Newsletter 03 | 2016

AFRHINET

An ACP-EU Technology-Transfer Network on Rainwater Harvesting Irrigation Management for Sustainable Dryland Agriculture, Food Security and Poverty Alleviation in sub-Saharan Africa

WELCOME TO THE THIRD NEWSLETTER OF THE AFRHINET PROJECT!

Dear AFRHINET Reader,

The third issue of the AFRHINET newsletter highlights the efforts that the AFRHINET project has exerted in developing advanced capacity building materials on the use of rainwater for off-season small-scale irrigation in rural arid and semi-arid areas of sub-Saharan Africa. The materials have been used to develop a curricula for an advanced capacity building course which have been contextualised and implemented in Kenya, Mozambique and Zimbabwe. Furthermore, this third issue also focuses on the operationalisation of the AFRHINET Research and Technology Transfer Centres and the development of national and regional research and technology transfer strategies in the field of rainwater harvesting irrigation management in Ethiopia, Kenya, Mozambique and Zimbabwe. Please, do not forget to visit our AFRHINET virtual Research Technology Transfer Centres at http://www.rainwatertechcentres.net/.

AFRHINET is a technology transfer network on the use of rainwater harvesting for off-season small-scale irrigation in rural arid and semi-arid areas of sub-Saharan Africa. This three-year project aims to foster the knowledge and use of rainwater harvesting technologies for small-scale irrigation during the dry season. The action of the project takes place in Ethiopia (Addis Ababa University and Water Aid-Ethiopia), Kenya (University of Nairobi and ICRAF-SEARNET), Mozambique (Eduardo Mondlane University) and Zimbabwe (University of Zimbabwe and ICRISAT-Bulawayo). The AFRHINET project is coordinated at HAW Hamburg (Germany).

Happy Reading!
Sanyukta Kanwal & Josep de Trincheria

A RWHI system based on a farm pond is complemented by other micro-catchment and in-situ RWH management technologies. Source: Oduor, 2015

AFRHINET CAPACITY BUILDING ACTIVITIES

By Francis Oremo, Nicholas Oguge and Josep de Trincheria

DEVELOPMENT OF ADVANCED TRAINING MATERIALS ON RAINWATER HARVESTING IRRIGATION MANAGEMENT (RWHI)

The AFRHINET project has completed the design of advanced training manuals on RWHI management. The two-phase capacity building materials focus on the scientific and practical dimensions with regard to the implementation of innovative RWHI technologies. The main contents of the training materials are:

Chapter 1
Introduction, Principles of RWHI systems, „Classification" of RWH systems, RWHI systems, Benefits of RWHI Systems and Challenges in Designing, Constructing, and Operating RWHI Systems.

Chapter 2
RWHI Technological Options: Earth Dams and Water Pans, Sand and Subsurface Dams, On-farm Storage (Farm Pond) Systems, Rock Catchment Systems and Roof Catchment Systems.

Chapter 3
Small-scale Irrigation Technologies: Water Lifting and Delivery Systems, and Irrigation Water Application Systems.

Chapter 4
Integrated Rainwater Harvesting Irrigation Systems.

The development of the AFRHINET training materials give due consideration to dryland agricultural water management and aim to showcase effective solutions to reduce absolute poverty and hunger in rural drylands of sub-Saharan Africa. While there has been some focus on capacity building by donor agencies and other development organisations through the promotion of rainwater harvesting storage technologies and small-scale irrigation technologies, there is lack of common understanding of best practices which cost-effectively link both dimensions in order to facilitate an optimal use of rainwater for small-scale irrigation during the dry season.

The effects of recurrent drought in sub-Saharan Africa continue to devastate dryland communities by hampering their ability to produce food and generate income, especially during the dry season. Hence, there is a need for concerted effort and partnership by all stakeholders in the field of RWHI in order to ensure that the capacity building courses contribute meaningfully to the fight against hunger and rural poverty. The training manuals propose and support mechanisms to identify, mentor and incubate RWHI innovations by African youths, women and other community groups in order to boost their resilience to climate change, improve water and food security, and raise awareness of African capacity for innovation.

