

## 7 | Farmers document and share their innovations on traditional wells in Sudan

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The Gash is a seasonal stream in eastern Sudan and brings considerable amounts of water that inundate the vegetable and fruit gardens adjacent to Kassala town, close to the border with Eritrea. Being untamed, the floods from the Gash regularly destroy the traditional wells that are used to irrigate these fruit gardens. One innovative farmer, Mohammed Ali Atta-Allah from Kassala, improved the traditional *Massaffi* well with constructive modifications. Ali Atta-Allah is known by the local community in Kassala for several local innovations, including eradication of the noxious shrub Mesquite (*Prosopis* sp.). He is also known for his organisational skills and leadership. These and other local innovations, both physical and organisational, were identified and documented by PROLINNOVA-Sudan for further validation or dissemination to other communities.

### Documentating the *Massaffi*

Farmers in this area of Sudan usually install pumps deep inside their wells to lift the water for irrigation. However, seasonal streams and rivers during the flooding season cause erosion to the wells and damage the pumps. As an innovative farmer and an iron craftsman, Mohammed Ali looked for a solution to solve this problem and came up with the *Massaffi* water-harvesting technique. *Massaffi* is an Arabic word which means 'filters'. The innovative *Massaffi* draws water from both surface and deep groundwater by means of perforated pipes that are locally made from scrap iron. For this innovation, the farmer innovator got the nickname 'George', after George Stevenson, the inventor of the steam engine. The *Massaffi* is thus deeper than the traditional well, collects water through the perforated pipes, has a concrete foundation with the pump installed on the surface instead of inside it. George has been joined by several part-time farmers, who are also artisans, in working on the *Massaffi*. They are all members of the local Artisans Union.

The *Massaffi* scores points on several counts: it is socially acceptable because farmers can dig it themselves through group action or self-help (traditionally called *Nafeer*). It withstands floods and is sustainable due to its concrete foundation. There is no accumulation of carbon dioxide inside the well, which is better for the environment, healthier for the operator and increases the lifespan of the motor.

Of nearly 200 innovations identified in five regions of Sudan, PROLINNOVA-Sudan chose the improved *Massaffi* for the farmer-led documentation (FLD) pilot, as it was an innovation with potential for dissemination to other farmers. When the pilot was proposed to George and his group of farmers, they saw it as a means of keeping records of their work for further learning. They also thought it was a good channel for disseminating the multiple attributes of the *Massaffi* technique – engineering, economic and socio-organisational – to other farmer groups in northern Sudan. They also thought that this could help expand their *Massaffi* business.

Generally, in Sudan, formal research institutions do not attach much value to indigenous knowledge and local innovation. Partners of PROLINNOVA-Sudan were, however, convinced about the practicality, efficiency and feasibility of the improved *Massaffi* and wanted: a) to study and validate the innovation; and b) to support sharing of information through FLD. Thus, the objectives of the farmers to be involved in FLD found a good match with those of PROLINNOVA-Sudan to support FLD.

## Process of the FLD pilot

George, the innovator, and Nageeb Ibrahim, a researcher at the University of Sennar in the Blue Nile area, co-facilitated the planning and design of the FLD pilot. This process involved identification of stakeholders, making contact with them and clarifying their roles in the FLD pilot. The stakeholders included farmers, researchers, government officials, bank employees, students and academicians.

## FLD Inception workshop

The FLD pilot started in October 2009 with an inception workshop in the meeting hall of the Fruit and Vegetable Growers Union in Kassala. The facilitators invited a group of participants to this meeting, which included five farmers identified by George who were also skilled artisans, an official from the Agricultural Bank (provider of microfinance), staff members from the Ministry of Agriculture, Animal Wealth and Irrigation in Kassala State, a cameraman, and a woman who wanted to learn photography to assist a women's group engaged in handicraft and needle work.

