



# Rainwater Harvesting Implementation Network



Invest in the future, harvest RAIN

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## Every drop counts

More than 850 million people – that is one person in six – have no choice but to use potentially harmful sources of water. Considerably more have inadequate access to water, struggling each day to procure sufficient water to meet their basic needs. The consequence of insufficient water is a bleak future for the billions of people locked in a cycle of poverty and disease. Procuring adequate water is a daily time and energy-consuming labour chore, particularly for women and children. The magnitude of this challenge will only increase in the face of population growth, conflict situations, rural to urban migration and the expected impacts of climate change.

Rainwater harvesting can be an attractive alternative solution to water shortage. By collecting and storing rainwater, the dependence on less reliable water sources, such as open ponds, decreases. Rainwater harvesting has been practiced for centuries and is a simple and low-cost technology. Rainwater is collected from rooftops or surface catchments and is stored in different storage systems. Through its decentralised nature, the collection and storage of rainwater enables people at household and community level to manage their own water. Rainwater harvesting can be more than adequate in meeting a significant proportion of water needs.



The RAIN Foundation has an excellent track record in rainwater harvesting. RAIN's particular value is in being able to reach the un-served, in regions where access to piped water is not possible and ground water is inaccessible, inadequate or not drinkable. RAIN projects reach – on average – 10.000 beneficiaries per year, and the outlook for the coming years is promising.

Rainwater Harvesting Implementation Network (RAIN) is an international network that seeks to increase access to water for vulnerable sections of society in developing countries – women and children in particular – by collecting and storing rainwater.

# Nepal

## The water problem in Nepal

Nepal faces a mounting number of natural disasters due to climate change. The melting of the glaciers has led to greater and more frequent flooding, the average temperature is rising and rainfall has become more irregular. The lowlands are becoming wetter and the highlands dryer. To avoid the floods, many inhabitants are fleeing to higher ground.

The Makwanpur district is a mountainous area where water is scarce: only 42% of the population has access to clean drinking water, although rainfall should be sufficient to bridge the dry period. Piped water supply and boreholes are financially and technically not feasible due to high altitude differences. Inhabitants are often obliged to walk for hours to fetch safe drinking water. Despite the good quality of the soil, agricultural productivity is low. Most farmers have no access to water for irrigation, and after the rainy season, which lasts for eight months, agriculture is impossible.



## Rainwater for drinking water, irrigation and biogas production

In 2004, four implementing partners started a project aimed at serving families in 4 communities with 35 rainwater harvesting tanks for drinking water and constructing storage facilities for improved irrigation of small-scale agriculture.

The pilot phase has yielded a total storage capacity of 564 m<sup>3</sup>, changing the lives of some 3000 people. The rainwater harvesting systems supply an average family with sufficient safe drinking water, leaving the women with more time to spare for other activities and children, especially girls, free to attend school. Since 2007 RAIN has supported the establishment of a rainwater harvesting capacity centre (RHCC) at BSP-Nepal, which is the driving force behind the successful introduction and

upscaling of biogas production for livelihood enhancement in Nepal. BSP-RHCC joined the Ministerial Steering Committee on Rainwater Harvesting, established by the Nepali government to coordinate public and private efforts to develop and implement rainwater harvesting. Rainwater harvesting is rapidly gaining recognition by policy makers in Nepal.

As a result of its success and close collaboration with Plan Nederland, Simavi, local implementing partners and local authorities, an increasing number of rainwater harvesting tanks and storage facilities are now being installed in combination with small-scale irrigation systems for vegetable gardens and biogas plants.

## A clear vision and ambitious goals

RAIN envisions a world in which all people have access to a reliable source of clean water, thereby empowering them to improve their lives through better health, livelihood security and education. RAIN aims to increase access to water by developing the capacity for the collection of rainwater, with a focus on regions where other means of water supply are unavailable or not viable options.

RAIN was established in June 2003 when an alliance between AIDEnvironment and Plan Nederland initiated the Global Rainwater Harvesting Collective programme in response to appeals for action on the ground at the World Summit on Sustainable Development in South Africa, September 2002. The programme evolved into the Rainwater Harvesting Implementation Network (RAIN) and acquired the status of a foundation in December 2003.