The capacity building courses are intended to contribute to increased food security by replicating and upscaling innovative RWHI technologies and practices for sustainable development in productivity of rainfed-based farming systems. By emphasizing innovative RWHI technologies, AFRHINET is at the centre of the sub-Saharan region's greatest challenge that includes providing adequate and nutritious food in the face of ensuing climate change, and addressing water resource constraints threatening the livelihoods of millions of people.

ADVANCED CAPACITY BUILDING COURSES ON RAINWATER HARVESTING IRRIGATION MANAGEMENT

The AFRHINET training materials, which have been specifically tailored for scientists, practitioners and government officials, have been used to develop a curricula for an advanced capacity building course. The materials have been contextualised and implemented in Kenya, Mozambique and Zimbabwe. The courses are expected to take place in Ethiopia during May 2016.

Thus, a two-phase capacity-building course focusing on the scientific basis and the practical dimensions of RWHI management has been implemented in Kenya, Mozambique and Zimbabwe between March and April 2016. The one-week courses have attracted more than 100 participants from academia, public service, private sector, NGOs, civil society and community groups who are directly or indirectly involved in research, development, promotion and adoption of RWH for food security interventions. During the training, participants had access to practices, innovations and lessons learned in critical areas affecting replication and scaling up of RWHI technologies. During the third year of the AFRHINET project, the training materials will be further reviewed and officially published at the end of the project lifetime.

AFRHINET capacity building courses in Kenya (above) and Mozambique (below). Source: AFRHINET project, 2016

AFRHINET RESEARCH, TECHNOLOGY TRANSFER AND ADOPTION ACTIVITIES

By Menas Wuta, Rumbidzai Nyawasha and Josep de Trincheria

OPERATIONALISATION OF THE AFRHINET RESEARCH AND TECHNOLOGY TRANSFER CENTRES

Each of the five AFRHINET partners in Ethiopia, Kenya, Mozambique, Zimbabwe and Germany have established a Research and Technology Transfer Centre (RTTC) at their respective universities. The RTTCs aim at:

- Fostering the exchange of innovative knowledge and technologies in the field of RWHI with other academic and scientific organisations at national and regional level.
- Be an information hub where all up-to-date know-how and innovations in the field of RWHI can be readily accessed by whoever needs it.
- Create partnerships and synergies with other relevant multivariate stakeholders in the field of RWHI to improve food security and facilitate poverty alleviation in rural arid and semi-arid sub-Saharan Africa.

The RTTCs are an important outcome of the AFRHINET project and their successful establishment is strongly linked to the sustainability of AFRHINET beyond the project lifetime. The AFRHINET RTTCs are a nucleus of information and technological innovations at the respective partner universities and as such, deliberate efforts are taking place to ensure its viability and sustainability. In this regard, each AFRHINET partner has designed specific activities to make their AFRHINET RTTCs operational.

Rainwater that has been stored during the rainy season can be cost-effectively used for small-scale irrigation during the dry season. Source: AFRHINET project, 2016

IN ETHIOPIA…

…the AFRHINET RTTC at Addis Ababa University is putting in place the following activities in order to operationalise the RTTC:

- **Information and knowledge management:** The RTTC is setting up and maintaining information banks on innovative RWHI practices in the country, which is coupled with activities to facilitate their dissemination.
- **Building and managing strategic partnerships:** The RTTC is strengthening strategic collaborations and partnerships with other research institutions, government agencies, NGOs and other practitioners in the field of RWHI.
- **Policy analysis and dialogue:** The RTTC is lobbying the public sector including relevant line ministries to provide an enable environment for technology transfer in the field of RWHI management.
- **Capacity development and training:** The RTTC is cooperating with other university departments and organisations to offer courses and training in relevant RWHI technologies that have potential to improve the livelihoods of smallholder farmers.
- **Pilot projects and demonstration trials:** Action research and demonstration activities are planned to constitute one of the main activities of the RTTC in Ethiopia.
- **Consultancies:** The RTTC is planning to provide consultancies for government, NGOs and the general public as and when the need arises.

