Rainwater champions

Stories from Ethiopia, Kenya and Uganda
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The editor has taken every care to ensure that the contents of this publication are as accurate as possible. The authors have ultimate responsibility, however, for the content of individual articles.

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Dear reader,

It is a pleasure and an honour to write the foreword for this booklet. Since its foundation in 2003, RAIN has actively promoted all aspects of rainwater harvesting. We work on techniques, but also on business model development, policy support and capacity building. More and more we use the 3R approach (see page 14), which allows us to integrate the landscape dimension in our work. RAIN’s commitment to promote rainwater harvesting for everyone calls for a large network of partners for implementation, knowledge exchange and up-scaling. It also implies that we actively want to lobby for inclusion of rainwater harvesting in government policies and planning.

In our work we often witness the ability of rural communities to shape and transform their productive resources and well-being. Despite this, rural communities’ initiatives, processes and logics often remain invisible for outsiders.

Through its collaboration with the International Fund for Agricultural Development and the Dutch WASH Alliance, RAIN had the opportunity to make the personal side of rainwater harvesting more visible. In his booklet we introduce to you 12 people and groups who are working hard to make rainwater harvesting a reality, fighting their own struggles and overcoming challenges. These individuals and groups are the Rainwater Harvesting Champions! They reap the benefits from their own work, such as increased and more diverse food production, reduced erosion and protected ecosystems, better hygiene, but also local empowerment. Together, these benefits add to improved wellbeing in the short and long term. Many of these people have been sources of information and inspiration to those around them.

This publication provides a platform that allows the champions to share their knowledge, experiences and perceptions with you. We recommend this booklet to all practitioners and policy makers who design and implement policies, programs and projects. We hope that, like RAIN, you too will benefit from the insights and inspiration the Rainwater Harvesting Champions have given us!

Peter de Haan
Director, RAIN
A common Ugandan proverb says that “The requirements of wealth are met by rain”. Unfortunately, in many parts of the world it does not rain often enough. In East Africa, rainfall is becoming increasingly erratic – months without rain severely limit the availability of water for agriculture, livestock and household use. In (rural) areas with limited water infrastructure, women need to travel far or pay high fees for their water supply in the dry months. Crops have low yields, animals suffer and the environment degrades. Yet there are simple solutions that can make a big difference in the face of such problems. All it takes is to make use of the months in which the rains do fill the rivers, the ponds and the ground.

Rainwater harvesting and water buffering comes in many forms. For example, rainwater harvesting ponds catch and store rainwater; sand dams retain water in the banks of seasonal rivers; and ‘3R’ techniques (Recharge, Retention and Re-use of water) increase the level of water in the soil. RAIN develops knowledge on such technologies, offers advice and implements projects around the world to spread the use of simple technologies with a big impact. This publication shows a selection of such impacts in Uganda, Ethiopia and Kenya. Some of these cases were made possible with the technical and financial support of RAIN, while others are successful examples of activities similar to RAIN’s and they all offer an opportunity to learn more about what makes rainwater harvesting work.

The stories in this booklet are about more than successfully implemented projects in rural Africa. None of the successes portrayed here would have been possible without the commitment, spirit and hard work of local people who decided that their lives deserved to be improved. Men and women, young and old, hard workers and entrepreneurs – these are our rainwater champions.

Often, the champions portrayed here are part of a community that works together and supports each other. Self-help groups often play an important role in rainwater harvesting or buffering interventions at the landscape level.

Each story features an individual or a group, who actively made use of the opportunities presented to them. Sometimes they were offered financial support or training, sometimes the community worked together, and sometimes individuals just worked tirelessly by themselves. In all cases, it becomes clear that without the
effort, intelligence and perseverance of the champions, there would be no rainwater harvesting success.

These stories have been produced by local RAIN officers and partners in the three countries. After a one-week documentation workshop, facilitated by GUAVA stories, the authors went out into the field to learn from the champions. Using the documentation methodology they had just learned, they collected information that allowed them to describe the champions’ achievements and analyse what contributed most to their success. As a result, the experiences of the champions offer more than nice stories to share – they offer lessons that RAIN and anyone else working with rainwater harvesting and buffering can benefit from.

We thank the International Fund for Agricultural Development (IFAD) and the Dutch Ministry of Foreign Affairs for their support in this process.

Laura Eggens (GUAVA stories) and Sean Patrick (RAIN)
The power of 3R
Stories from Ethiopia, Kenya and Uganda

Soil erosion devastated the stony slopes of Kamwenge and Ibanda districts in western Uganda. The hills were stripped of vegetation and, as a result, runoff rainwater would wash away fertile topsoil. Farmers found a solution when in 2012 they learnt about 3R and wetland protection at a landscape scale. One farmer, David Rukyiloru, has shown how extraordinary efforts in the face of poor circumstances can turn a life around.

James W. Kisekka and Evelyne Busingye

On the border of the Kamwenge and Ibanda districts lies a wetland called Rwambu. The degraded land on the hills surrounding Rwambu was one of the areas supported by RAIN, Wetlands International, and the Ugandan NGO Joint Efforts to Save the Environment (JESE). The three organisations asked individual farmers if various 3R measures (see ‘What is 3R?’ on page 14) could be built in their fields to serve as demonstration sites. Members of the community collected locally available resources, like stones and soil, and worked to build the 3R measures in exchange for lunch. One of the pilot fields belongs to David, aged 56 years and a father of eight. David’s land of about 2.5 hectares lies at the top half of a hill in Rwesigire village, on the Kamwenge side of the wetland. The 3R measures reduce siltation of the wetland in the valley, but also bring important benefits to the farmers on the hills.

In David’s garden, JESE planted *Grevillea robusta* wind break trees, made stone bunds using stones from his own field, and constructed soil bunds of the *fanya juu* and *fanya chini* type (see ‘What is 3R?’). Seeing how effective the measures were at reducing soil erosion, David and his family worked hard to expand the initiative: he now has about 500 trees including *Eucalyptus* and *Grevillea*, five 15-metre soil bunds (four done by the project and one himself), eight 15-metre stone bunds (five done by the project and three himself), and three 15-metre grass strips (all done by himself).

In this way, David not only accepted the project, but he wholeheartedly embraced 3R and put his own blood and sweat into making his land more

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Stories from Ethiopia, Kenya and Uganda
productive. “It was uncommon to see this fertile black soil in my field,” David recalls. “Before, all the fertile soil would be washed downhill. When you construct stone bunds you can grow crops on the soil they trap,” he says, pointing to the soil collected upstream of the stone bunds. That the efforts lead to results is clear. “In just two years, I was able to grow many crops, including bananas. The bananas growing close to the fanya juus and fanya chinis have bigger stems and give bigger bunches.” At the same time, his bean yields have more than doubled. “I used to plant eight kilograms of beans on 1000 square metres and would harvest 40 kilograms. Now from these same eight kilos of seed I harvest about 100 kilograms from the same piece of land.”

David was particularly motivated because he had sold his fertile land on the lower slopes, leaving him with no good land to grow crops. “I had sold off the productive portion of the land to pay the tuition fees for my children. The only choice I had was to start cultivating the land on the hill, but the soils were becoming continuously less productive due to erosion. I could barely harvest any crop.” David had already abandoned cultivating uphill, but became inspired again seeing how well his crops are doing. “Now that I have learnt how to restore my degraded land and to protect it from erosion, I plan to open up more land on the hill for cultivation.”

Many farmers still use less effective methods, and their crops and fertile soils are often washed down by the rain. David tries to convince his neighbours that the benefits of the different 3R measures outweigh all the hard labour they require. “I found
another neighbour burning grass in his field to create land for farming,” David remembers. “I advised him to instead leave strips of grass to control erosion but he did not listen. When the rains came, most of his beans and maize were washed down. You can see the maize in my garden is healthier than that in his garden.”

Others did accept David’s advice and assistance. “One neighbour asked why my banana plantation is healthier than his, and I told him it was because of the fanya juus. He contracted me to construct three fanya juus, each 15 metres, on his plantation.” David received 80,000 Uganda shillings (about 24 euros) to construct the fanya juus in his neighbour’s field. And, equally impressive, another neighbour constructed one fanya juu by himself based on David’s recommendation. As a result, David’s willingness to try out new approaches on his land not only transformed his own life, but has made a lasting change in the entire community.
What is 3R?

3R stands for the Recharge, Retention and Reuse of water: a collection of technologies to keep water in the local system. 3R technologies store rainwater in the wet season, making it available to use in the dry season. 3R helps to increase access to water by reversing degradation, preventing soil erosion, and improving soil moisture recharge and retention. The point of departure is the buffer-function of households or landscapes, which allows people to deal with regular water variability as well as the dramatic variations that accompany climate change.

