

and the African Development Bank. International financial institutions have a lot of money available to make cities resistant to the effects of climate change, but they lack good investment proposals that are part of a long-term strategy. Major infrastructural interventions in the water system could have a lead time of ten years, which is much too long for a city like Alexandria.”

“Right after a disaster there is momentum to address the water infrastructure, but there are no effective, well-thought-out plans”

In this comprehensive delta plan there is room for renewing the water drainage systems, for ‘water-sensitive’ construction, which is new concept for the city, and for improved water storage. Although water scarcity is one of the greatest problems in Egypt, people are not used anymore to collect and store rainwater in the city. “We are now busy working on a strategic plan to solve this. Water scarcity will only increase as a result of climate change and a new dam in the Blue Nile in Ethiopia”, explains Rifaat Abdel Wahab from the Holding Company.

According to Professor Zevenbergen and his Egyptian colleagues, the AFMA model can be applied in many Arabian cities that have to fight incidental flooding, which no longer seems to be incidental, as professor Elbarki explains: “We are not only talking about Alexandria. In recent years we have also witnessed extreme flooding in Cairo and Hurgada.”

Professor Zevenbergen: “This project is one of the very first precautionary water management systems that will be implemented in an urban context in a developing country. This is a breakthrough, with huge potential for scaling up. This could be a game changer.”

Another exciting aspect involved in the AFMA project is the public-private partnership, which is no mean feat in a country with a serious government bureaucracy like Egypt. The public partner is the Holding, which is responsible for water infrastructure. The engineering firm GRID and construction firm Montaser are involved on the private side. The NGO Alexandria Business Association is involved in training the water ambassadors, amongst others. Professor Zevenbergen emphasises that the city officials are explicitly not a partner, but a beneficiary, to prevent cumbersome project management.

“This form of collaboration is new to us”, Moustafa Bahrawi (26) acknowledges. He participates in the project on behalf of GRID – and is conducting research into the water quality in Lake Mariout, as a student of professors Zevenbergen and Elbarki. “We are all equal partners, with no boss dictating the rules. We have to work things out together, and learn to jointly engage in the debate. This is cer-

tainly a learning process for the authorities, and it took quite a while before they accepted it. For us in the private sector it is a great experience which is very valuable for us.”

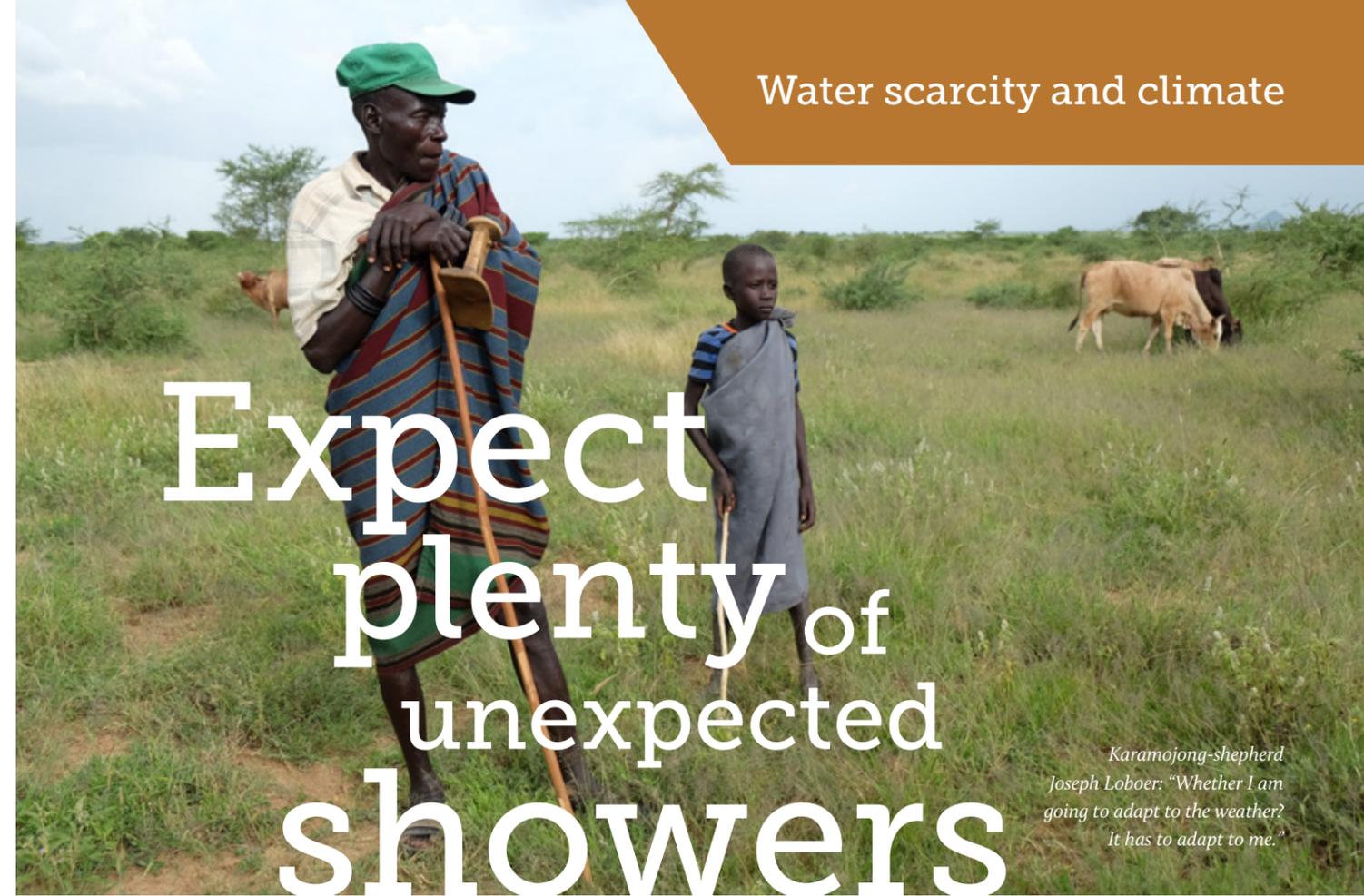
Elbarki explains that public parties such as the Holding Company have an important, but limited responsibility, they are only involved in urban planning or managing water sources. “Managing the water network such as the drainage channels is a public task, but experience in Alexandria teaches us that the maintenance could be effectively carried out by private parties such as GRID and Montaser.” Professor Rifaat states that the Holding Company is now also gaining experience in another public-private partnership. “In Kafr El-Sheikh our sister company is part of a PPP involved in ‘sludge to energy’, together with a German technology firm, amongst others. We produce power there for the urban grid and fertiliser for farming.”