Evolution of control measures for seepage and evaporation water losses in farm ponds. Source: Ngigi, 2015

IN KENYA…

…the AFRHINET RTTC at University of Nairobi has been very active in engaging stakeholders at the public and private level in order to take part in their technology transfer activities. A quadripartite Memorandum of Understanding (MoU) was signed among the AFRHINET RTTC, the Ministry of Environment, Water and Natural Resources, Jomo Kenyatta University of Agriculture and Technology, and Kenya Rainwater Association. The MoU committed the Parties to work together towards scaling-up research, capacity building, high-level policy dialogue and brokerage of knowledge and technology transfer in the water and environment sectors in Kenya, with a special focus on RWH for food security. In addition, other several activities have been carried out to operationalise the AFRHINET RTTC in Kenya:

- **Information and knowledge management:** The RTTC is identifying research and innovation needs in RWHI management, and sharing such information with academic and research institutions for further research. Furthermore, it is keeping abreast with major national, regional and Africa-wide policies on poverty alleviation, agricultural development and food security in order to understand which priorities are assigned for problems such as recurrent drought and climate change.
- **Building and managing strategic partnerships:** The RTTC is playing a significant role in disseminating knowledge, technologies and information on RHWI management, and in linking research communities with regional market, government agencies, businesses/micro-enterprises, NGOs and community groups.
- **Policy analysis and dialogue:** The RTTC is focusing on policy dialogue to influence decision-making on adoption and up-scaling of relevant RWHI in Kenya. This is guided by the appreciation that in addition to research and innovation, there is a need for significant contribution from policy and market development.
- **Capacity development and training:** The RTTC is targeting all relevant actors along different value chains (i. e. research institutions, public agencies, private sector, NGOs, farmer groups, agro-processors and market agents) who are directly or indirectly involved in research, development, promotion and adoption of RWHI interventions.
- **Pilot projects and demonstration trials:** The RTTC is cooperating with non-governmental organisations, farmers' associations, community-based organisations and government's agricultural extension services in order to conduct pilot projects and demonstration trials in Kenya.
- **Consultancies:** The RTTCs offers online and physical access to knowledge transfer, but also provides consultancies as need arises.

IN MOZAMBIQUE…

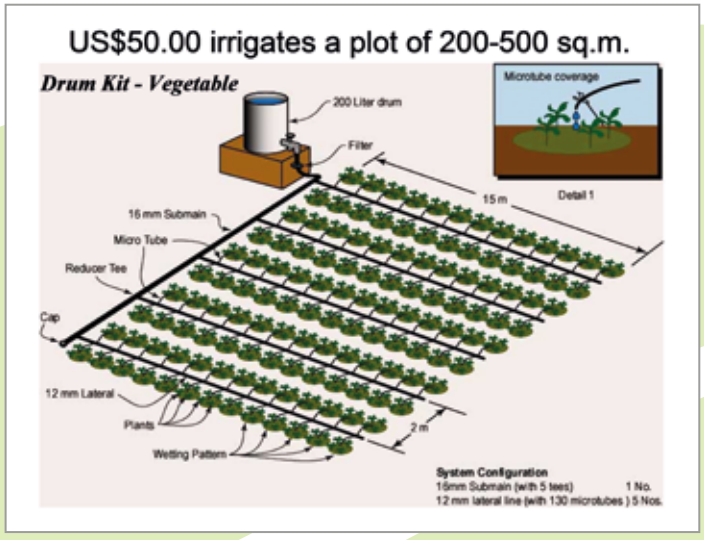
…the AFRHINET RTTC has been established at Eduardo Mondlane University. The biggest challenge in Mozambique is that there has not been much policy support with regards to RWHI management in the country. Therefore, the RTTC is aiming to change this reality through direct influence on policy-makers. The RTTC is expected to be the leading institution in the country with regard to capacity building and promotion of RWHI technologies. Some of the activities to operationalise the RTTC in Mozambique includes:

