PILOT PROJECT ON RAIN WATER HARVESTING TECHNOLOGY FOR URBAN HOUSEHOLDS.

Final Report

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Lanka Rain Water Harvesting Forum

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PROGRESS REPORT

Project name:	Pilot Project On Rain Water Harvesting Technology For Urban Households
Project processing No:	95.2074.3-002.00
Project phase:	**Final report**
Duration:	**24 months (1st November 2002 – 31st October 2004) later extended to 31st December 2005**
Date of report:	31st March 2005
Reporting period:	1st November **2002 – 31st March 2005**

Table of Content

Context

The project aims to design and introduce low cost integrated rainwater harvesting systems in newly and existing urban households of two income levels that is low and middle income.

Sub objectives are,

- To assess the economic viability/environmental impacts of using rainwater harvesting in urban sector.
- To create awareness on rainwater harvesting among the urban community.
- To carry out research and development on new technology for urban households/buildings.
- To set up a pool of trained masons on constructing rainwater harvesting systems for urban areas.
- To create awareness among Architects in order to design low cost tanks.
- To recommend a suitable policy to CEA for implementation.

Activity planned until and during this period

Planned activity for the period covers activities planned up to the end of the 24th month given in the activity plan (annex 1).

List of planned activities

1. Literature review
2. Competition
3. Research & Development of six tanks
4. Pilot test the in one district.
5. Pilot test and On the job-training for masons in 2 districts
6. Awareness programs and O&M to beneficiaries
7. Publications
8. Monitoring
9. Evaluation
10. Symposium

Activities carried out until end of the first year period

Delay occurred in holding the competition to get innovative designs of rain water harvesting system for urban households since S-lon Lanka (a local PVC product company) was interested in sponsoring the competition. In order to get more publicity and wider coverage LRWHF had several discussions with them. However, later their focus area changed and they decided to sponsor promotion of concept and designs.

1. Conduct literature review and study on economic/environmental viability of rain water harvesting in urban sector in Sri Lanka
2. Competition to gather innovative design for urban rain water harvesting
3. Research and development of technology
4. Disseminate the technology through exhibitions and awareness programs

Activities Planned out until end of the Second year period

1. Pilot test of the designed systems in selected project areas.
2. Conduct on-the-job training programs for masons on planning, design and construction of rainwater units in project areas.
3. Conduct awareness programs and operation & maintenance to recipient of RWH units.
4. Disseminate the above technologies via symposium, leaflets, brochures, media programs and exhibitions.
5. Linking and net working with relevant government and non government authorized bodies
6. Influence engineers, architects and planners on incorporating rainwater harvesting in new housing schemes and commercial / public building.
7. Monitoring and evaluation.

Results achieved during the first year of the project period

1. Literature review and Study
   - Research study was conducted to review the available rainwater harvesting systems in local & international publication on urban and rural rainwater harvesting systems (Annex 2)
   - A visit was arrange on the 2nd August 2003 for the Forum members to Millennium City, a soft ware company which has incorporated rain water harvesting system in their office complex. Designed by Ms Hilke Ebert, GTZ Colombo
   - Study was conducted to assess the economic viability/ environmental impact of using rain water harvesting in the urban sector in 3 districts (Negambo, Anuradhapura, Kandy) (Annex 3)

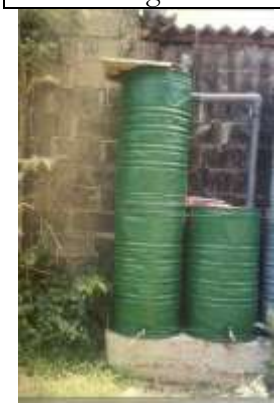
2. Competition

   Competition was held to gather public innovative idea on rain water harvesting. The competition was announced in the local papers in all 3 local languages (Sinhala, Tamil and English). Brochure was also send to 115 Schools, 72 Institutions around the island and 114 memebrs of LRWHF. Announcements were made at professional meetings such as Rural Water Collaboration Group meeting, Institute of Engineers Sri Lanka building design sector meeting, Institute of Architects meetings as well as water and environment publications (Links , *Parisara Maga* May 2003)(Annex 4)
   Fifty six (56) entries were received from students, professionals and individuals. A panel of judgers consisting of a Engineers (Mr Deva Hapugoda, Ms Hilke Ebert) and

architects (Mr Tissa Gunasena) selected 13 winners in three different categories. (Annex 5)
The winning entries were displayed at 2 Public exhibitions (4.6, 4.7).