RAIN has grown into a result-driven organisation that strives to enhance the quality of life of the most vulnerable people through the provision of a reliable source of water. The number of implementation projects and donors is steadily growing. New and cost-effective techniques are being researched and instruments to improve the exchange of expertise are being further developed.

Well equipped to play a leading role in rainwater harvesting, RAIN has formulated six ambitious goals, to be reached by 2012:

- Access to water for at least 100,000 people;
- Rainwater harvesting programmes established in at least 8 countries;
- Further reduction of the cost per litre of water;



- Documented results of impact monitoring and sharing best practices;
- Broad donor base and approximately 6 million euro in implementation funds;
- Recognition as a global centre of expertise for rainwater harvesting implementation.

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# West-Africa

## Water supply for the three countries through strong partnerships

Funded by the Sustainable Economic Development Department of the Netherlands Ministry of Foreign Affairs with a grant of 3.3 million euro for the period of 2006-2011, RAIN's West Africa Programme will lead to the construction of rainwater harvesting storage systems for more than 20 million litres of water, serving 30,000 people in Burkina Faso, Mali and Senegal. This will be achieved by RAIN's 18 partner organisations which implement the rainwater harvesting systems and strengthen users' capacities for sustainable operation, maintenance and management. The partner organisations are trained, supported and monitored by the RHCC CECEP in Burkina Faso. CECEP was jointly established by WaterAid Burkina Faso and CREPA. CREPA is responsible for the technical aspects and WaterAid for the organisational, managerial and financial aspects. CECEP plays an important role in strengthening the capacity of implementing organisations, in analysing project proposal, evaluating project implementation and in placing rainwater harvesting on the agenda.

The bottom-up and participatory RAIN model has proved highly effective in establishing partnerships and creating networks of local organisations.



## Community training in Thialane

A one-day training in hygiene and quality control of the harvested water was organised in June 2008 for 52 beneficiaries by RAIN's partner organisation Caritas Kaolack. It focused on preventative measures during the collection and extraction of water in and around the rainwater harvesting tank. It also addressed the hygiene aspects of water use, including the hygiene of the jerry can, purification of the water and

appropriate storage. Each beneficiary was subsequently visited at least twice to check whether the operational and management skills acquired during the training were still being applied. These visits resulted in a better understanding of operation and management of the rainwater harvesting systems and hygiene practices, leading, in turn, to tailored advice to the beneficiaries from the IMOs. Such training sessions have proved to ensure effective and durable management of rainwater harvesting systems.



**Woman of a household with a rainwater harvesting system in Fado, Burkina Faso:**

“Now the water is nearby, I can cook meals during the day. Before my family had a rainwater harvesting tank, I spent the whole day collecting water. I feel less tired now.”

## A powerful network

The RAIN organisation reflects its focus on partnership: an international network supported by a Programme Management Unit. Based in The Netherlands, the Unit's team of dedicated professionals ensures partner organisations are identified and strengthened in each country programme. Further, the Unit stimulates in-country innovation, monitoring and evaluation of the programme and its impacts, and fosters access to information and expertise to support rainwater harvesting initiatives.

RAIN works in close collaboration with its Rainwater Harvesting Capacity Centres (RHCCs) and implementing organisations (IMOs) in countries where the RAIN programme is in place. The RHCCs coordinate, support and monitor the construction of rainwater harvesting structures. The IMOs build the rainwater harvesting structures, select and train beneficiaries in the management and maintenance of the rainwater harvesting structures, and actively support RAIN's ongoing quest for improvement.

