation infrastructure with total community participation and to establish an institutional structure to operate, maintain and manage rural infrastructure by the community.

To achieve this objective, CWSSP embarked on an initial survey to identify the appropriate sources of water supply to the rural village. With other traditional water supply systems are either too costly or technically not feasible, Rainwater harvesting is the only option available for these rural villages of Sri Lanka.

This paper is a case study of a rain water harvesting project in one such village.

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<sup>1</sup> Though the UM proposed international drinking water and sanitation decade officially which ended in 1990, the decade was extended till 1995 in Sri Lanka to achieve the proposed targets.

### **Case Study Location and Community**

Dematawelhinna is a small village of about 250 households in the Badulla district in the central hills of Sri Lanka. Settlement in this village dates back to late 1960's. Most settlers selected this area as it was close to the Badulla town centre. The area receives an average annual rainfall of 1751 mm . The Badulla district is 2200 ft. above mean sea level while the village Dematawelhinna is 450 ft. above Badulla town centre. The village lies on a steep terrain and has a thick vegetation, of perennial trees, the soils are of well drained Reddish Brown Earth. The village has five natural springs, from which the population depends for their daily water requirement. However, during the dry months of July to October and January to February most of these spring dry-up leaving just a trickle of water for the use of the community. The income pattern of the villagers varies from Rs. 2000-5000 per month depending on the type of employment. About 60% of the household heads are casual labourers with no fixed income. 30% are employed in low paid government jobs while the balance 10% are employed in the Garment Industry. At the time of CWSSP intervention in 1993 there were 204 settler families, however, at present there are 250 families, with the increase in settler families due to second generation settlements.

### **Pre-project Situation**

#### **Water Scarcity and Management**

During the pre-project period these villagers did not have adequate water at site. Villagers say that until 1990 there was plenty of water in the natural springs and they only had to visit the springs for their requirement. However, with the global weather change in the past decade, coupled with deforestation in some parts of the central hills, natural spring water had been drying up. This situation has aggravated annually and good water has been a very scarce commodity.

### **Natural Springs and Fetching Water**

Most villagers collected their daily requirement of domestic water from the five natural springs in the villages. However, few who are closer to the foot hills used water from private wells for a very limited quantity of water. Fetching water for domestic use is a ritual for the women in the village. They visit the water springs at least twice during a day. On a normal day a household spends about 4-6 hours a day fetching just 4-5 pots (40-50 liters) of water. During dry periods they collect water throughout the day, from dawn to mid-night. Long water lines and trickle of water in springs can some-times extend the water collection time period to 08 hours per day. During the dry months of June to August most members of the family including children join in the collection of water throughout the day. During this time it takes at least 1 1/2 - 2 hours to fill a pot of water. A normal household collects 4-5 pots of water per day, there are others who collect as much as 7 cans (25 liters per can) per day due to high domestic requirement (to bath the sick mother and to tend to a large family requirement). Collecting of 7 cans of water take almost a day leaving just a few minutes for lunch. Though there is a scarcity of water most people have been selective in their water needs. They collect drinking water from special springs which they have identified as good for drinking.

### **Water Line Conflicts**

With limited amount of water and high demand, there are long water lines at springs usually identified by "long line of pots" of more than 30-40 at a time.

Conflicts among water collectors is a common occurrence specially when some users bring large containers that take a long time to fill. There has been cases of harassment to children in the "Water Line" specially when children tend to contaminate small water holes with foreign objects.

### **Water Management During Scarcity Times**

Water is a precious resource for these villagers. The 4-5 pots they bring had to be sparingly used. Prior to the Rainwater project villagers had adopted different methods to conserve the limited quantity of water. In a household it is the women, usually the wife or the grown-up daughters in the family who take decisions in utilizing water. In most Dematawelhinna households, women use the water after washing rice to wash the plates and this water is further used for the first wash of cooking pots. Women conserve water by cooking for both breakfast and lunch at the sometime. Where villagers have cattle, they use the water from washing rice for cattle, which incidently can be more nutritious to cattle than plain water. Women insist that the rest of the householders use the collect water sparingly for drinking and non should be thrown away. However, if they have excess it is collected separately for toilet purposes.

All these water management strategies are used, to minimize the number of visits for water collection and to save time.

### **Impact of Water Scarcity on Social Life**

Water, as widely known is the life blood of any culture. Dematawelhinna is no exception to this rule. during the pre-project period, villagers had to restrict their movements due to inadequate water for household use. Fetching water was the most important activity for women in Dematawelhinna. Women with small children had to hand over the household chores like looking after children, to fathers or to in-laws. Shortage of water often restricted social visits and these house holders too did not entertain any visitors, as they could not treat them in the typical traditional ways, due to lack of water. There are instances when

young girls had to abandon their social visits to relatives in distance places, specially during festive times, as they were the sole individuals responsible to collect water for the household. Usually, they collect more water per day to compensate for their absence from the village.