Things are also changing with regard to city officials. Professor Abdelaziz Konsowa was elected as the new governor in early September. Prior to this he was a professor of civil engineering and dean of the technical faculty. He has been closely involved in the water management project from the outset and visited IHE Delft in April. As soon as he took up office, he ran simulation models to test the urban water drainage systems in anticipation of the rainy season, and called on the head of the sewer system to carry out maintenance work on the pumps and installations and tackle blockages. “This makes contact with the local authorities so much easier”, according to Moustafa Bahrawi, “they completely understand what is required for the project.” And the lines are short. While we are talking to professor Elbarki via Skype, he has to briefly interrupt our discussion. “My apologies, I received an important phone call from the governor about urban water drainage.”

Konsowa took office at a strategic time. The initial one-year phase has come to an end. During this phase some scientific riddles had to be solved, simulation models tested and – very important – the Consortium Agreement was drafted. It sets out everyone’s tasks, what should be done in the project itself and the related risks and responsibilities. And in the meantime a *Flood Management Unit* had to be introduced at the Holding Company, and the employees were trained by IHE, which had to be done with the necessary administrative care, according to Professor Zevenbergen.

Now the residents of the city of Alexander the Great will really notice the effects of the plan. Moustafa Bahrawi: “As a result of the project we now have a mobile information and training facility, a container full of ICT, which travels from one district to another and increases water awareness among people. It is very simple, with computer games and simple lessons. And soon the water ambassadors will also begin work in the poor neighbourhoods. They are going to teach people how to respond to floods, and that the best thing to do is to stay indoors. This should make it possible to prevent a disaster with such an impact as three years ago.”

Professor Zevenbergen and his Egyptian colleagues believe in the project’s potential to limit the effects of heavy rainfall and prepare the population when flooding occurs. However, they warn that the project cannot cover all eventualities and control all factors. “We cannot reduce the uncertainties about what weather extremes climate change will bring. And we also cannot eliminate the uncertainty of migration flows and uncontrolled urbanisation.” ●



Expect
plenty of
unexpected
showers

*Karamojong-shepherd
Joseph Loboer: “Whether I am
going to adapt to the weather?
It has to adapt to me.”*

The North Ugandan region of Karamoja is getting hotter and wetter. The local nomadic herders are desperate: how do they cope with the vagaries of the new weather? Persevere or adapt? “The battle for the future has only just begun.”