3. Research and Development of Technology
Several low cost design for low income households were tested at a slum dwelling near the rail way tract at Udhamulla, Colombo.
Two designs, one design using barrels and another of wooden planks were initially tested at 5 households. The two designs were later modified to suit the location and requirements and tested at 12 households.
A survey was conducted to assess the social and economic benefits of the system as well as water quality of the collected rain water harvesting system. (Annex 6)

Initial designs	Modified Designs to suit the roof height




LRWHF board appointed committee to select the design for implementation. The committee selected 4 designs (3 from competition winners and one design from LRWHF member) and decided to invite the designers to construct the systems.

Development a gutter filter:
A gutter filter originally manufactured in Europe was modified to suit local conditions by a local PVC company. Several discussion were held with local PVC companies (S-lon, National, Anton) to develop and manufacture the gutter filter.
S-LON LANKA PVT LIMITED manufactured several models using local materials which is been tested at several locations.

Design of Rain water harvesting System for Commercial/Institutional Establishment.
An engineer from LRWHF is engaged in developing a rain water harvesting system for University of Moratuwa.

4. Awareness and Disseminating the technology
    1. Awareness program was held to workers of Elephant House (Soft Drink production company) on the benefits of rain water harvesting and potential usage for

commercial establishments. Following this program the managers of Elephant House request LRWHF to assess their factory site and give a recommendation for use of rain water harvesting. A visit was made by 2 engineers and a architect to inspect the factory site and a recommended plan of action was send to them (annex 4)

2. Meeting was held with Ranweli Group of Hotels and a site visit was made to give recommendation for constructing rain water harvesting systems for the hotel complex in Negambo (north Colombo)
3. Presentation was made at Institute of Engineers Sri Lanka to Building Construction section on urban rain water harvesting potential in Sri Lanka and designs from around the world.
4. Presentation was made to 1st year civil engineering student of the University of Moratuwa on the potential of Rain water harvesting in the urban sector. Following this presentation an assignment was given to the students to design a low cost rain water harvesting system for low income and middle income households in urban sector. Nine groups presented their designs and Director of LRWHF was invited to judge. One group submitted their design (the winning design) for the competition.
5. Director of LRWHF was interviewed on local TV Channel Rupavahini, on the program "Sirileiya" on 23rd August 2003 to discuss the potential of urban rain water harvesting and to report on the competition.
6. Participated in the exhibition organized by Institute of Chartered Builders of Sri Lanka from 25-27th September 2003. The winning entries of the competition and other designs of rain water harvesting system for urban households were displayed.
7. Participated in an exhibition organized by Ministry of Housing, Plantation and Infrastructure Development to celebrate the UN declared World Habitat Day from 5-7 October 2003. Winning entries as well as designs developed for low-income households in urban sector was displayed.

5. Linking and net working with relevant government and non government authorized bodies
    1. Participated in several discussion with Ministry of Urban and Public Utilities on how to popularize rain water harvesting in the urban sector. Presentation were made to staff of Ministry of Urban Utilities and their partner organization.
    2. Presentation were made to private sector (4.1, 4.2) and Institutions (4.3, 4.4).

Activities carried out Until the End of the Second year of Project Period (November 2003- December 2004)

8. Continue research and development of Architectural designs of two types of rainwater systems for existing and newly built urban households, commercial/public establishments.
   - Design and develop system to artificial recharging the ground water with rain water at Kurunegala.
   - Designed a roof water collection and ground water recharging system for …….. church at Moratuwa (Colombo District)
   - Designed a roof water collection and ground water recharging system for Heycarb factory premises at ….
   - Design a roof water collection and ground water recharging system for apparel factory in Kottawa (Colombo district)
   - Design a roof water collection system for " Sudharishi Hall" (Sinhala cultural club at Bauddhloka Mawatha, Colombo
9. Continue pilot test of the above mentioned systems in selected project areas.
   - The first prize winner of the competition was invited to plan and construct his design at a public location. The location selected was an orphanage run by a organization called "Oba mama" in Matara. An 8 m^3 low cost ferro-cement was constructed was fitted with complete filtering system, for use as drinking water. The orphanage house 25 orphan boys brought over from all over the country including conflict areas in the North and the East. The premises also have a Montessori for 250 kids in the area. This is an ideal site for demonstration also because there are number of visitors to this center both local, national and international. The orphanage was set up and run by funds from donors in Japan.
   - An 8 m^3 low cost ferro-cement was constructed at Housing estate in Hantana Kandy. The water supply scheme operating in this area can not cope with the demand due to expansion of the house scheme. Therefore, water is supplied to households only for few hours a day. This area get good rain fall and the system will be used to supplement the pipe scheme.
   - An 8 m^3 low cost ferro-cement was constructed at Dharmapal Vidayalaya, Pannipitiya (Colombo district). This is one of the leading schools in the area and has about 4000 students. The site was selected under the patronage of the Hon. Minister for Urban Development and Water Supply Mr Dinesh Gunawardena. The handing over ceremony of the tank was attended by the Hon. Minister and the event was widely covered by both print and electronic media.
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10. Conduct on-the-job training programs for masons on planning, design and construction of rainwater units in project areas.