### **Impact on Children**

Fetching water in the nights has often effected school children in their studies. As stated earlier school children also participate in collecting water in the nights specially during the dry season.

A number of occasions school teachers have complained to parents about poor performance of children and non attendance to regular home work. However, parents have not revealed the actual reasons to teachers due to embarrassment.

### **Impact on Physical Health**

Occurrence of water borne diseases which is usually expected in a situation such as Dematawelhinna was not significant in this village. The main reason being the quality of spring water. However, there are other potential physical health problems due to carrying water in steep terrains. The most common complains made by women is back pains and pain in limbs. Also there is a potential danger of lowering of the womb when women carry heavy weights on their heads and shoulders. Though there had been no serious cases reported, constant carrying of water in steep terrains can lead to situations such as slip-disk or permanent ligerment strains.

### **Rainwater Harvesting Project**

Many options of providing water to the village were consider at the initial stages. A natural spring was identified which could provide water to 45 households but the option was discarded as there were 204 settler families. Second option was dug wells. This too was discarded due to elevation problems and high cost of

construction. The third option, Tube-wells were investigated and 15 locations were identified. The cost of the tube well programme was estimated at Rs. 871611 from state support and Rs. 51547 from community contribution. However, this option too was rejected on technical grounds. The fourth option was pumping water from the town water supply tank. The cost estimated for this option was Rs. 3 million. However, the total funds allocated to supply water to Dematawelhinna village was only 1.1 million. Hence, the difference had to be borne by the village community. Under this option each household had to contribute Rs. 2000 as the cost of the option and a monthly Rs. 145 for operation and maintenance of the pump houses.

This option though technically feasible had to be rejected due to cost considerations. The economy of Dematawelhinna villagers are poor thus they could not effort the expected contribution. With all possible regular options failing due to various reasons, Rainwater Harvesting from Roof catchments was decided as the only option available. Total estimated cost of the entire project was Rs. 1314 706 with a total community contribution of Rs. 262025 (20% of project cost) which include labour and material.

Initially the Rainwater option was rejected by the majority due to health reasons. Villagers questioned the possibility of mosquito breeding in stagnant waters. Of the first 100 applications for Rainwater tanks only 46 households consented. However at the first meeting a further 100 households consented. Hence, at present there are 146 Rainwater tanks constructed in the village. There are two types of tanks, under ground brick dome tanks and above ground Ferro-cement tanks. At present there are 63 Ferro-cement tanks and 83 brick-dome tanks. The former tank cost Rs. 6500 while the Ferro-cement tank cost Rs. 8600. The CWSSP provides all the material required for construction and only unskilled labour is the direct contribution of villages to the project. The brick-dome type require 12 man days while the Ferro-cement tank require 14 man days. Besides the direct contribution in construction,

beneficiaries have to instal gutters to their roofs. The cost of gutters varies from Rs. 3000-4500 depending on the size of the roof. As most men in the village are employed out of the village, unskilled labour is mostly provided by women.

The size of the Rainwater collection tanks is 5M<sup>3</sup> or 5000 liters. To construct a tank each beneficiary household has to collect 350 liters of water. This has been a difficult task in the village due to lack of convenient and sufficient water source. Once the notice of construction is given the required amount of water is collected over a month or more by households. Some use the first flush of water from newly constructed tanks of neighbours and some others get the help of few families to carry water in a line from the source to the site.

#### **Village Community Organization**

The village Rainwater harvesting project is implemented through village Community Base Organizations (CBOs). The village population is grouped into small groups of 10 people. The leaders of these small groups are formed into a CBO. The CBO which is implementing the Rainwater harvesting project has a executive committee of 11 members with the Secretary and two Committee Members being women.

The Rainwater harvesting project is implemented through the following organizational structure.

CWSSP ---> District partner organization ---> community base organizations.

In this case the partner organization is the Badulla Thrift and Credit Society (locally known as SANASA) which also acts as a rural bank in Sri Lanka.



The village CBOs are expected to show their strength in participation and community work prior to under-taking any major project. The state provides Rs. 5000 (US \$ 40) to CBOs which has less than 100 households and Rs. 7500/- (US \$ 60) to CBOs which has 100-200 households. The CBOs are expected to use these funds in any village development actively. In this case the CBO used the allocated Rs. 7500/- to improve the village community hall.

In the Rainwater harvesting project the CBO participated in the initial survey to identify village needs, once the need was identified, the Technical Officer attached to the partner organization decides on the appropriate technology to be used.

#### **Project Impact on Water Security**

Since the implementation of the project, all households have now constructed a rain water collection container of 5000 liters. Assured water supply at door step has brought a change in the life style of the villagers. Since the project, women do not have to travel and spend long hours in collecting water. Those who spent almost 4-6 hours a day to collect water, either do not visit natural springs at all or visit these springs once in 3 to 4 days.