- **Contextualisation:** Development of a strategic vision on RWHI specifically tailored to Mozambique. Also, identifying research areas and development areas within RWHI with high importance and impact on poverty reduction and sustainable development in Mozambique.
- **Promotion and dissemination:** Promote and disseminate RWHI research results, methodologies and technologies through the organization of seminars, workshops, training courses, curriculum development and demonstration field trials.
- **Policy-making:** Promote the formulation of policy programs in RWHI in Mozambique
- **Networking:** Establishment of networks and links with different national and international institutions and partners in RWHI management.
- **Fundraising:** Mobilize resources and funds (public and private) for the implementation of programs and projects in RWHI management.

IN ZIMBABWE…

…the AFRHINET RTTC has been established at University of Zimbabwe and seeks to consolidate all the efforts on RWHI currently being done in the country. Even though relevant policies already exist, they are fragmented across different departments and private organisations. The RTTC aims to identify all relevant stakeholders within the field of RWHI and facilitate unity of purpose. Several activities to operationalise the RTTC in Zimbabwe are:

- **Capacity development and training:** The RTTC is cooperating with other departments and organisations in order to offer more courses and training in other relevant technologies that show potential to alleviate the problems being faced in the country.
- **Pilot projects and demonstration trials:** The RTTC is facilitating the setting up of pilot projects and demonstration trials as well as better improved technologies in selected areas in order to enhance up scaling of RWHI technologies.
- **Workshops/Seminars/Conferences:** The RTTC is taking the lead role in presentation of seminars, workshops and technology demonstration activities. Also, in the participation of similar events organised by other stakeholders, where RWHI management is promoted and disseminated. This is also expected to provide an opportunity to help marketing the AFRHINET RTTC to other stakeholders.
- **Consultancies:** The RTTC is actively offering consultancies in the area of RWHI management and other related areas.



A typical 200-litre mini-tank (drum) LHLCD irrigation system. Source: Ngigi, 2009

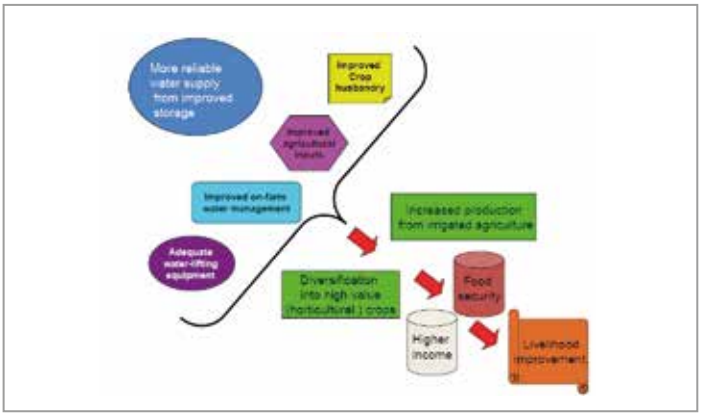
A sand storage dam built by stages of reduced height in Zimbabwe is a perfect example of a design innovation which has the potential to increase the capacity of the sand reservoir to supply water. Source: De Trincheria, 2015

NATIONAL AND REGIONAL RESEARCH AND TECHNOLOGY TRANSFER STRATEGIES

Rainfall variability and recurrent droughts have resulted in huge water scarcity, thereby, exacerbating food insecurity. Water scarcity can be viewed as a problem of water storage and by addressing this it will help improve water availability. Several technologies exist to improve water storage and because the majority of sub-Saharan Africa relies on rainfed agriculture, rainwater harvesting technologies for small-scale irrigation (RWHI) are essential in order to improve and sustain the livelihoods of the rural population. A number of technologies are available for use, however, uptake and adoption is still very low. In this regard, one of the greatest challenges related to low adoption is the inaccessibility of know-how and information in order to assist and inform the farmers on what, where and how works in their specific environments.