Champions in all countries make use of such measures: William, Samuel and the Sikika group in Kenya; the Mehoni group and the Yasin in Ethiopia; and Fred, David and Kazaro in Uganda. These champions used different types of terraces and other cross-slope barriers to ensure that rainwater does not easily run off but can be soaked up into the soil. Kazaro, for instance, constructed earth bunds of 100 metres long across his farm to harvest runoff water. He built these earthen bunds along the hill’s contour by digging a ditch and using the excess soil to create a ridge on the downhill side of it.

David constructed two types of terraces on his own and his neighbour’s fields: the *fanya juu* (‘do upwards’ in Kiswahili) and *fanya chini* (‘do downwards’). *Fanya juu* is made by excavating ditches and putting soil uphill to form an embankment, often stabilised with grasses. With the *fanya chini* terraces, the excavated soil is put below the ditch. *Fanya chini* requires less initial labour, but it needs more maintenance as the trenches fill up.
with silt, whereas the *fanya juu* will level out the land uphill of the bund. “I prefer *fanya juus* to *fanya chinis,*** David says, “because they collect water uphill of the soil heap, allowing it to seep slowly into the soil”. David also established eight 15-metre stone bunds on his farm. Using stones from his own land, he created stone lines on the slopes to form walls, slowing down and spreading the runoff rainwater. Also, David planted three 15-metre grass strips. This less labour intensive measure uses grass or other types of vegetation to protect the soil and reduce erosion of the slope.

Another 3R measure, not necessarily restricted to slopes, is the use of agroforestry. William was one of the champions who planted trees, such as *Gliricidia sepium, Acacia albida* and *Tephrosia candida*. These trees boost soil fertility and break hardpans (impervious layers caused by heavy rains or compacting), allowing water to seep into the soil. Using these and other natural solutions to improve the soil ensures healthy vegetation and water recharge. In a development context these technologies can easily be implemented by local communities. Clearly communicating projects and their effects to the community is essential for proper execution and maintenance. When this is done, the measures often remain part of the farmers’ practices for a long time. In some of the accounts we received, 3R was first implemented in a few fields, to showcase the effect and encourage replication of the practices in the community later. 3R measures consistently and measurably restore soils, capture water and improve yields, as can be learnt from the rainwater champions in East Africa.

For more information, visit www.bebuffered.com
In the past, Kyumani residents in eastern Kenya faced a myriad of water and environmental problems. Poor soil moisture and hard pans prevented water from reaching roots, causing low crop yields. There was barely any adequate pasture for cattle. Moreover, people had to travel seven kilometres to fetch polluted drinking water from the nearest river. In 2009, a devastating famine in the arid and semi-arid zones of Kenya prompted several organisations to support the rural people in this region. William Nguma Munyao was one of the farmers who not only benefitted from this support, but who played a leading role in multiplying the impact of rainwater harvesting in his community.

Alex Oduor

William radiantly demonstrates his great passion for using rainwater on his farm and in his house. He lives in the village of Kyumani in Makueni County with his wife Jennifer and their five children. William settled in his one-hectare farm in 1992. Today, William’s farm is a shining example of how rainwater harvesting and several other techniques can combat the severe problems of the region.

When the World Agroforestry Centre (ICRAF) and the Kenyan Red Cross
William Nguma muNyao

A teacher with a learning attitude

supported the construction of six trapezoidal lined ponds (see ‘What are rainwater harvesting ponds?’ on page 40) in Masongaleni, William was among the first farmers to build one. William and his neighbours received food in exchange for the work. Water conservation techniques such as bench terraces, zai pits (or ‘planting pockets’), semi-circular bunds, trapezoidal bunds and drip irrigation were introduced, as well as a chisel plough that breaks hard pans and boosts the soil moisture. ICRAF introduced three tree species that break hard pans and boost soil fertility and moisture, such as *Tephrosia candida*, *Faidherbia albida* and *Gliricidia sepium*.

William took on the challenge and learned about pond excavation, lining, maintenance and repair, but also about the other agricultural techniques that would help him optimise the moisture in the soil. Being a former teacher with a knack for experimentation, William cannot help but increase and share his knowledge.
with his neighbours. He is eager to understand how systems work, and subsequently modifies them through farm experimentation.

This learning attitude also helped him cope with problems along the way, like when the current pond liner ripped. “This pond liner is of inferior quality, and is easily torn by protruding roots or stones,” William explains. “It is also eaten by rodents or reptiles that find their way in the pond. Despite my repairs, I actually lost all the water from the pond.” But William discovered some surprising results. “Having lost hope for not knowing what to do, I merely watched as all the water disappeared into the ground. But, with time, I noted that the mango trees surrounding the pond were performing very well. I realised that the water that had percolated underground was not lost after all. The mango trees were directly benefitting from the water!”

Damaged liners are a common problem that William continuously tries to address. He reports back to the support agencies involved, who see him as a role model and a link to his community. In this light, William was awarded a training-of-trainers course in runoff pond systems, specifically focused on pond liners and pumps. He has also learnt about fertilizer trees, which help improve soil fertility in an inexpensive way. William is now able to repair torn liners and promotes the use of fertilizer trees with confidence.

William uses the water from his pond for cooking and (drip) irrigation of seedlings and crops such as tomatoes, spinach, capsicum, kale, mangoes, papaya, neem, guavas and William Nguma Munyao’s tree nursery. “I believe it is necessary to seek advice and improve your understanding, so that you may also assist neighbours,” William explains.
multipurpose trees – both for home consumption and sales. For example, William is able to get a profit of 8000 Kenyan shillings (70 euros) from his tomato plot of 70 square metres. Villagers also come to his farm to fetch water from the pond, with his permission. Owing to the existence of the pond, William and his family members save a significant part of their time previously used for fetching water from river Thange, which can now be used for other productive activities.

Above all, William is a teacher. His own farm is doing very well, which has attracted a lot of farmers looking to emulate him – from his own village and beyond. Speaking to William, this becomes immediately apparent. “As you are talking to me right now,” William interjects, “there is a group of visitors waiting for this interview to end so that I can talk to them about runoff water harvesting and these wonderful ponds.” These visitors are often farmers, who hail from villages as far as 20 kilometres away. Visiting farmers from Makindu, for example, have dug ponds that are awaiting lining. “Even the area member of parliament for Kibwezi West, Honourable Musimba, has been here to see me and is now supporting the construction of seven ponds in his constituency located 25 kilometres away,” William says proudly. That neighbours and other communities come to his farm to learn demonstrates that they see him as an agent of change.

Based on his teaching skills and generous demeanour, William is respected by many. He has been nominated to occupy leadership positions, such as his role as Secretary of the Kyumani Museo self-help group that constructs ponds on a rotational basis. William represents the group in a larger consortium of 26 villages. In the absence of support agencies, he is the one to whom community members come for technical advice.

William might have a leadership position, but he emphasises that it is the group effort that matters in making rainwater harvesting technologies a success. “A person cannot work alone. Unless we work together, we will always be poor. I believe it is necessary to seek advice and improve your understanding, so that you may also assist neighbours that cannot look for information themselves on how to eradicate poverty in the area.”
Location: Mehoni, Tigray, Ethiopia

Technology: 3R and a cistern for green business

From landless to green entrepreneurs
Twelve years ago the upper catchment areas of the Mehoni watershed in Ethiopia were extremely degraded as a result of deforestation, intensive grazing, erosion and floods. Around 2002 the local government started a large-scale watershed rehabilitation programme, significantly recovering the watershed and improving the local food security conditions. One entrepreneurial group has taken the rehabilitation process one step further to generate an income and it inspires others to do the same.

Selamawit Yetemegn and Eskinder Feleke Woldeyes

In Mehoni, located in the south of the Tigray region, annual rainfall reaches up to 600–700 millimetres. Rain-fed production of wheat and sorghum is the source of many rural livelihoods, but the degradation of the land had drastically reduced productivity and left many farmers without enough food. To reverse the impacts of degradation, the government designed a strategy on sustainable land management based on the closure of catchment areas, allowing no grazing animals and limiting human intervention. They constructed in-situ rainwater buffering structures such as trenches, stone bunds (see ‘What is 3R?’ on page 14) and physical and biological gully treatment. The entire Mehoni community deserves praise for their achievements in rehabilitating the watershed, but one particular group stands out.

Fourteen young men and eight young women without farmland organised themselves in 2011 to establish an ecologically friendly business on a part of the rehabilitated area. These landless entrepreneurs received a permit from the local government to start up a small business in the lower part of the watershed. Without farmland, landless youth have few options: they can work for other farmers or rely on their family. In rural Ethiopia, where labour is relatively cheap, working for others does not earn enough to make a living. So with this opportunity to establish income-generating activities, these young people can reduce their dependency on food aid.