The reason they still visit some of the springs is to conserve the water in the tanks for a worse situation. When people realize that the drought months are coming or when the rains ease for few days, they collect water from natural springs, but the quantity collected is usually limited to 1 or 2 pots. Hence, the time taken to collect is also less. Thus, the project has given more leisure time, specially to women. The time saved due to assured supply of water is some times being used to collect firewood, attend to work in various village societies and few have also started income generating activities. Some of the important income generating activities started due to water security are Mushroom cultivation and Poultry. For both these activities water is an essential criterion. Mushroom cultivation requires constant wetting of

culture-media bags and surrounding jute sack walls. This activity was not possible prior to the project due to inadequate water. Though poultry was an economic activity before project too, the householders had to spend more time in collecting additional water for poultry birds. This activity too has become easier with the assured supply water in situ. Householders earn approximately Rs. 1000/- per month from Mushrooms. Due to the assured water supply villagers are now more inclined to entertain relations and visitors and also visit their relations out side the village, without having to think about collecting water for immediate domestic use.

There was at least one case where an entire wedding ceremony was managed by collecting Rainwater. In a similar situation prior to the project, number of villagers had to line-up from a water source to collect water in a conveyer type system.

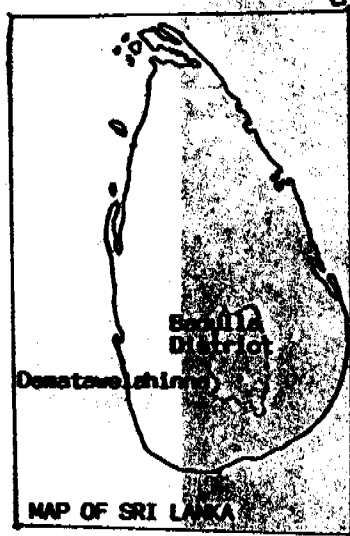
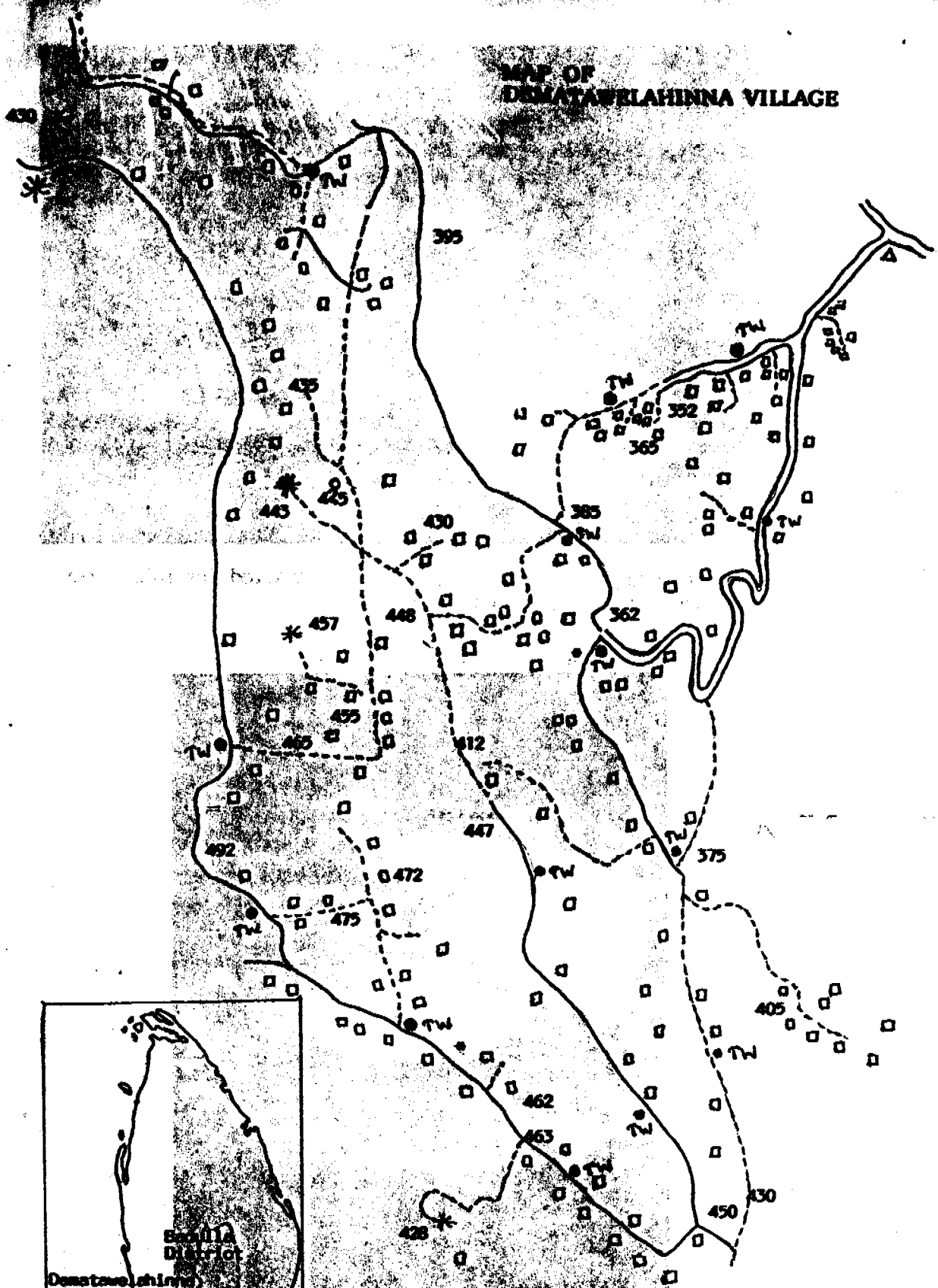
Though an assured supply of water is available to householders, most of them still practice the same judicious water management methods adopted prior to the project. This incidently is done to save the collected rain water for worse situations. The Best use of these water tanks have been during the dry months of June to August and January to February. There had been case reported where half the tank (2500 liters) has been used tie-up the three dry months in a family of 4 including two young children.