Even though there is already a basket of technologies that small-scale farmers can use for irrigation, the lack of appropriate technology transfer platforms has hindered the development of small-scale irrigation. Currently, there is no clear or elaborate research and technology transfer strategy, and different stakeholders are implementing rainwater harvesting projects independently without a clear common monitoring, coordination and standardisation process. Thus, many stakeholders are rarely aware of technologies that are being developed or promoted by their peers or other organisations. In addition, the research on rainwater harvesting and irrigation is limited and uncoordinated. Therefore, much is required to address the challenges and barriers to promoting adoption, scaling up and increased investments.

Research communities rarely communicate their findings, and when the results are disseminated, they do so through international journal papers whose local access is limited, which is coupled with few local forums to share research findings among different stakeholders. Furthermore, there is limited coordination between academic and research organizations, on one hand, and regional market, businesses/micro-enterprises, NGOs and public sectors, policy-making process actors, and local communities, on the other. Thus, the information available on RWHI is scattered and not easily accessible to local practitioners, including farmers.



Causal relationship between improved water storage and better livelihood.
Source: Payen et al., 2012

In the field of rainwater harvesting for small-scale irrigation, the AFRHINET project is leading the process of strengthening cooperation and networking among research communities with businesses/micro-enterprises, NGOs and public sectors, policy-making actors and local communities. In order to achieve this, the national and regional AFRHINET research and technology transfer strategies provide an overview of the actions to be followed in order to ensure successful technology transfer across the region. Thus, the main goal of the strategies is to facilitate replication and up-scaling of integrated and innovative RWHI practices in dryland areas of sub-Saharan Africa for improved livelihoods and food security. This will be attained through scaling-up research in RWHI management, capacity building, managing strategic networks, high-level policy dialogue and brokerage of knowledge and technology transfers.

In this regard, the establishment of the AFHRINET RTTCs will assist in raising awareness among the various stakeholders with regard to existing technologies as well as best practices available in the field of RWHI. It will also foster human and institutional capacity to handle technology whilst at the same time promoting the formation of strong networks and collaborations among relevant stakeholders. Through the strategy outlined, the AFRHINET RTTCs will be able to lobby government and other policy makers to develop policies that support RWHI. Thereby, making it easier to conduct related activities with minimal impediment.

The precarious state of food security and the extent of rural poverty in dryland areas argue for the need for research and technology transfer of innovative rainwater management systems. The AFRHINET RTTCs are a unique intervention for scaling up integrated and innovative RWHI practices in dryland areas of sub-Saharan Africa for improved livelihoods and food security. Thus, the strategy will guide and monitor the RTTCs to ensure success

RWH Storage Technology	Replicability and Transfer potential
Earth dams and Community ponds	+++
Farm ponds	+++
Road Catchments + Storage System	++
In-situ RWH for shallow groundwater recharge	++
Roof Catchments + Storage System	+
Rock Catchments + Storage System	+
Groundwater dams: sand dams, sub-surface dams and weirs	+

Transfer potential of rainwater harvesting storage technologies that can be used for small-scale irrigation.

Source: AFRHINET Project, 2016

4TH AFRHINET INTERNATIONAL PROMOTION, DISSEMINATION AND ROUNDTABLE EVENT IN ETHIOPIA ON 23RD FEBRUARY 2016

By Josep de Trincheria

Food insecurity poses today a problem to hundreds of millions of rural people in sub-Saharan Africa. By mid-century, 9 billion people will require food security and much of this will still be derived from rural production systems, placing these systems at the heart of the sustainable development agenda. However, the variability in water resources and insufficient capacity to manage that variability lies behind much of the prevailing poverty and food insecurity. It is widely known that Africa is one of the most vulnerable continents to climate variability and change, which is expected to have widespread impacts on African societies and their interaction with their natural environment. Many of these challenges are directly or indirectly water-related, especially in terms of capturing and storing rainwater when and where it falls. In this regard, meeting global food needs requires cost-effective strategies for managing rainwater at a small-scale farmer level. However, rainwater harvesting management may not only have the potential to eradicate hunger, but also to alleviate poverty and adapt to climate variability and change.