Rainwater harvesting is at the core of the group’s initiative. They constructed a ‘bee house’ on the land,
collecting rainwater from the roof and storing it in an underground cement tank with a metal cover (see ‘What are underground cisterns?’ on page 26). The rainwater is then used by the bees, for cultivating fodder for sheep, and for growing fruit trees, herbs and spices. The house that serves to harvest rainwater not only hosts traditional and modern beehives, but also has space to store agricultural products. With the government training they received on beekeeping, rainwater harvesting, construction, plant nurturing, marketing and financial management, combined with some exchange visits and support for construction materials, the group members have all the ingredients to succeed in their business.

The group has set an example to other landless people, showing that it is possible to get out of a situation of economic dependency.

The system supplies sufficient water, the whole year round, for the bees, the sheep and for irrigation. Two group members, Mr Birhanu Hadis and Mrs Nigisti Hagos, are fascinated with the work they are doing and pleased with their achievements. “We never expected that we could benefit from rainwater harvesting this much,” they say. “It has saved us time and energy. Besides, the bees don’t have to fly long distances to collect water. We can provide both the bees and the sheep with water on the spot. The bees are more productive and the sheep can easily be fattened. We are very satisfied with the results we are getting and we plan to expand the business even further to increase our profits.”

The greatest benefits are employment and a sense of security. Previously, the members were dependent on their family and government food aid, but now they have their own property to manage and they generate a considerable income. They sell honey, gesho (a local plant used to make homemade beer), fodder and sheep. In the past two years they have earned 30,000 Ethiopian birr (1200 euros) from honey sales alone, in addition to 10,000 birr (400 euros) from gesho and 2000 birr (80 euros) from grass sales. During the same period, the sheep have increased from 14 to 35
and the beehives grew from seven to 24. They have planted papaya trees and they are growing other fruit trees in the nursery that will be planted soon.

Setting up their business was not without challenges. Their permit to use the land sparked up protest from land-owning community members, who believed the land should remain communal property and not be used by one group for profit. To resolve this conflict, Birhanu and Nigisti explain, lengthy dialogues and negotiations between the local government, the group and the community were necessary. “The local government explained that we are part of the community, and if our livelihoods change we contribute to the development of the whole community. And it does not stop with us: the land is big enough for other upcoming landless youth from any family, who can also have the opportunity to develop businesses and generate their own income. They explained that our initiative can be seen as an example of entrepreneurship that can be replicated elsewhere in our surrounding.”

The community agreed, under the condition that other organised
groups can also use parts of the communal land – but only if they do not affect the regeneration of the vegetation and if they pay special attention to the environment. Nigisti highlights that “other groups have now started different business initiatives after looking at our group, and they are also becoming successful. They haven’t constructed rainwater harvesting systems yet, but are planning to do so.”

According to Birhanu and Nigisti, what led to their success was their willingness to work in an organised group and their continuous effort to develop their business plan. From the beginning, the group established a clear organisational setting and everyone worked devotedly following their agreements. “We are here now according to our schedule, to guard the land, water the plants and provide water for the bees,” Birhanu and Nigisti explain. All group members participate in maintenance work and guarding the property, while three of them manage the group’s finances. They have formalised agreements on who is responsible for repairing damages, and they set money aside for this. No major malfunctions have occurred yet, but the group is prepared in case they do.

“We are here now according to our agreed schedule, to guard the land, water the plants and provide water for the bees,” Birhanu Hadis mentions.
The Mehoni group is making plans for the future. They want to scale up their efforts and include new activities such as fruit gardening. With their success, the group has set an example to other landless people and youth, showing that it is possible to get out of a situation of economic dependency. Others can easily replicate their experience, with a little support. The young farmers in Mehoni have demonstrated that a simple technology can be used without difficulty, and with the proper organisation and attitude, it can transform many more lives.

Engaging women

The group was formed with both men and women who were equally motivated, and who all joined on their own initiative. Nigisti thinks back on her own decision to join. “I joined the group of my own free will, because I assumed there would be benefits. Other women did not see the value of the group, and some even thought it was not appropriate for women as women are supposed to be fully engaged with household activities. Now that they see the profit, there is an increasing interest in such business. I think more women will want to join other upcoming groups.”
In Ethiopia, two champion groups harvest and store rainwater in underground tanks. These cisterns were made of cement and are either covered by a corrugated iron sheet or a cement roof, preventing evaporation and contamination. Rain that falls on roofs or on surfaces around the tanks is then directed to the cistern through small ditches. Water passes through a filtering system that removes the silt before entering the cisterns. The tanks are equipped with hand pumps, either on top of the cover or connected to a water point with faucets.

In Mehoni the cylindrical cistern measures 20 cubic metres, while in Bule Gufu it holds about 60 cubic metres of water, serving 113 households for over three months. The water is used for domestic use in Bule Gufu, and for livestock and small-scale irrigation in Mehoni. The tank and silt traps need to be cleaned regularly to ensure that water quality is better compared to that of ponds or other open water sources. A distance of at least 200 metres from the village prevents contamination. Additional water treatment at the point-of-use may be necessary to ensure safe drinking water, because most of the contamination occurs when water is retrieved.

The technology is simple to understand and maintain by the community, and can be constructed by local artisans – although cement is not always available or affordable on the local market. The cement structure is durable, though somewhat difficult to expand. “Initially, I was afraid that the spherical concrete structure might crack shortly after construction, but I have noticed that it is good enough to resist the heat and I am now happy about it,” says Shukunnu Kanchora from Bule Gufu. So far, the main structural problem communities encounter is the short lifespan of the pump.

Underground cisterns that require materials such as cement, iron sheets, pipes and pumps are seen as a big investment by local landless youth, like in Mehoni, or by individual households. But in comparison to other water systems, a cistern requires a relatively small investment and can therefore certainly be replicated elsewhere with some support from organisations and governments. In Bule Gufu, the project was implemented with a 20% in-kind contribution from community members.
A cistern with silt traps in Ethiopia.

A woman collects water from an underground cistern, using a pump.
Location: Bule Gufu, Borena zone, Oromia, Ethiopia

Technology: underground cistern for household water use

Managed by local experts
In the southernmost part of Ethiopia, in the Borena zone of the Oromia region, lies the village of Bule Gufu. The pastoral people of this area rear their livestock with an average annual rainfall of 600 millimetres. To complement their traditional rainwater harvesting systems, an underground cistern helps the community bridge the long dry period that can last up to six months. Here, a women-only water management committee is tackling the main challenges they face with their own creativity and knowledge.

Selamawit Yetemegn and Eskinder Feleke Woldeyes

The pastoral community of Bule Gufu relies solely on livestock rearing for its livelihood. Because their cattle needs water year round, water management is a most important issue. Rainwater harvesting is a traditional activity in Borena, as the communities use ponds in the wet season and traditional wells called ela during the dry season. However, these traditional systems have their limitations, particularly for potable water. Therefore, Bule Gufu welcomed the support of RAIN and the local NGO Action for Development in 2006/2007. They constructed an underground cylindrical cistern of 50 cubic metres in Bule Gufu (see ‘What are underground cisterns?’ on page 26) to store water for the domestic use of up to 113 households. The water from the cistern is clean, and with additional treatment it can be used for drinking and sanitation. The system has improved the community’s health and helped them save time. This has been especially true for young women and girls, who now have more opportunities to go to school.

The enormous benefits this system brings would not have been realised without the group of women managing the distribution of the water. The management committee, consisting of seven members, ensures the appropriate use of the available water, manages finances, and organises cleaning and maintenance activities. Twice a year, they encourage the community to clean the tank and the silt trap, guaranteeing clean and healthy water. Since the tank can only store water for about three to four
months, the committee collects a fee from all users, which in the extreme dry season is used to buy water from tanker trucks and this thus secures water year round.

Shukunnu Kanchora is one of the members of the management committee. She is 41 years old and has one son and two daughters. “My father had a traditional pond and we used to collect water from that pond for our household and livestock,” Shukunnu remembers. “However, the pond water was of low quality and because it was open, livestock directly drank from it. The cistern is closed and the surrounding area is fenced and protected, so it provides clean water. My family and I like the water we get from here because we know it is protected.”

In Ethiopia, most water management committees stop functioning after a few months. Most government and non-government supported schemes end up broken or malfunctioning, even if considerable investments have been made. However the women-led rainwater harvesting scheme of Bule Gufu has been successfully providing water for the community for the past eight years. Of the many Water, Sanitation and Hygiene committees assessed by RAIN in Ethiopia, this is the longest and best functioning one – a distinction that makes its members feel very proud. They have set a good example for other committees with their work, and the rainwater harvesting community can learn a lot from their experience.

“Water is a precious resource in our communities because our animals, the source of our livelihood, heavily depend on water and pasture,” Shukunnu Kanchora explains.
The reasons behind their success include a long tradition of drafting bylaws and following them accordingly. Borena people are known for the Gada system, a governance system based on democratic elections and rule. Communities form committees for peacekeeping with neighbouring people, resource distribution, and conflict resolution. They regulate the use of water sources, pasture lands, animals and domestic goods, providing a social and political order that creates a very positive framework for the water committee. In many places, the management committee only deals with financial issues, while in Bule Gufu the committee members also take part in the maintenance of the system itself. Moreover, their traditional conflict-management approach, using dialogue, works well.