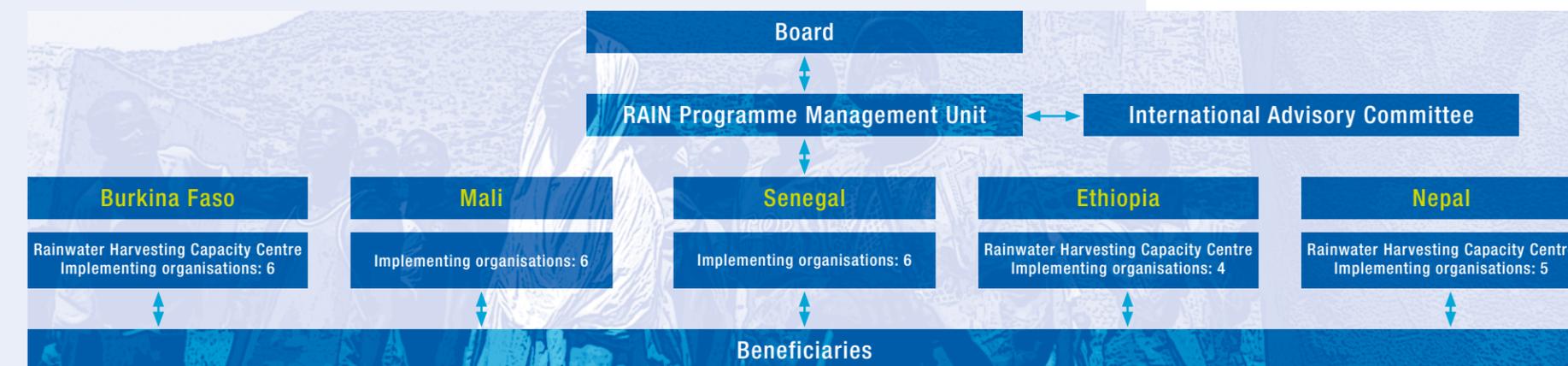
RAIN aims to establish an RHCC in every country of operation as a resource centre for rainwater harvesting in that particular

area. Ideally, such RHCCs will coordinate and support rainwater harvesting on a national level, integrating rainwater harvesting in integrated water resource management plans and governmental water policies, and actively promoting the potential of rainwater harvesting as part of the solution to the increasing water shortage. Investing in the empowerment of RHCCs ensures the permanent availability of expertise and support, and provides a lasting model.

RAIN strives to integrate rainwater harvesting in water and hygiene, educational and health programmes through partnerships with international organisations such as the Southern and Eastern Africa Rainwater Network (Searnet) and the Centre Régional pour l'Eau Potable et l'Assainissement à faible coût (CREPA).

RAIN is administered by a Governing Board and advised by an International Advisory Committee made up of key players in the international water sector. RAIN receives support from international NGOs, multilateral and bilateral donors, and private institutions.

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# Technologies

## Rainwater harvesting technologies

RAIN is currently promoting a number of rainwater harvesting technologies. There are many different ways to harvest rainwater. Below a brief description is given of the technologies currently implemented under the RAIN programme. RAIN continues to optimise and expand its technologies, as demonstrated by its Research and Development programme in Burkina Faso.

### Roof water harvesting

**The ferro-cement tank.** This technology goes back more than 30 years and is particularly popular in RAIN's West Africa Programme. The combination of mortar and steel provides a framework strong enough to withstand the pressure of the water as well as the effects of expansion and shrinkage caused by fluctuating weather conditions. The ferro-cement tanks in RAIN's West Africa programme have a capacity ranging from 10,000 to 14,000 litres and are mostly built at household level.

**The stone masonry tank.** This type of tank can store up to 60,000 litres of water. It is made of large stones and cement, creating a strong framework, and is relatively simple to build. These tanks are mainly constructed at community level for schools or health centres.

**The below-ground tank.** The main part of this tank is built below ground level. A wall approximately 90 cm high with a cover is visible above ground. These tanks can be either circular or rectangular and can store up to 60,000 litres of rainwater.

**Rain jar.** This rainwater harvesting tank has a much smaller capacity than the other types of tanks, as its construction is not reinforced. It derives its strength from its shape. This makes it a particularly cost-effective design. The Thai Jar is

probably the best known type of rain jar. It owes its popularity to the fact that after training people can easily construct and even finance their own rain jar. This type of tank can hold between 200 and 6,500 litres.

### Groundwater recharge

A **sand dam** is a partially subsurface dam built on the bedrock or an impermeable layer of a dry and sandy river bed. It is constructed across a river to block the subsurface flow of water, creating a reservoir upstream of the dam in the river bed and banks. This reservoir fills with infiltrating flood water. Once the sand dam has matured, the reservoir can achieve a capacity of over 1500 m<sup>3</sup>.