Presentations at this meeting highlighted the status of well irrigation in Kassala, and the economic as well as socio-organisational advantages of the improved *Massaffi*. The pipes used as filters and the motor pump were also displayed. The involvement of professionals from service agencies facilitated vertical sharing of information and created wider awareness on the *Massaffi*.

The participants noted the importance of documenting the *Massaffi* as a low-cost innovation that is made from local material. It was agreed that a digital camera would be used by the farmers to document the *Massaffi*. This exercise would also help them to better understand its different technical aspects. The photos, either printed or included in PowerPoint presentations, would be used to share this information with other farming communities.

## Training farmers to use camera

A professional cameraman from Kassala trained the farmers on how to use a digital camera. He started initially with the group of six farmers at the inception workshop, but more farmers joined later in the process. After the training, the camera was left with the farmers so that they could get familiar with it and document various stages of *Massaffi* construction. The farmers took pictures of the different *Massaffi* parts, themselves and work in progress. After the initial training at the

inception workshop, the cameraman visited the farmers several times and helped them improve their camera skills.



Cameraman training farmers in how to use a camera (photo: Nageeb Ibrahim)

## Using the photos

During the period November 2009 to April 2010, the FLD group members exchanged the photos among themselves and with farmers in the neighbourhood. Initially, they kept the photos in digital form on the camera, but later transferred them to a special disc for computer back-up and preparation of PowerPoint presentations.

The farmers were serious about learning photography for documentation, but they also had fun. The number of farmers in the group grew to ten. The camera enabled easy exchange of experiences on *Massaffi* from various locations. More and more farmers were trained via the camera on *Massaffi*.

## Kassala farmers visit Barankawa

Farmers in Barankawa, living close to Sennar University and the Abu Naama Research Station, had expressed to Nageeb Ibrahim the need to improve their traditional wells. Thus, in May 2010, an exchange visit was organised for a group of Kassala farmers to visit Barankawa and share their knowledge on *Massaffi*, making use of their photos. The visit started with a transect walk, so that a suitable site could be chosen for the visitors to stop, see and discuss the practices of the

owners of traditional wells, called *Matarat* in this area of Sudan. The transect walk was led by a farmer group leader from Barankawa.

Subsequently, a workshop on traditional wells was organised. Ten farmers from Barankawa were responsible for hosting the Kassala farmers and other stakeholders, such as researchers, staff of the university and the Agricultural Bank, local government officials and representatives of the National Farmers Union. The venue for the workshop was strategically chosen to be the Faculty of Agriculture in the University of Sennar. This location within an institution of higher learning would provide due recognition to the traditional technique and was acceptable to formal institutions who would participate. Moreover, it could provide an opportunity for farmers to voice their concerns directly to officials and authorities. About 60 farmers, researchers, bankers, Ministry of Agriculture staff, students and agricultural labourers attended the workshop in May 2010. The programme included a presentation made by George, the Kassala group leader, using photos of the *Massaffi* technique taken by the FLD group.

The farmers from Kassala and Barankawa interacted intensively with each other and with the other stakeholders, cross-checking different technical aspects of the *Massaffi*. The photos were very useful to clarify points in this discussion. Questions asked included cases of saline water irrigation on bananas, well dryness, river floods and soil erosion, for which the Barankawa farmers found some answers from the *Massaffi* farmers. At the end of the discussions, there appeared to be real differences in well design, with the *Massaffi* considered superior to the *Matarat*. The Barankawa farmers wanted to adopt the technique for their own conditions, but needed to find the means. The Kassala farmers knew that they had created a demand for the *Massaffi* and were willing to help the Barankawa farmers with the improvements, perhaps with support from a non-governmental organisation.