Most importantly, the committee seems to be so tenacious in their efforts because it is made up of those who understand the burden of domestic water the best: the women. Women know the issues related to the collection and management of domestic water, because in rural Ethiopia they are the ones solely responsible for this. Women take care of the family by themselves, sometimes for weeks and months, as the men are travelling long distances in search of pastures. Collecting water and fuel are among the women’s main duties and take a considerable amount of time. The women managing the rainwater harvesting system are fully aware of its importance, remembering the burden of collecting water from far – particularly in the dry season, when the heat of the day made fetching water even more difficult.

The committee is made up of those who understand the burden of water: the women

Shukunnu knows the benefits of a well-functioning system all too well. “We now have clean water, and our children, especially our girls, have the opportunity to go to school. Our health has improved. This cistern has helped our children and us save a great deal of time and energy.” And if it were up to Shukunnu, many others should follow their example. “I believe this kind of work should also be taken up by other pastoral villages, as they can have better quality water with low running and maintenance costs. Water is a precious resource in our communities because our animals, the source of our livelihoods, heavily depend on water and pasture.”
The water table in the Rwambu area in western Uganda had dropped considerably. Especially during the dry season, springs and shallow wells would dry up – even though the area received sufficient rainfall. This region improved their water situation considerably: by constructing 3R measures, but also by implementing a ‘Pay As You Fetch’ system for collecting water. In spite of earlier payment schemes that failed, community member Fred Akahurira Junior has been able to motivate the discouraged community to keep the system running.

James W. Kisekka and Evelyne Busingye

During several decades farmers stripped the Rwambu’s hill-slopes of vegetation, allowing the 700-1000 millimetres of annual rainwater less time to infiltrate into the ground and as a result most of it would run downhill along the bare steep slopes. Constructed in the early 1990s by an NGO called HEWASA (Health and Water Sanitation), the borehole at Rwesigire is one of the many water sources of which the yield had reduced considerably over the years. “You had to pump several times before the water would come out; because of this the pump usually
broke down,” recalls Ms Stellamaris Nakimuli, a local restaurant operator. The borehole was abandoned for several years. Before 2013, the community was left with only two options: to collect dirty water from unprotected springs in the wetlands down in the valley, or to buy water from vendors at 500 Uganda shillings (0.15 euros) for 20 litres. Most families would buy water, because the hilly terrain made collecting water an extremely strenuous task.

In collaboration with RAIN and Wetlands International, the NGO Joint Efforts to Save the Environment (JESE) supported farmers to put simple 3R measures (see ‘What is 3R?’ on page 14) into practice to increase ground water recharge in the area of Rwambu. These measures included afforestation, stone bunds, soil bunds, percolation pits, and check dams. To monitor the changes in the water table, they periodically measured the ground water level in the

Fred Akahurira Junior

Stories from Ethiopia, Kenya and Uganda
Fred is an active and caring link between the community and the entrepreneur

Fred was trained in meter reading and bookkeeping. He registers every sale and collects 100 Uganda shillings (about 0.03 euros) for every 20 litres community members fetch from the borehole. From the money collected for the water, 20% is saved to make major repairs in case the borehole breaks down. The remaining 80% is managed by the entrepreneur to pay Fred’s salary and to undertake minor repairs and maintenance of the borehole. Taking into account how much community members were willing to pay, the price for water was agreed upon – five times less than what the vendors charge. All community members are able to pay for at least 20 litres per day. With this money, there is no need to wait for government or NGO support when the borehole needs repairing, or to collect money from the community when a problem occurs. The necessary financial resources are available straight away, and nobody needs to go without clean water.

Stellamaris describes how she benefits from the borehole. “I had to buy 60 litres of water every day at 900-1500 shillings from water vendors. Now I spend only 300 for the same quantity. The majority of residents around here are happy with this borehole. You could barely buy anything with our smallest coin of a 100 shillings, besides small items like a sweet. Now with a 100 shillings you are able to buy 20 litres of water!”

Fred is not just the person who collects fees and manages the books. He is an active and caring member of the community, who serves as the link between the community and the entrepreneur. “There are times when my customers do not have the money to pay for the water. Then, I sell it to them on credit. The good thing is that they always pay their debts,” says Fred. He knows them all, and they know that to remain a regular customer, they need to repay Fred’s trust. By being flexible with payments, he encourages them to continue using the borehole as a source of water. Because his wages are a percentage of the money he collects,
he remains motivated to have as many customers as possible.

Currently, 16 households collect water from the borehole every day, but the number drops during the rainy season when people harvest rainwater elsewhere. There are roughly 30 households within a two kilometres radius from the borehole, so not everyone fetches water from Fred. Some community members are opposed to the payment system, arguing that water from boreholes must be free. Some still collect water from the wetland, and those owning bicycles collect water from the free borehole more than three kilometres away at Rwebinyonyi. Yet more people are using the borehole than was previously expected.

The ‘Pay As You Fetch’ scheme in Rwambu shows how important a holistic landscape approach to water management is. Before the 3R measures improved the borehole’s water table, the community would also jointly pay to repair the pump. But it was frustrating to see that there was less and less water available and most lost the motivation to pay for repeated repairs. As a result, they were hesitant to pay when the ‘Pay As You Fetch’ scheme was set up. But Fred’s encouragement, the low price of water and the awareness raising meetings on the effects of 3R on the availability of water convinced them to start contributing to this self-sustaining rainwater harvesting system.
In the village of Maleno in Masongaleni Location, people suffered from erratic and unreliable rainfall, a domestic water shortage, food insecurity and outbreaks of water-related diseases. Maleno is not too far from both the mighty Athi river and the Thange river, yet distance and difficult paths make it a daunting task for women to fetch water from either water source. In response to the devastating drought that ravaged through Kenya in 2009, rainwater harvesting ponds for both the household and the farm were introduced to the region. Ms Domitila Katunge Molu, a Maleno farmer, was able to take the use of pond water to a new and unexpected level with poultry farming.

Alex Oduor

Domitila, her husband Daniel and their three sons settled in their three-hectare farm 12 years ago. Domitila is ever smiling and welcoming to her guests, and she has shown great potential as a poultry entrepreneur. In 2013, Domitila was the first in the region who got inspired to use her trapezoidal pond (see ‘What are rainwater harvesting ponds?’ on page 40) with runoff rainwater to gain ground in the small-scale livestock industry. This is an approach that is often overlooked: most farmers opt
to use the extra water from ponds for supplementary irrigation. Having attended a training course on poultry business in 2011, Domitila knew that raising chickens could be a profitable business. But water had always been a challenge. Using pond water to raise poultry was a bold move, and the outcomes have been a surprise. Her overwhelming success, which showed the clear link between water harvesting and poultry production, has shown everyone that she is a rainwater champion.

Domitila’s pond has a capacity of 250 cubic metres of water, enough to raise up to 315 birds during the three-month dry season. The water from the pond is clean and can be used for the animals, especially since she does not use agricultural chemicals near the water storage. Domitila sells big healthy hens for between 450 and 800 Kenyan shillings (4-7 euros), and day-old to two week-old chicks for 100 to 200 Kenyan shillings (0.90-1.80 euros). Domitila became a marvel to the community when her life and that of her family transformed completely.
Using only her poultry earnings, Domitila installed a solar panel to power her TV and radio. In addition, she improved her house from grass thatched to iron-roofed. The visibility of this success made her a role model for potential adopters – some of whom are coming from as far as 50 kilometres away.

A former receptionist and school secretary in Nairobi, Domitila speaks English, Swahili and Kamba, allowing her to communicate both with the community members in their mother tongue, as well as in Kiswahili or English to visitors. They come to learn about her techniques of local brooding. In her training on poultry raising Domitila learnt about using modern hatcheries, but because she could not afford a hatchery she improvised. By ‘tricking’ the surrogate hens to brood and care for chicks that were not their own, she was able to raise many more chicks. She is keen to share her experiences with visitors, inspiring them with her entrepreneurial spirit. The list of those who have visited Domitila includes extension agents from Uganda, Kitui, neighbouring farms in Kibwezi and even students and government agents from Sweden and the Netherlands.

Because the use of runoff ponds for poultry production is a new concept, it is mostly extension agents who are interested in Domitila’s experience – those who know of the potential benefits. In other words, adoption by other farmers is not direct, but via extension agents. One example is when the Ministry of Agriculture constructed a poultry house in Masongaleni that will be used for hatching day old chicks, so farmers in the surrounding areas can easily access the chicks at affordable prices.