### Surface run-off

This **below** or **partially below-ground tank** stores run-off from paved and unpaved surface catchments and is hemispherical in shape. The fact that the soil is used as reinforcement makes it more cost-effective than the other rainwater harvesting systems. It can store up to 90,000 litres of water. The water from surface catchments may have a high sediment load, so that filtering and treatment of the water after extraction from the tank is recommended.

## Appropriate and affordable technology

Constantly in pursuit of the best appropriate solutions, RAIN puts great effort into the optimisation of durable and low-cost technologies. Sustainable and economical water storage for the poor is one of the major challenges in rainwater harvesting. To achieve adequate dry-season performance, rainwater harvesting systems need substantial water storage – from 200 to 2000 litres per person, depending on the climate (length of dry period) and water usage. This storage system is currently too costly for the poorest households and some government programmes.

In 2008 RAIN initiated a comprehensive research and development programme aimed at the improvement of the current ferro-cement storage tanks in West Africa. Together with its RHCC CECEP in Burkina Faso, RAIN aims to make these tanks more cost-effective, durable and functional. Other types of systems capable of storing larger quantities



of water are also being researched and tested under this research and development programme. Cost-effective storage of water will enable RAIN to increase the benefits of rainwater harvesting beyond the provision of clean drinking water, and to support, for example, small-scale agriculture and livestock farming.

Rainwater harvesting systems are highly durable, with an operational life estimated at 15 to 20 years, provided the systems are well maintained. RAIN's participative approach ensures that the necessary expertise is developed within the community and meets its needs. Maintenance, small repairs and replacement of systems can be carried out locally. The sharing of best practices guarantees that new insights are directly ploughed back into improving existing technology.

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# Ethiopia

## The water problem in Ethiopia

The Borana Zone is a semi-arid region in southern Ethiopia that suffers frequent and prolonged droughts. The area has two dry seasons, each lasting three months. The people in the Borana Zone depend largely on open water sources, with unreliable water quality and availability. During the last decade numerous wells and boreholes have been constructed. However, in large areas groundwater is not accessible or contains high salt levels which make it unsuitable for drinking. Additionally, groundwater levels have dropped due to overexploitation, resulting in boreholes and wells running dry. During the dry period people have to travel long distances, up to as much as 15-25 km, to fetch water.



## Innovative approach for optimal impact

In 2007 RAIN and its partners have won the Swiss Re International Resource Award for sustainable watershed management for their project 'Water Harvesting to improve livelihoods in southern Ethiopia: from pilots to mainstream', which was awarded for its high community involvement approach, strong international partnerships and strong training component to ensure upscaling. The project contributes to regional water resource protection: making optimal use of available water resources, enhancing catchment water retention capacity and averting ground water depletion. Through an innovative combination of infrastructure to harvest rain and surface run-off water with sand dams and surface run-off systems which provide an effective solution to water availability in the short and long-term. More than 2,000 people benefit from this project. Integral part of the project was the training of at least 10 organisations as well as the establishment of 10

water management committees formed by the beneficiaries. Due to the on-job trainings and workshops, other implementing partners will soon start to upscale this technology to other areas in Ethiopia. This project is the result of North-North, North-South and South-South collaborations. RAIN, Acacia Water, ERHA, AFD and SASOL have been awarded the Swiss Re Resource Award 2007 for this project. The pilot project aims to ensure further upscaling in Ethiopia in the coming years.

RAIN's RHCC in Ethiopia, ERHA (Ethiopian Rainwater Harvesting Association) facilitates the construction of rainwater harvesting projects, trains and strengthens implementing partners, raises funds and lobbies actively to get rainwater harvesting on the national agenda.

## Focus on results that last

The projects RAIN has initiated have proved highly successful from the very beginning. The key to their success lies in the RAIN approach: straightforward and participatory. Five core principles underpin the way RAIN operates.

### 1. Focusing on implementation

RAIN focuses on implementing rainwater harvesting structures in the field. It explores, enhances and optimises local rainwater harvesting technologies and establishes and strengthens local capacity. The projects concentrate on appropriate, low-cost materials and technologies, adapted to local conditions.