The workshop was also used as a forum for local farmers to air their concerns to the researchers, university/bank staff, and government officials present, as such a gathering was rare. The event was also a chance to inform the researchers about supporting local innovation through participatory innovation development. One Barankawa farmer mentioned during the workshop that his traditional *Matarat* well went dry after a very short time. The farmers drew a map of the village indicating the site of this well. The participants then visited the site in order to practically compare this *Matarat* with the *Massaffi*. This stimulated the Kassala farmers to attempt some engineering drawings of the well for sharing among themselves and with other communities. The Barankawa group received a camera which they could use to document their innovations with some external support.

## **Continuing to use the camera**

In Kassala, the camera is helping in strengthening the groups' cohesion. It is in George's custody and is made available to any farmer of the group who wishes to document his/her work, including the woman who wanted to use photography for the women's group. New innovations related to the *Massaffi* are emerging and being documented through photos, for example, on irrigation technologies,

greenhouse farming etc. Sometimes, the photos are being used for training farmers in other areas, to whom *Massaffi* is a new technique.



Farmers from Kassala and Barankawa in discussion during field visit (photo: Nageeb Ibrahim)

## Results of the FLD pilot

The *Massaffi* FLD pilot has produced a substantial amount of documentation:

- A photo archive on the technical aspects of *Massaffi* (about 650 photos on an external disk for current and future use).
- About ten farmers from Kassala have been trained in the use of digital cameras. They in turn are training other farmers and spreading the FLD methodology.
- Several other documents developed by the farmers such as reports, maps and drawings.
- Ten hours of tape recordings on how the *Massaffi* works, group discussions and interviews with government officials and key informants etc.

In addition, the FLD pilot has created awareness among the Kassala farmers that they could expand their *Massaffi* business to other demanding communities in Sudan. After the exchange visit in 2010, the Barankawa farmers wanted to pool their resources to meet the costs of improving their *Matarat* along the lines of the *Massaffi*. More than 200 farmers in Sennar area, close to Barankawa, have requested for improvements to their traditional wells. They have been trying to get support from the Farmers Union and the local government.

The workshop was a positive experience for the farmers on how to open up communication channels with researchers and other stakeholders, making use of the event for campaigning, advocacy and lobbying. Participants of the workshops felt that such events should be organised more often, to bridge the existing communication gap between researchers and local farmers. Joint experimentation on local innovations, participatory research and farmers' involvement in the research agenda were some topics mentioned for future workshops.

One farmer from the FLD group delivered a speech at a workshop of the Common Fund for Commodities, a national programme of the Federal Ministry of Agriculture and the Sudan Standards and Meteorology Organisation, emphasising the importance of *Massaffi* for good irrigation practices on banana plots and fruit gardens.

## Farmers' suggestions for follow-up

The farmers in Kassala and Barankawa were generally positive about the FLD pilot and came up with some ideas for follow-up:

- The state-level Fruit and Vegetable Farmers Union in Sennar expressed the need for their members (about 20 farmers) to be trained in the *Massaffi* technique.
- They saw the need for a more comprehensive publication on *Massaffi* including, financial and engineering aspects as well as communication networks of *Massaffi* in Sudan.
- The Barankawa group suggested re-activating the farmer field school (FFS) in the area and training them on FLD. This FFS was informally organised by the Abu Naama Research Station in the early 1990s for the purpose of an intergrated pest management project of FAO, but has been inactive since then.

## Some lessons learned

FLD served its purpose as an educational tool, as it allowed farmers within and beyond Kassala to become aware of the *Massaffi* well design and its benefits through the photo reports. In fact, it gave an impetus to the Barankawa farmers to consider improving their traditional wells.

Farmers realise that their photographs, videos and written documents can be used not only for sharing experiences with other farmers, but also for informing and influencing higher-level decision-makers.

The pilot has not given much attention to continuity of the FLD process, by the farmers themselves or by linking the farmers to other organisations. The farmers in Kassala and Barankawa are continuing the process through informal means.

The FLD pilot gave recognition to at least one promising local innovation and made it known more widely, among farmers as well as other important stakeholders such as researchers, bankers, academics etc.