Author and photographer: Eva Huson

Joseph Loboer nervously rocks back and forth on his little wooden chair in the grass. Flanked by twenty or so grazing cows, he peers up at the ashen sky from underneath his cap. “It will rain soon”, the herder mutters as he pulls his chequered *suka* blanket around him more snugly.

In front of him, above the vast savannah plains, a threatening layer of clouds rumbles. It is the end of June and here in Karamoja, a remote area in north Uganda, there should not be much rain at all. However, Loboer gets soaked in a downpour almost every day.

Africa may have contributed least to global warming, but the continent is greatly affected by the changing climate. The mercury is

rising, the Sahel is advancing and entire streets are transformed into swirling rivers by rainstorms. This includes Karamoja, where the heavy showers are increasingly random and the droughts are longer and hotter.

The changing weather is a disaster for the Karamojong, the inhabitants of Karamoja. The nomadic herders have been roaming the plains for centuries with their herds of cows and goats, constantly searching for the next pool of water and pasture. In the summer Karamojong herders such as Loboer move around for weeks, if not months at a time. Originally this nomadic lifestyle was a useful way of coping with the annual dry season, but now it is becoming ever more difficult to maintain this survival strategy.

On the grasslands in the north of Karamoja, where the upstream rivers dry up in the summer months, nomadic herders have to walk further and further, and exhausted herds die of thirst or as a result of one of the deadly livestock viruses spreading rapidly through East Africa, partly as a result of the changing climate.

In the lower-lying south, where the rivers flow into marshy swamps and fertile farmland, they worry constantly during the rainy season – fearing floods and inundation. In the absence of their men who travel with their livestock, women and children grow sorghum beside their thatched huts, *manyattas*. Due to the modest knowledge of farming and few tools, this was always a relatively opportunistic exercise, but these days their vegetable gardens are increasingly bare. Weird creatures and fungi ravage crops and the changing weather means that the right time to sow is now a matter of guesswork.



The Ugandan region of Karamoja struggles with changed weather patterns

One minute the recently planted cuttings are washed away by heavy rainfall, while the next crops waste away in the blazing sun. The heatwave in 2016 was a recent low point, in which the United Nations calculated that almost half of the Karamojong's harvest failed. This was a total disaster, because the nomadic herders rely on this harvest during the scorching dry season. Unlike the rest of Uganda, there are not two harvest periods, but just one harvest period.

It is no wonder that the inhabitants of Karamoja find the 'new' weather conditions so hard to bear. Besides changing weather patterns they are saddled with another problem: the region is poverty-stricken. At least three quarters of the Karamojong survive on less than one euro a day.

Meanwhile, undernourishment, illiteracy and alcoholism are common, and basic needs such as electricity and water are scarce. Schools, healthcare and the road network barely function. Since it is far from Kampala, Uganda's political centre, government leaders have historically demonstrated little interest in this nomadic region.

And the wretched cattle war has left its marks. Cattle raids have always been a part of the Karamojong culture, but at the end of the 1970s things went terribly wrong. The nomadic herders got their hands on the abandoned arms depot of former president Idi Amin and transformed Karamoja into one vast area plagued by raids and terrorised by armed gangs. They sometimes stole hundreds of cattle at the same time.

Finally, in 2010, Ugandan troops succeeded in disarming the region and peace was restored. The flip side is that since then a large group of nomadic herders have been robbed and former gang members are now left without work. The fact that many of them are addicted to *kwètè*, an alcoholic drink brewed from grain, does not help Karamoja's already fragile situation.

This also applies to the region's explosive population growth, which is partly the result of polygamous marriages. A nomadic

herder like Loboer has many mouths to feed at home, because he has three wives and 21 children, as befits a respected Karamojong. According to expectations, Karamoja's population, which is now around one million, will grow annually between six and seven per cent.

A heavy downpour or extreme drought soon spells disaster here

Just as problematic is the fact that the region is highly dependent on external food aid. The first international aid operation was launched years ago, during the famine of 1967. Half a century later, many aid organisations, including the UN World Food Programme, are still there; they have become part of Karamoja's food problem, instead of its solution.

All in all, Karamoja is a region that has very little room for manoeuvre. A heavy downpour or extreme drought soon spells disaster. The crucial question is: how can the Karamojong adapt to the changing weather and avert a future calamity?

On the grassy plain to the north of Karamoja, Loboer, the nomadic herder thinks that this is a strange question. "Whether I am going to adapt to the weather?" he asks, chuckling. "The weather has to adapt to me." The nomadic herder refers to what most of his contemporaries do when the clouds refuse to break: fall back on African spirituality. Loboer: "We will ask Akuju, our God, to change the weather. We pray, sacrifice a bull or perform a traditional dance." Does such occultism work? "Oh, it is not up to us", he grins. "Sometimes it does, and sometimes it doesn't."