Given the specific skills needed, not many farmers have adopted her techniques yet

Like every entrepreneur, Domitila faces rough patches in her business. The thin liner, susceptible to tear from protruding stones or tree roots, tore within three years. “Ever since the lining was irreparably torn, it can no longer hold any water more than a day” Domitila says. With the lining torn, her stock reduced to a mere 19 hens and 70 chicks. “I have sold most of the chickens and left a bare minimum for household consumption. My business has really collapsed,” Domitila laments. Her system can still use some improvement before it is completely sustainable and can recover from such a setback. Yet Domitila is not giving up.
Currently Domitila uses her water for onions, kale and tomatoes, as well as for the birds. In addition, she raises tree seedlings in her homestead nursery. “When there is a surplus of any crop, I sell it at the market. As for poultry, buyers often come to my farm to buy them directly.” Before the pond liner got torn, runoff captured in the pond could last between five to six months for every rainy season. “If I am able to repair the liner, I am contemplating expanding the pond reservoir by doubling its size and raise even more birds”, Domitila said.

Raising poultry requires training and a mastery of delicate husbandry practices, such as administering medicine, cross-breeding to contain diseases and increase productivity, as well as adequate feeding. Given the specific skills and knowledge needed, not many farmers have adopted Domitila’s techniques yet. Yet Domitila and her neighbours support each other and also learn from each other. Domitila is a member and Secretary of the Masongaleni poultry self-help group, a strong group with 52 active members. They discuss issues of the poultry business, operate a revolving fund for school fees or farm improvements, and help each other with maintenance activities.

The greatest concern for Domitila and other potential poultry farmers is to replace all pond liners of 0.5 millimetre thickness with new ones of 0.8-1 millimetre thickness. Thicker liners can last for more than 10 years, instead of the current two to three years. Also, the farmers hope to increase the size of their ponds to match more diverse water requirements – something they hope scientists and extension agents take into account in future projects.
What are rainwater harvesting ponds?

Several of the rainwater harvesting champions use household ponds to store rainwater. Such ponds store rain and runoff water that flows along paths and roads and is directed to the ponds with hand-dug channels. Farmers use the water stored in the pond for watering crops and trees, or for their livestock.

In many examples, as seen in some of the stories from Kenya and Ethiopia, the ponds have a trapezoidal shape. But ponds can also have other shapes, like Ato Legese’s round pond. A trapezoidal pond is not suitable in areas where soils have a high clay content, but are best suited where the soils are porous and lining is required to prevent a loss of water. Ponds come in different sizes: William’s pond, for example, measures 14 x 6 x 4 metres and holds 250 cubic metres of water; while Domitila’s is a bit smaller with dimensions of 12 x 6 x 2.7 metres.

Most ponds constructed by our champions are equipped with pond liners. These liners have proven to be major bottlenecks for the sustainability of the pond. Domitila’s pond liner ripped and seriously damaged her business as she had no means to repair it. Tears in the liner allow the water to slowly seep out, in William’s case emptying the pond within a month. Even when people take the initiative to solve this problem, there are limits to what can be repaired. William and Domitila’s pond liners, for example, are of 0.5 millimetre thick PVC material, and to replace it (as was necessary for Domitila after only three years) would cost about 600
euros. Instead, champions recommend using thicker liners, like those of one millimetre thickness. Samuel, who used the thick liner from the start, agrees that this has been one of the keys to success. His pond is still fully operational after more than 10 years.

In some areas ponds can also function without liners, as Ato Legese in Ethiopia has shown. He made sure to dig his pond in the right location, where it was excavated in an area of compact clay soil that traps the water. Also, there is hardly any silt upstream from the place where Ato Legese dug his pond, so he does not need a silt trap. Such traps or filters are crucial in other ponds, as silt and debris can easily damage liners and pumps.

In addition to the pump, often the most expensive component of the pond system is the excavation of the reservoir—depending on whether manual labour or an excavation machine is used. In Kenya, for instance, mechanical excavation costs about 300 euros for a 250-cubic-metres pond. In many cases, farmers organise the work in groups and take turns working together for each of their members. With such a system, replicating the pond technology in the community becomes easier. Rainwater harvesting ponds are relatively simple technologies, but often require hard manual labour and the right pond liner.
By the sweat of his brow
In the Rift Valley of Ethiopia, East Shewa zone, the village of Golje Bildema receives around 750 millimetres of rain per year. Rainwater harvesting was introduced some 15 years ago – yet the number of households benefitting from rainwater is very limited. Mr Legese Yadete, an elderly farmer, independently strived to make his rainwater harvesting pond a success in spite of the constraints that have made many other initiatives fail.

Selamawit Yetemegn and Eskinder Feleke Woldeyes

Ato Legese lives in Golje Bildema with six family members. In 2008 he and his neighbours received a government-initiated training course on pond construction, the production of maize and related agricultural techniques. Every farmer was encouraged to build a rainwater harvesting structure to supplement rain-fed farming (see ‘What are rainwater harvesting ponds?’ on page 40). Many started to dig ponds but most of the structures did not survive long. The top-down approach offered a “one-size-fits-all” solution without paying attention to the specific characteristics of each area or the farmers’ willingness and capacity. The weak structures could not be maintained because of a lack of skilled labour. Some started using the pond area for farming and others abandoned the ponds altogether. The communal pond in Golje Bildema did not have sufficient water in the dry season and it was not effectively managed, resulting in many conflicts on its use and management.

Ato Legese’s first pond failed too, because the ground was not compact enough to store water without a pond liner.

But our champion did not give up after his first unsuccessful attempt to harvest rainwater. Ato Legese was not happy with the communal pond: “I decided to dig my own pond so that I don’t have to deal with the conflict”, he says. After trying on his own for two years he asked the local agricultural bureau for advice. Using their advice on how to properly select the site for his pond, he chose a place that had compact clay soil and signs of water logging. Not able to afford mechanical excavation, Ato Legese started excavating manually. Digging the pond was labour-intensive and tiresome, but it was worth the effort: his second pond became successful beyond his imagination.

Now Ato Legese and his family use the pond to water the garden hosting
a variety of vegetables, fruit trees, spices, herbs, animal fodder trees and shade trees. In addition, the pond water is used for preparing home-made beer and for livestock during the dry season. While the rain-fed farm provides the family with its basic products, the garden using harvested rainwater is the economic pillar of the family. Ato Legese sells his products on the Mojo and Adama markets that are relatively close and accessible. Moreover, the garden provides additional nutrition for his family. Currently he earns around 30,000 Ethiopian birr (1200 euros) from his garden every year, and his growing fruit trees promise an estimated 20,000 birr (800 euros) more in the near future. Gesho, a local plant used to make homemade beer, brings the biggest profit.

Experimentation seems to be an important quality of a champion

The pond has directly improved the living standards of the family. The young children attend school, and Ato Legese bought a power generator for household electricity. “Before I started working on this garden the whole area was used for rain-fed farming of teff and wheat, but that could only cover our household consumption. We got very little additional income. With the garden, I can harvest three times a year.”

Without any financial or labour support it took Ato Legese four years to reach the current status of the pond. Every dry season he works on the rehabilitation and expansion of the pond, both in depth and width. From 8 AM to 6 PM Ato Legese can be found either by his pond or maintaining his garden. He regularly mentions that the maintenance process is labour intensive and tiresome, as he has to dig silt out of the pond and expand the pond area.

But it is this hard work and dedication that has made the pond a success, and Ato Legese a true rainwater harvesting champion. It has been worth it, he explains. “I am spending all my time and energy on the pond because I am benefiting from it.” According to him, the main reason for his success has been the effort and the time he has invested. “I am determined to work hard. I wanted to change my economic situation and I knew that could only be done through hard work. So I labour the whole day.”

Experimentation seems to be an important quality of a champion. “I keep myself busy thinking how to
improve the system and get a better yield. I try new seed varieties, and when something does not work the way I planned I try something else. When the first pond failed I tried to dig another pond and that has worked.” It is obvious that Ato Legese did not need a lot of instruction. “Other people failed because they needed strong follow-up and did not realise that the rainwater harvesting was for their own good. But I knew the benefits I could get if I had an additional water source and I decided to spend my time on that.”

Ato Legese wants to continue expanding the pond and he is looking for opportunities to use an excavation machine. To further improve the system, he plans to apply a cement lining to solve the problem of percolation. In addition, he hopes to plant sugar cane and make a guard house in the garden to prevent the recurring problem of thieves stealing his fruit and plants.