### 2. Targeting areas with maximum impact

RAIN initiates rainwater harvesting projects primarily in so-called 'type 3 areas: areas where people have no access to surface water, have low or no borehole or spring potential, or poor water quality due to geological origin of aquifers. In such areas rainwater harvesting is often the only solution to water scarcity.

### 3. Ensuring sustainability

RAIN ensures sustainability in its projects through a demand-driven, service-oriented and participatory approach. All expertise is locally developed and strengthened, and local ownership forms the basis for all its projects.



### 4. Sharing experiences

To support its core skills and step up the effectiveness of its approach, RAIN facilitates the exchange of knowledge and expertise. Dissemination of information ensures that expertise and best practices are communicated to RAIN's network and stakeholders.

### 5. Contributing to broader programmes

Rainwater harvesting projects are best embedded in an integrated approach to managing water resources. The RHCC national capacity centres facilitate the implementation and promotion of rainwater harvesting projects throughout the country and contribute to broader programmes by creating alliances and partnerships to expand programme impact and raise rainwater harvesting awareness.



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## Fulfilling the promise

RAIN's approach is working. The primary focus on drinking water, remote and rural areas, and decentralised storage systems has benefited many. The experiences and insights gained so far enable RAIN to optimise and expand its activities.

RAIN will broaden its approach to increase the benefits of rainwater harvesting beyond the provision of clean drinking water for uses such as small scale agriculture and livestock keeping. Moreover, rainwater will be used to improve hygiene conditions. RAIN is aware that its programme can also benefit a wider target group and it involves government, private sector and NGOs in the identification, development, implementation and upscaling of locally appropriate technologies. With more than 50% of the world's population now living in cities, rainwater harvesting will increasingly be an important part of an integrated solution to urban water supply. The success of rainwater harvesting and the positive effects of incorporating it in existing water management programmes and poverty reduction strategies stimulate demand in many other areas. In the near future RAIN envisions expanding its activities in Asia and Sub-Saharan Africa.

Since its foundation, RAIN has set great store by participation, capacity building, exchanging of expertise and sharing of experiences. This has resulted in a wealth of knowledge about rainwater harvesting; appropriate technologies, water quality, site selection, implementing and maintaining a rainwater harvesting infrastructure, multiple uses, and innovative financing schemes. In the upcoming years RAIN will – further – develop several tools to optimise research and learning programmes.



RAIN pays special attention to the participation of women while implementing projects. RAIN involves women in planning, designing and managing the rainwater harvesting interventions. RAIN actively encourages its partner organisations to promote the participation of women throughout the entire project cycle. Substantial involvement in decision-making and management entities like water committees is ensured by explicitly including gender in RAIN project guidelines, training, developing and executing user surveys and impact assessments.

Rainwater harvesting will contribute substantially to the realisation of the Millennium Development Goals. By providing a relatively cheap supply of clean water the health and living standards of the world's poorest people will improve significantly. The unique approach of the RAIN Foundation assures an accessible long-term solution to inadequate water access.

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### **Governing Board**

Paul van Koppen, Chair - Director of Kopconsult, and formerly Director of the International Centre for Water and Sanitation, The Netherlands

Michiel de Wilde, Board member - Chief Operating Officer of Royal Tropical Institute, and formerly Director of Aidenvironment, The Netherlands

### **Advisory Committee members**

Mesfin Shenkut – Director of MS Consultancy, Ethiopia

Martin Keizer – Senior Advisor Water and Sanitation, PLAN Nederland, The Netherlands

### **RAIN Team**

Ard Schoemaker, Operational Manager

Kirsten Neke, Programme Manager

Basja Jantowski, Programme Officer

Peter Ton, Programme Officer

Robert Meerman, Programme Officer

### **Partnerships**

Rainwater partnership (UNEP, IRSCA, IRHA, SEARNET)

CREPA HQ

SEARNET

Acacia Water

IRC Multiple Use group

NWP-NGO platform

### **Donors**

Dutch Ministry of Foreign Affairs - Directorate-General for International Cooperation

PLAN Nederland

Fondation Ensemble

Swiss RE

Aqua for All