A short distance away, in the town of Moroto, the Ugandan knowledge centre Nabwin is taking a different approach. Here researchers are preparing the region for the erratic future with hard science. The fenced site is one large outdoor laboratory. Fields are full of modified crops and the grazing cows and goats are all crossed. The aim of the research team is: to find out which crops and animals are best suited to Karamoja's new climate.

The cassava they planted grows extra fast, can withstand the heat better and is exceptionally nutritious. At least, that's the hope: experiments with the crop are still ongoing. The same applies to the spotted calves that the knowledge centre recently distributed to surrounding villages. The expectation is that the animals can cope well with the drought and if everything works out, produce a lot of extra milk.

Gertrude Akol (23) and Mark Lukutae (22) think it is wonderful. Both of them are Karamojong and are following an internship at Nabwin this semester. "For me this is just the beginning", Mark says. "I have almost completed my bachelor in agronomy and afterwards I am going to follow a master's programme and a doctorate." Gertrude, who is in her final year of practical school for agriculture, also wants to continue her studies.

What is all this knowledge needed for? "To become a farmer", Gertrude explains. Just like Mark, she does not aspire to the life of a nomadic herder, but to that of a settled farmer. "Farming is the only way the Karamojong can develop and prepare for the climate", the intern says. Mark nods: "The more I learn about farming, the more I can harvest and sell later on."

The Karamojong community does not have much knowledge about farming. The vegetable gardens around the *mayattas* are small and usually rely on natural rainfall, an opportunistic form of farming that is not sufficient for withstanding the extreme weather. This is why the interns hope to learn how they can become a *real* farmer.

Their favourite subject is irrigation. Gertrude: "In Karamoja it is something we use far too little. I think it would be wonderful to teach everyone at home how to create a terrace or use something as simple as a rain barrel."

The plea of the interns for settled farming sounds like music to the ears of the Ugandan government. Since the region was disarmed and peace restored, Kampala is more mindful of Karamoja and an impressive development plan has been drawn up for the area. In this plan the cabinet of President Yoweri Museveni states that the traditional nomadic life is inadequate to make the future of the area more resilient.

Instead, the ministry for Karamoja must try and get the Karamojong to work in the fields and embrace a life in which they settle down, which is supported by aid organisations through educational farming programmes, pilot gardens and the distribution of modified seeds. And apparently with success, because the number of arable farms in Karamoja has doubled in recent years.

The fact that Museveni's government is suddenly concerned about the remote northern area is not only related to the end of the cattle war. A couple of years ago experts discovered numerous minerals in the soil, after which the government named the mining sector – an industry that provides substantial tax revenues – as one of Karamoja's 'top sectors'.

This is because government leaders in Kampala argue that these



Young Karamojong Mark Lukutae (22) and Gertrude Akol (23) are students in farming



In the Ugandan research center Nabwin, researchers experiment with modified crops and crossed cattle

types of private sector developments provide jobs and serve as an effective incentive for setting up infrastructural projects. The first mining companies have now begun exploration work and there is a smooth asphalt road running from Moroto to the cities of Mbale and Soroti. Karamojong still mainly travel on foot, but nonetheless: Karamoja is finally connected to the rest of the country.

Interns Mark and Gertrude, dressed in a neat blouse and boat shoes, view the economic activity with great enthusiasm. The two are not scared that the development wave will wipe out Karamojong culture and the associated pastoral lifestyle: "If you want to progress, you also have to give some things up", according to Mark. "Take the weather forecast. In the past the elders forecast the weather by 'rea-ding' nature, but actually they were merely guessing. I prefer to listen to the meteorological weather forecast."

Gertrude also thinks that settling the Karamojong is an irreversible process that will only make society stronger. "Settling down is not the end, but actually the start of our prosperity."

However, the enthusiasm of the interns is matched by the fear for the future of the older Karamojong men. They have seen that the amount of space they can move around in has shrink in recent decades. “It started with the English”, Angura Natotinyo shudders, who is an elderly Karamojong at the head of the Kaabong district. “They destroyed our traditional migration routes with their borders in Uganda, South Sudan and Kenya.”

He believes it went downhill after that. Today, the Ugandan land registry also interferes in the region and almost half of Karamoja is in the hands of the Ugandan nature authorities. Natotinyo: “They create reserves there which we no longer can access with our herds.” And there are mining companies too, which buy up and seal off pieces of land in a dubious manner, according to Human Rights Watch.