Some young farmers in the surrounding area are currently digging their rainwater harvesting pond, Ato Legese says. However, the adoption rate of the pond methodology has been low ever since the failed first government intervention. Ato Legese shows that it is possible to be successful, even though the hard manual work is a challenge. Furthermore, his experience shows that it is crucial for farmers to understand where the best location for the pond will be on their land. Perhaps a revolving fund system among community members can offer financial support to hire machinery or labour to dig new ponds or upgrade existing ones. Overcoming these challenges will open up a world of possibilities. The technology is simple and affordable, and the benefits are obvious when looking at Ato Legese’s household.
The district of Mbarara in south-western Uganda receives ample rainfall, but still many people have no access to clean drinking water. Until recently, the village of Nyamitooma had one free water source: a stream located four kilometres away from the village. Women and children used to spend large parts of their days travelling to the stream, and household conflicts arose as a result of such pressures. When the community started working together and took the initiative to build household rainwater harvesting tanks, these conflicts quickly came to an end.

James W. Kisekka and Evelyne Busingye
Most water sources in Mbarara are difficult to reach. As in most of Uganda’s drylands, ground water levels are so low that sinking boreholes is expensive. “I used to spend a lot of time collecting water from the stream, and still I had to do all the other domestic chores,” Mrs Asiimwe remembers. “It took at least three hours to go to the stream and come..."
back, and that would be for only one 20-litre jerry can. I would go to the stream twice in a day, and at times I would send my children to collect water in the morning before they could go to school. If we needed a lot of water at home, they would not go to school.”

Nyamitooma’s approach realised as a group what did not work individually

In 2011 a government programme approached individual households to set up rainwater harvesting tanks. Households were to contribute half the cost of the tank, 500,000 Uganda shillings (about 150 euros), before construction would begin. But this initiative failed. “None of the members could afford to raise that money,” says Mrs Asiimwe’s husband Stephen, the chairman of the village’s governing body.

Yet the Nyamitooma community managed to change their fortunes through their own imagination and pro-active attitude. They realised that what did not work individually, could work if they approached it as a group. The community was already organised in a farmers’ group, which made it easier for them to take the next step. In 2013 they wrote to the sub-county representatives requesting their help in securing access to clean water. Coincidentally, the Agency for Cooperation and Research in Development (ACORD) was just starting a rainwater programme in the district.

ACORD and the community agreed that before a household tank could be constructed, the family was asked to install basic sanitation facilities like a latrine, bathing shelter, drying-rack for utensils, and a kitchen. In this way, the two main water-related challenges in the community – water and sanitation – were simultaneously addressed. “I had no kitchen, and my house and latrine were all in really bad conditions,” Alice Mbabazi, a 52 year old Nyamitooma group member recalls. “I was never comfortable to let visitors into my home, because of the poor conditions. Even though ACORD’s requirements were really strict, we accepted them because we knew it was for our benefit.”

ACORD prepared the community with training courses about group dynamics; about communication and resolving potential disagreements; about family planning; and about proper hygiene and sanitation. Also, local masons were trained in tank
construction and repair. “The training energised me to change conditions at home,” Alice continues. “I knew I had to do things by myself. I did them at my pace according to my means.”

In Nyamitooma, a total of 46 members divided over three separate groups decided to work with ACORD. Each group was formed on the basis of existing relationships: friends, close neighbours and relatives. Fewer conflicts arise by subdividing a large group into smaller units and it is trust that keeps these groups together. All three groups are registered at the sub-county and have their own managing committee, but the groups share one coordinator.

They agreed that ACORD and the groups would both finance 23 tanks of 7000 litres each, enough to provide families with water during two to three months – almost covering a dry season. The community agreed to contribute local materials. Alice, for example, contributed stones, poles, and water. “Getting the materials by myself was tiresome, but I kept pushing myself because I was really interested to improve conditions at home.” The group pools money to jointly construct rainwater
harvesting facilities for all members. The Nyamitooma group devised an elaborate approach to manage this: all families were required to contribute an equal amount, but they were able to pay in monthly instalments of 30,000 Uganda shillings (9 euros). They also agreed that there may be months during which the members are exempted from payment, especially during times of drought or when the new school term begins. “We want parents to first pay school fees,” Stephen says. Still, the process is not always an easy one. “At times community members cannot make good on their commitments,” group treasurer Yosam Mpungu admits. When families experience difficulties in raising their monthly contributions, they deal with it as a group. “When you cannot contribute, the other group members look at you as a defaulter. The only way you go about it is to go to the meetings and explain your situation,” says Alice.

Mrs Asiimwe collects water from her family’s tank.
The group also determines the order of construction, giving first priority to widows, the elderly, members with HIV/AIDS, and those most distant from the available water sources. The group checks if the selected household meets the hygiene and sanitation requirements, after which the group contracts a mason to construct the tank. The benefitting family continues to contribute for the rest of the group. The regular maintenance tasks are left in the hands of the household, but the group monitors the state and use of the sanitation facilities. In November 2014, out of the planned 46 tanks ACORD had financed 19, while the groups had financed 17, and had already collected money to finance their 18th tank.

Nyamitooma group members are enthusiastic about the results of the system they have put in place. Benefits go beyond access to water: this has actually improved family life. The Asiimwe family explains: “Our children perform better in school, because now they do not miss classes as much,” Mrs Asiimwe notes. Also, rainwater harvesting has affected the prevalence of conflict in the community, Stephen affirms. “Cases of domestic violence have reduced, because of improved hygiene and sanitation, and increased access to water,” says Stephen. Throughout the country, men have shown to be hesitant to join self-help groups, often believing the groups are platforms for women to gossip. But in Nyamitooma the groups include men too. Having both men and women sharing roles and responsibilities has greatly reduced the occurrence of conflicts at household level.

Nyamitooma is regarded a model village in sanitation and is visited by many from within and outside of the district. It is unique because the service was demand-driven and because an elaborate group approach to co-financing was taken up by the community. The village realised their need for a water source and were supported by their chairperson, who is always keen to follow up on the initiatives from the members of his community. They understood that individual households could not afford to finance their clean water provision alone, but they were also not simply looking for a hand-out. They set up a system that fits well within their culture of working together.
Location: Machakos county, Kenya

Technology: private pond, 3R and drip irrigation for food production

Leading like a champion chief
On a daily basis, Samuel inspires farmers in and around Mango to take up rainwater harvesting practices. Moreover, he is increasingly expanding rainwater harvesting efforts on his farm. Samuel is an elderly man, living on a farm of three hectares together with his wife. His children have grown up and moved to the cities. Over the past 11 years, Samuel has invested his own energy and savings in a pond liner for his rainwater harvesting pond (see ‘What are rainwater harvesting ponds?’ on page 40), in terracing his farm to retain water (see ‘What is 3R?’ on page 14), and in a drip irrigation system that helps him use his water efficiently. Moreover, Samuel has bought a roof tank which easily fills up to the equivalent of 40 drums of water in the rainy season, all for household use.

For more than 11 years, Samuel’s pond has never failed to supply him with a good amount of water. Samuel has always been able to fix damages to the liner. During the rainy season, his pond fills up within about three days. After the pond is fully filled up, the rest of the water runs off to other parts of Samuel’s or his neighbour’s farm.

The former chief’s investments resulted in productive fruit trees, crops, cows and chickens. For instance, on average Samuel earns around 13,000 Kenyan shillings (120 euros) from his bean production every year, 17,000 shillings (150 euros) from his tomatoes, and 20,000 shillings (180 euros) by selling his maize. Samuel grows a wide variety of products, including mangoes, capsicum, watermelon, citrus, and much more.
Some products he sells directly from the kiosk he built on his farm, and some are sold in the towns of Maasi, Makutano, Machakos and Nairobi. “It took about three to five years to get a return on my investments,” Samuel says. Even today, his profits are not enough to sustain his family entirely. “I would like to increase the water volumes when I have enough money to invest more,” Samuel explains.

Even though he is an elderly man, Samuel still shows a lot of energy as he goes around his village to lecture on rainwater harvesting, inspiring his neighbours to read more about the topic. Because he was responsible for the community during his many years as chief, Samuel remains concerned for the well-being of his village, while at the same time his status still allows him to influence people. His education, position and contacts with other actors such as NGOs have given Samuel ample knowledge on rainwater harvesting, and he feels responsible to share this knowledge.

According to Samuel, many people in the community are aware that rainwater harvesting is an effective way of increasing the soil moisture, which

As a former chief, Samuel’s status still allows him to influence people
helps increase yields on the farm. The main barrier that prevents people from applying the methods is a lack of funds. Also, illiteracy prevents some community members from reading the books, documents or manuals that Samuel wants to share. “To solve this, I give seminars and I see them change slowly.” He teaches his community some of the important lessons he has learnt, like how drip irrigation helps him use his resources wisely.

Samuel himself learnt about many techniques during trainings and workshops held in the community over the years, provided by the Ministry of Agriculture and non-profit organisations. As the chief is frequently the first point of contact, Samuel was more aware of such programmes than his neighbours. World Vision, for example, has shared technical advice on pond liners, while ICRAF has provided community members with trainings on agroforestry practices. Samuel now knows the benefits that planting trees on his farm can bring, and he has started a tree nursery. He encourages other farmers in his community to follow trainings as well, hoping that such trainings, which are now organised once every three months, will be held more frequently.