It is against this background that the workshop "Fostering Food Security, Poverty Alleviation and Climate Resilience through Rainwater-Smart Agriculture in sub-Saharan Africa" was organised in the frame of the AFRHINET project. The workshop was hosted by the AFRHINET Research and Technology Transfer Centres at Addis Ababa University (Ethiopia) in cooperation with other AFRHINET Research and Technology Transfer Centres at University of Nairobi (Kenya), Eduardo Mondlane University (Mozambique), University of Zimbabwe (Zimbabwe) and Hamburg University of Applied Sciences (Germany). In addition, the AFRHINET associates SEARNET-ICRAF (Kenya), WaterAid-Ethiopia and ICRISAT-Zimbabwe did also actively participated in the workshop. The event was well attended with more than 70 participants from all over the world.

The workshop focused on rainwater-smart agricultural management strategies in sub-Saharan Africa, with a special emphasis on food security, poverty alleviation and climate resilience in rural arid and semi-arid areas. In this regard, cost-effective experiences from research, field projects and best-practices on the use of rainwater for irrigated and rainfed small-scale agriculture in sub-Saharan Africa were showcased to relevant international stakeholders. Rainwater-smart adaptation strategies are understood as a subset of water-smart and climate-smart adaptation strategies that refer to theoretical and practical approaches which specifically addresses challenges and uncertainties surrounding the availability, access and use of rainwater, particularly to achieve food security, poverty alleviation and climate resilience.

The specific objectives of the workshop "Fostering Food Security, Poverty Alleviation and Climate Resilience through Rainwater-Smart Agricultural Management Strategies in sub-Saharan Africa" were:

- To provide research institutions, universities, NGOs, governments and enterprises from sub-Saharan Africa with a special focus on Ethiopia with an opportunity to display and present their works in this field of knowledge
- To foster the exchange of information, ideas and experiences acquired in the execution of rainwater-smart projects, especially successful initiatives and best-practices practices across sub-Saharan Africa
- To provide a platform to network and identify possibilities for future cooperation

Participants of the international workshop celebrated in Addis Ababa.
Source: AFRHINET Project, 2016

To access all the presentations delivered during the international dissemination, promotion and round table event of the AFRHINET project in Ethiopia, please visit this link **http://www.afrhinet.eu/materials/viewcategory/5-networking-and-dissemination-events.html**

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Ethiopia Addis Ababa University
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Kenya University of Nairobi
http://www.uonbi.ac.ke

Mozambique Eduardo Mondlane University
http://www.uem.mz

Zimbabwe University of Zimbabwe
http://www.uz.ac.zw

ASSOCIATES

Kenya World Agroforestry Centre
http://www.worldagroforestry.org/category/countries/kenya

Ethiopia WaterAid
http://www.wateraid.orgwhere-we-work/page/ethiopia

Zimbabwe International Crops Research Institute for the Semi-Arid Tropics
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PARTNERS

The AFRHINET international team is eager to exchange experiences with other practitioners of RWHI within and beyond the arid and semi-arid regions of Africa. For more information on the project, please visit the AFRHINET website at **www.afrhinet.eu** and the AFRHINET virtual Research and Technology Transfer Centres at **www.rainwatertechcentres.net**

JOIN THE AFRHINET NETWORK!

Join the AFRHINET network at **http://afrhinet.eu/transnational-network.html** to be informed about our project activities and share your experiences on Rainwater Harvesting Irrigation Management.

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