Since the project children have not been used to collect water in the nights, hence, they have more time for their studies. Women do not complain of back aches and pain in limb joints. Young girls who were saddled with the drudgery of carrying water at the expense of leisure, postpone carrier development training and social visits, are now free to attend to these activities without any hindrance.

**Conclusion**

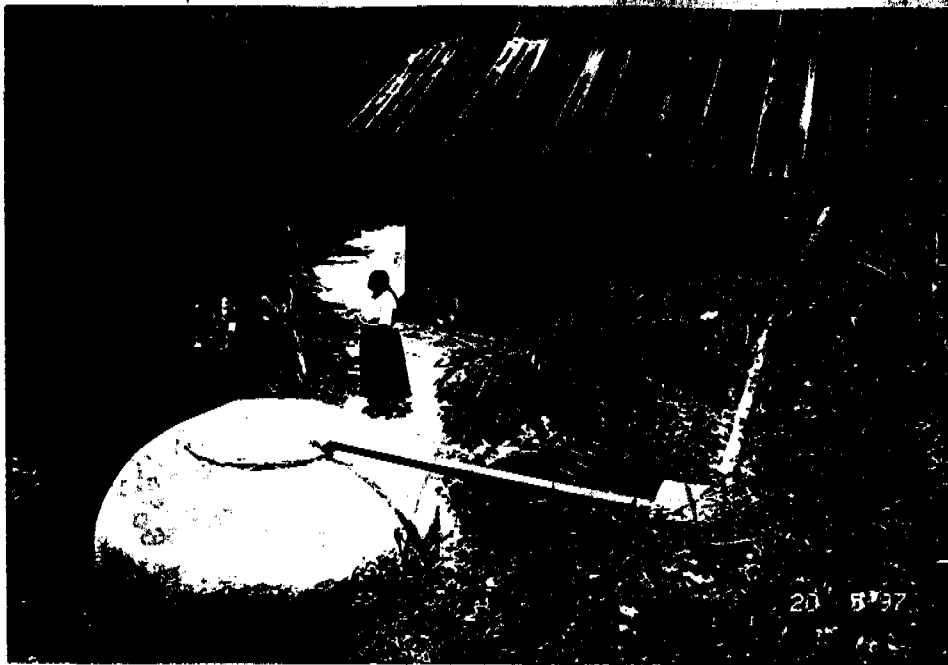
The CWSSP initiated Rainwater harvesting project has given the villagers of Dematawelhinna a sense of water security which has improved their livelihood. Increased in leisure time for women, reduced health risks and improved income earning activities are some of the more important achievements of the project.

# MAP OF DEMATAWELAHINNA VILLAGE



## Legends

- Community Centres
- Temple
- Natural Springs
- Proposed Tube Wells
- Elevation from Badulla City
- Main Road
- By Roads
- Foot Paths
- Houses



Above ground Ferro-cement tank constructed for rain-water harvesting from a roof catchment



Surface opening of a under ground brick-dome tank



**Small natural springs frequently used by villages for domestic purposes**



**Natural sprouts specially used to collect drinking water**



Jute Sacked Mushroom Cultivation shed an economic activity started due to water security



Blooming Mushrooms inside the shed



**Carrying 25 liters of water on the shoulders. Drugery that causes immense hardships to villagers. The torch in the mouth is to avoid serpents when carrying water in the nights.**