Samuel allows farmers from near and far to visit his farm to showcase how rainwater harvesting can successfully improve agricultural production. Moreover, he is teaching farmers that simple techniques can make a big difference. When new donors or NGOs come to Samuel’s farm to introduce new technologies, he is always very eager to take them up and inspires his community to do the same. “I am truly convinced that more training is the way forward, and that if more people know about rainwater harvesting, the community can flourish.”

The Mbusa self-help group

Several activities that improve rainwater use in the community are executed through the Mbusa self-help group. Women generally concentrate on buying drums for water, while men are involved in more labour-intensive activities such as the digging of holes for tree planting. The entire group digs on one farm and then on the next. Samuel, chair of the group, has played a crucial part in setting up the guidelines for the group. At the end of each year, the group organises a celebration, which motivates people to continue working together.
More than 30 years ago, the Bishanbehe sand dam was built to supply the people in Bishanbehe with water for their households, livestock and irrigation. But the distribution of the available water was a problem in the community. Until in 2009 a local youth decided to try managing water in a different way, and prevent the conflicts surrounding it. Yasin Mohammed was democratically elected and given the title ‘Aba Melaka’, or ‘Water Father’. He is at the centre of a system that has finally made the sand dam a solution for the entire community.

Eskinder Feleke Woldeyes and Selamawit Yetemegn

The Bishanbehe sand dam (see ‘What are sand dams?’ on page 60), located in the Dire Dawa region in eastern Ethiopia, was built in 1983 and rehabilitated in 1993. It supplies water for around 60 hectares of farmland and 700 households the whole year round. Their livelihoods depend mainly on mixed crop-livestock farming systems, with a focus
on potato, papaya and other cash crops. For these crops, in this region, irrigation is essential for cultivation. Thanks to the sand dam, the community members were able to increase their yields and income from crops like coffee, papaya, orange, lemon, mango, banana, onion, potato, tomato and peppers. From a single cash crop, farmers now earn around 20,000 Ethiopian birr (800 euros) per hectare per year. The added income has helped them to pay for their children’s school expenses and to buy cows and goats for milk. Moreover, the increased fruit and vegetable harvests improved their families’ nutrition levels.

However, not everyone experienced these benefits at first. Once the sand dam was built, it created conflict...
Since Yasin started serving as the ‘Aba Melaka’, conflict has minimised and production has increased.

Under Yasin’s management, all irrigation users experience ownership of the system. They know that they benefit if they participate. People were aware of their land’s potential to produce, and the management system’s fair water distribution now helps to reach that potential. Each irrigation user agreed to pay 200 birr (8 euros) per year for repairing the system. Their willingness to contribute to maintenance costs helps keep the system working in the long term. This is encouraged by a new government policy that states that minor maintenance costs need to be covered by users.

Yasin provides regular follow-up and monitoring of the system and he operates according to the communally determined bylaws. For example, the community decided to organise all irrigation users into small groups. Farmers with adjacent farms formed such groups, allowing them to use only one irrigation canal for all their farms. This not only prevents conflicts, but saves time and effort as they only need to create, clean and repair one canal per group. It is also more efficient – less water is needed.

Yasin has charisma and strong management and leadership skills. Because he is elected by the community, they accept his leadership. Most irrigation users see that since Yasin started as the ‘Aba Melaka’, conflict has minimised and production has increased. Many also attribute the increase of the water volume to him, as they believe that Allah blessed their community after Yasin’s election. Clearly, he is a highly respected person in the community.

Mostly, it is his devotion to servicing his community that has brought significant change. As the ‘Aba
Melaka’, Yasin has a very high workload: he spends a minimum of six hours per day supervising, preventing and helping to resolve disputes, as well as monitoring the distribution of water. But his time is spent willingly. He sometimes forgets to work on his own farm, he says, due to his passion for this community service.

In an area where external support from the government or NGOs is limited, the community managed to find their own way to make the most of their rainwater-system. Nonetheless, Yasin explains, they would appreciate more support in terms of extension and training. Also, as of yet there is no water management system for domestic water supply, nor a water extraction system for domestic water supply. This places a burden on women and children to fetch water directly from the irrigation canal, while this water may not be potable.

More can be done to encourage the expansion and the replication of the system, such as organising irrigation users into cooperatives or introducing new or strengthening traditional saving systems, as well as enhancing microfinance support. Even though the initial costs of building a sand dam can often not be covered by the community alone, the story of Yasin and his community show that good management and community investments in maintenance can turn a sand dam into a group success.
What are sand dams?

In areas with sandy riverbeds in seasonal rivers, like in the villages of Kinani (in Kenya) and Bishanbehe (in Ethiopia), sand dams provide high quality storage of rain and runoff water. A sand dam is not made with sand but with a stone or cemented wall. This wall is built across the river channel and into the banks, with a spillway in the middle to keep the river in its course. The dam collects sand during each flood and the deposited sand starts to saturate with water. This water stays in the pores between the grains of sand in the banks and bed of the river, waiting to be pumped out through an extraction well. The sand can contain up to one third of its volume in water. This water does not evaporate and no water-borne diseases can enter underground. Sand acts as a natural filter, purifying the extracted water.

Experience with different sand dams has shown that the location as well as the quantity and quality of the sand are crucial for its success. In some cases the water can even be pumped to a reservoir sitting on high ground. From there gravity allows the water to flow to places agreed upon by the water users. This requires no extra costs for pumping up water for irrigation. The sand dam in Bishanbehe, for example, helps the community grow crops and fruit throughout the year.

At the sites where champions succeed in managing their sand dam, the changes in water availability are remarkable. Sand dams increase the moisture in the soil, recharging water in shallow wells and making water available for drinking, irrigation or other purposes.

The many benefits of sand dams, in terms of agriculture, environment and drinking water, come at a cost. The construction and maintenance of sand dams is relatively expensive and requires trained engineers. Therefore, it is a challenge for individuals or even communities to invest in sand dams by themselves. Communities contribute in-kind, providing unskilled labour and local materials. Once the dam is finished, communities are responsible for the maintenance of the pump. If it is constructed well, sand dams have been known to last for more than 60 years without maintenance.

For more information, visit www.rain4food.net/wiki/
A stone wall is being built to create a sand dam.

A finished sand dam with a water pump in the dry season.
Once there was a well in Kinagamukono village, in south-western Uganda. But prolonged droughts and poor infiltration of rainwater into the hilly slopes of the village’s farms ensured that this well was dry for long periods. When water was available, the well was filled with silt and debris and covered with algae, dead frogs and insects. The well happened to be on Mr Kazaro Kahenano’s land, but it was also used by many others in the community. Kazaro, being the hospitable neighbour, not only welcomed his neighbours but he also welcomed significant improvements to his well.

James W. Kisekka and Evelyne Busingye
Kazaro, 78 years old, is a respected resident of Kinagamukono. “Our problem is water,” Kazaro said at a meeting organised by the NGO Joint Efforts to Save the Environment (JESE). “If JESE can give us a safe water source, you will have solved a million problems.” His farm of about three hectares housed an open well that he, his family and neighbouring households used to fetch water for domestic use and for their cattle. But the well was not a safe and reliable water source, yet.
In 2013, with support from RAIN, JESE replaced the old hand-dug well on Kazaro’s farm with a protected shallow well. The well includes a cattle trough that taps overflowing water for Kazaro’s animals to drink. With a history of dried up water points in the area, JESE supported Kazaro to build two earth bunds of about 100 metres long across the farm upstream of the well (see ‘What is 3R?’ on page 14). This helps to trap runoff rainwater and allows it to infiltrate into the soil and replenish the shallow well. Now there is enough water in the well for neighbours to continue collecting it, even in the dry season. JESE also helped the community set up a committee representing the benefiting households, which organises meetings, maintains the well and develops rules that help keep the system clean and functioning.

“It has been two years now that my family and my neighbours have been enjoying the clean water,” Kazaro says. “To my surprise, the well has never dried up! We attribute this constant flow to the earth bunds that were constructed on the upper parts of my farm to help ‘catch’ the runoff. It also improved my pastures. Just look at them, they are all green!” Kazaro explains with a big grin, pointing at the pastures around the earth bunds. Grazing on the green pastures increased his four cows’ milk production from two to 4.5 litres per cow per day. This earns him an additional 4800 Uganda shillings (1.40 euros) per day, more than what an average rural household needs to spend in the market to complement what is harvested from the home garden. “Despite my old age, I am able to cater for my family’s needs and even pay school fees for two of my grandchildren. And I feel this is just the beginning of my journey to prosperity.”