Type of program	Date & Venue	No. of participants	Type of participants
Plumber training program on planning & designing RWH for Urban households conducted by Dr Raghavan from Rain Center in India	23rd October 2004 at LRWHF office, Nugegoda	13	S-lon Lanka plumbers group, Colombo
Awareness program on Urban and Industrial Rain water harvesting (annex)	25th October 2004 at NWS&DB auditorium	21	NWS&DB staff, and S-lon Lanka plumbers group, Kandy

11. Conduct awareness programs and operation & maintenance of RWH units.

Type of program	Date & Venue	No. of participants	Type of participants
Awareness program and Exhibition on Urban and Industrial Rain water harvesting	21st October 2004, Sethsiripaya, Ministry of Urban Development and Water supply (MoUD& WS)	58	Minister of Urban Development and Water supply Hon. Dinesh Goonawardena, Deputy Minister (MoUD& WS); Secretary of (MoUD& WS); Minister of Provincial Councils Hon. Janaka Bandara Tennakoon; His Grace the Mayor of Colombo, Prassana Goonawardena; Governor of NW Province, Hon.

			Alawe Maulana; NWS&DB officials, Urban Development Authority officials, Architects, Industrialist, Health officials, NGO representative
			
Awareness program on Urban and Industrial Rain water harvesting (annex)	25th October 2004 at Sandy River Inn, Kandy	25	NWS&DB officials, Industrialist, Health officials, NGO representative and students.
Awareness program on Urban and Industrial Rain water harvesting (annex)	22nd October 2004 at Irrigation Department Auditorium, Anuradhapura,	33	NWS&DB officials, Industrialist, Health officials, NGO representative
Presentation at Seminar on "RWH for Urban areas" organised by the	Ministry of Housing & NWS&DB , February 2004	50	Government officials
Presentation of the RWH systems and their maintenance.	24th February 2004 Ministry of Urban Public Utilities	40	Official of Urban Settlement Improvement project (USIP) and their partner

			organisations

12. Disseminate the above technologies via symposium, leaflets, brochures, media programs and exhibitions

- Symposium was held to share experience researchers, practitioners and professionals to share their ideas/thoughts/ findings and to promote rain water as an option for domestic water supply in urban areas on the 26th June 2004 at International Relations Institute, Horton Place, Colombo 7. Ten papers were selected for presentation (see annex ……). The Minister of urban Development and Water Supply Hon. Dinesh Goonwardena was the chief guest at this occasion. The Deputy speaker, Hon. Geethanjala Goonawardena also attended. There were large number (96)of participants from government, non- government , public and private sector attended.
- Leaflet on urban rain water harvesting was designed and printed in Sinhala, English and Tamil (1000 copies in each language) (annex…..)
- Booklet on urban rain water harvesting design was printed in Sinhala, Tamil and English
- Poster to promote urban rain water harvesting was designed and printed in Sinhala, Tamil and English
- Exhibition:
    - Participated in World Water Day Exhibition at BMICH, 22nd March 2004
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13. Continue linking and net working with relevant government and non government authorized bodies
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14. Influence engineers, architects and planners on incorporating rainwater harvesting in new housing schemes and commercial / public building.
    - An awareness program was held for the Urban municipality officers on the ……. Program was attended by …….. Urban councils in Colombo district
    - An awareness and training program was held to Moratuwa urban Council officers on the ……
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15. Monitoring and evaluation.

Activities Planed Until the End of the first year of Project Period (November 2004-December 2005)

Annexure 1

Activity Plan

	Year 1				Year 2			
	Q1	Q2	Q3	Q4	Q 1	Q2	Q3	Q4
1. Literature review								
2. Competition								
3. Research & Development of six tanks								
4. Pilot test the in one district.								
5. Pilot test and On the job-training for masons in 2 districts								
6. Awareness programs and O&M to beneficiaries								
7. Publications								
8. Monitoring								
9. Mid term evaluation								
10. Final evaluation								
11. Symposium								

Annexure 2