“Denying people access to a water source is wrong,” Kazaro Kahrenano believes.
Kazaro improved his own livelihood significantly, but this is not what makes him a rainwater harvesting champion. What really makes him unique is his consent to let so many others benefit from the water source on his property. “I believe that denying people access to a water source is wrong,” Kazaro states. Unfortunately, not all water users see it as their responsibility to maintain the well that they are using. Kazaro does not wait for them and takes action himself, even if it means that at times there is no one to help him with maintenance activities like slashing and cleaning. “Water sources should be kept clean,” he believes.

The community members did provide local materials and helped during the construction of the well and the soil bunds. Some of them still support Kazaro on a regular basis. The water user group meets every two months and has agreed on a set of informal guidelines for water users. JESE has trained committee members on record keeping and how best to work as a group, which will hopefully improve everyone’s participation in the future. Until then, whether he receives help from his neighbours or not, Kazaro will maintain and share his water source because of his own convictions.

**Kazaro does not wait for support and takes action himself**

The improvement of Kazaro’s well was driven by the demand from the community. They understand how the soil bunds improve their environment, and are able to maintain the simple and cheap technology themselves. But most importantly, Kazaro’s well demonstrates the importance of social values in water resource management, and the role one individual can play in strengthening them.
Location: Kinani, Makueni county, Kenya

Technology: community sand dam and 3R for food production

Strong bonds nourish us all
Sikika Self-help Group

In Kinani, a small village near the town of Woote, community members were forced to walk long distances to fetch water from the closest river. Many people depending on the same water source made the wait for the little available water strenuous. In 2011, with support from the county government and a local NGO, Kinani built a sand dam, water pumps, greenhouses and water tanks. Key to this process was the cohesive and well-functioning Sikika self-help group. The colourfully dressed Josephine Mutuku and Alice Wambua, treasurer and chairperson of Sikika respectively, are eager to share their story.

Elsabijn Marike Koelman

The Sikika self-help group, made up of 31 members (24 women and 7 men), has been functioning extraordinarily well for the past three years. Much of this success can be attributed to the enthusiasm of Josephine, Alice and the rest of the managing committee. They express the energy and will-power needed to make the group succeed, and they show dedication to their community.

The effective managing committee consists of seven members, including Josephine and Alice. They ensure that all members play an active role in the group and contribute labour. The committee managed to improve dozens of farms within their community while using increasingly efficient rainwater harvesting techniques. The committee meets three times a week, during which they reflect on their strategy and discuss how they can most effectively organise themselves and their work.

Since the establishment of the Sikika group in 2011, the members have not only been working on their individual farms, but they lease land collectively. On the communal as well as on individual farms, the group installed water pumps and drip irrigation systems to grow kale and onions with less water. All group members contribute labour to improve the farms. The Sikika group has helped in the construction of two sand dams and the building of terraces (see ‘What are sand dams?’ on page 60 and ‘What is 3R?’ on page 14). The group has planted various trees, such as mango, papaya and citrus. In addition it manages a greenhouse where drip irrigation is used to grow tomatoes, earning them 59,000 Kenyan shillings (515 euros) last year. In the future, they hope to expand their activities and include poultry farming.

The group is aware that their techniques need to be as efficient and
effective as possible to adapt to the climate. “When it rains, it can rain heavily for two weeks and then the rain suddenly stops,” Josephine explains. Knowing this, they are fully committed to their activities. “There has been a very big change,” Alice believes. “The shallow wells have water, the dam dries up but underneath there is still water. The vegetation has increased and along the river there is a lot of green for livestock.”

Their collective work has enabled the Sikika group to store some of their excess produce and sell it on the Kinani market. The group has a bank account where the communal farm profit is saved and partly shared among the members. The group savings are complemented by fines paid by members who fail to show up for work without a valid reason, ranging from 20 to 100 Kenyan shillings (0.15 to 0.90 euros). The savings are used for supplies for the communal farm. For instance, most recently they bought a fuel pump of 16,000 shillings (140 euros). Necessary investments are decided upon during group meetings.

The strong bond and cohesion within the group become evident as Josephine and Alice explain how members are happy to support each other in times of need. If one of the members falls ill, an amount of money from the mutual account is given to the household for a quick recovery. Moreover, an annual end-of-year party where county government members are invited and the group shares their produce, stimulates the group cohesion.

By providing a successful example, Josephine and Alice have helped other groups to set up such supportive systems. Similar groups in the county are now aware of the efforts and success of Sikika, and have approached members for advice. The exchange between groups is very useful, according to Josephine and Alice, and in times of need the groups support each other with local materials or knowledge.

Another characteristic is that men and women support each other in the group. Although tasks were initially equally divided among the men and women in the group, they learnt by doing that men were better at certain activities than women, and vice versa. Josephine explains: “Some activities were not done by women, such as digging with the pick axe. Instead, they know how to plant trees.” This realisation has helped the group to make use of everybody’s skills, and still ensure equal participation. This in turn has increased the decision making power of the women in the group.
The success of the rainwater harvesting interventions of Sikika is partly due to the support of the local NGO Utooni Development Organisation. Utooni field workers meet with Sikika members on a regular basis to share the group’s future plans and advise them on interventions such as sand dams and tree nurseries. Utooni’s support seems to work particularly well because they emphasise community participation to make projects sustainable. The entire community was involved in the construction of the sand dam on the communal Sikika farm, for example, creating a large pool of local experts who can maintain and repair the dam if necessary.

The entire community of Kinani makes use of the sand dam and there is equal access to the water it provides. Still, the amount of water available for farming in the community remains a problem, as Josephine and Alice emphasise. The Sikika group has acquired a lot of knowledge on rainwater harvesting, but the wider community is somewhat behind. “A lot of water is still wasted, runs off to the rivers and is then washed to the sea, which leaves the land dry,” Josephine says. Capacity building activities should be expanded to the wider community, according to the committee members of the Sikika group. More varied rainwater harvesting interventions in their community, including water ponds and tanks, could make a big difference.

The Sikika group is taking the necessary steps to make further improvements themselves, as they continue to save money through their increased productivity. Their success and commitment has also inspired outside support: the county government, for example, has sponsored the construction of the greenhouse. While such help is still welcomed by the Sikika group, they are well on their way to becoming independent.
Keynote address

As in most of East Africa, drought is a recurring problem in Ethiopia. The country, together with its various development partners, continues to search for practical, affordable and sustainable ways and means to mitigate the undesirable impacts of droughts.

It is well established that rainwater harvesting and use is one of the approaches being successfully employed in many parts of the world to mitigate the negative impacts of drought. The application has tended to contribute to increased agricultural productivity and production, thereby making a positive contribution to both food and income security. Harvested rainwater can effectively be used for irrigation (both for backyard and other small-scale home gardens), water for livestock, and other domestic uses.

In addition to this, rainwater harvesting has an added advantage as a labour-saving intervention, especially for women and the youth that are traditionally responsible for fetching water. The saved labour could be meaningfully applied to other productive activities for the benefit of the household.

Rainwater harvesting is not new in Ethiopia; it has been done since time immemorial and continues to be done today. However, what needs to be assured is the applicability, efficiency and sustainability of the technology to ensure that households individually and communally are able to collect, store and use this seasonally available resource – rainwater. The objective is for target families to be able to use the collected/harvested rainwater long after the preceding rain season has ended and before the onset of the oncoming rainy season.

To that effect, different stakeholders have worked variously with different households and communities in different parts of the country to demonstrate
and encourage the application of those rainwater harvesting techniques that have been tested and proven. In IFAD, this is being championed through our support to PASIDP (Participatory Smallholder Irrigation Development Project) in the Ethiopian Ministry of Agriculture, which has shown impressive results in the various water harvesting investments in four regions (Tigray, Anhara, Oromia and SNNP).

Highly positive results are being reported at household and community levels, where people have adopted the use of technologies disseminated by various partners in Ethiopia, and notably by RAIN. It is hoped that the Ethiopian government and its development partners will continue to spread the use of these technologies to many other parts of the country. This is particularly necessary in those areas that are more prone to the drought and flash flooding conditions, as they will allow communities to adapt to changing weather patterns and hence build on their resilience to climate change.

Robson Mutandi
International Fund for Agricultural Development (IFAD)

Robson Mutandi is the IFAD Representative and Country Director to the IFAD Ethiopia Country Office, from where he has responsibility for the Angola programme as well. He has vast experience in agricultural development, natural resource management and rural development. He has worked with governments, UN agencies, international finance institutions and bilateral agencies for over 30 years. He has dedicated most of these 30 years to championing sustainable innovative and dynamic approaches to lift rural poor people out of poverty, especially using rural finance as entry point to poverty reduction.
To see some of the East African rainwater champions in action, watch the short film made about the experiences of David in Uganda, the Meholi youth in Ethiopia, and Samuel in Kenya.

For this film and for more information on RAIN, rainwater harvesting technologies and RAIN’s strategies in East Africa, visit www.rainfoundation.org.