The concerns of the offended Karamojong such as Natotinyo are increased because there is no national nomadic policy in Uganda, as in many other East African countries. Indeed: the cabinet predominantly views the nomadic culture as an irritation. President Museveni does not hide the fact that he condemns the pastoral lifestyle and openly refers to it as ‘backward’ and ‘outdated’. Natotinyo believes there is a logical reason for this resentment. “He wants us to be useful for him: for us to participate in the economy and pay proper taxes.”

Moreover, according to the humanitarian think tank Inter-Agency Regional Analysts Network the herders should not only be concerned about their cultural decline, but also about their resilience. In a recent report about the region, the research group warns that



In the lower south, Karamojong struggle with flooding and torrents during the rainy season

Sustainable water management

The sustainable water management and intervention plans for Karamoja’s catchment areas Lokok and Lokere have been finalised and have been used by the local authorities since mid-2017. Aid organisations have funded and implemented several proposals and funding is being sought for the other projects. The plans and documents were compiled based on a collective decision-making process. In doing so, all parties in the water state are involved, from Karamoja’s technocrats to users. An aid collective led by Cordaid managed the process and provided technical support. The other team members are GiZ, Acacia Water, Rain, Wetlands International, and the four Cordaid partner organisations Caritas Kotido, Caritas Moroto, Socadido and TPO Uganda. These are the lessons learned by those involved.

Mieke Hulshof (Acacia Water, the Netherlands)

- **Do not shy away from the technical side.** “As a Dutch party we got involved to add our technical knowledge to the plans. In the beginning many parties hardly knew what a catchment actually is. We took the time to explain it properly, including the technical details. It was quite a challenge, but this knowledge proved to be invaluable later on in the process. After all, if you want to have a well-considered decision about a well or a dam, it helps when you know what is involved.”
- **Consider the opportunities.** “Thinking

in terms of solutions instead of problems is crucial in sustainable water management. You might be inclined to view arable farms as a threat to the proper functioning of the ecological system, but instead of stopping them, it is better to reflect on how you could cooperate sustainably with livestock and other farmers. In the water management plan we suggest to let the private sector pay towards conserving ecosystems and encourage farmers to focus more on sustainable farming.”

- **Allow all voices to be heard.** “If you want to devise an inclusive plan, you need to invest time and money in it. In order to draft the plans, we invited all parties involved in the catchments, which was not an obvious thing to do for the authorities and sometimes proved to be difficult in practice. A written invitation is not enough to get a nomadic herder to sit at the table. You have to go on a moped to visit him, explain what it’s all about in the local language and make sure someone has enough money for transport. Then employees must be willing to provide additional information during the meeting, so that everyone can actually participate in contributing ideas and have a say.”

Paul Lochap (Caritas Kotido, Uganda)

- **Make sure that the project is Ugandan.** “When writing the plans for sustainable water management, we wanted every-

one to sit around the table, from herders to technocratic officials. That was not easy, but we succeeded. I am proud of this; it meant that these are our plans, they are Ugandan plans. It is obvious that aid organisations and experts can give support, but we are ultimately responsible: it is our change and we have to get things going.”

- **Use local knowledge.** “As a region, Karamoja lags behind the rest of Uganda, but remember: our people have much in-house knowledge, especially about nature and the socio-economic context. This was highlighted in the project, also by our Dutch partners. I am pleased about this, because I know from experience that many aid organisations approach water projects differently, sometimes from a purely technical perspective. This is a shame, because that is not how you reinforce a project.”
- **Also convince the rest.** “The management and intervention plan includes a menu of project options from which anyone who wants to act, can choose. The government, aid organisations and donors can thus easily get started and know that the population is behind the project. The problem is just that donors in particular do not always prioritise sustainability. Take the example of the European Union: it will soon build two mega dams in the vicinity, while our plan clearly specifies that we are not interested in this solution. That’s a shame.”

by discouraging migration and cutting off traditional routes, you are depriving the Karamojong of their traditional survival strategies.

Natotinyo claims that this is asking for trouble, especially now that the weather is becoming increasingly erratic. If your harvest fails when you are a novice farmer, it is safer if you can fall back on your animals for a rainy day. He would also like to see Kampala investing more in developing the livestock industry instead of farming. “This is much more logical than chasing everyone into the fields, isn’t it?”

However, it is not only the Karamojong that become less resilient as a result of Museveni’s new policy. This also applies to Karamoja’s nature. Because while Ugandan policymakers consider the farming and mining industry as the key to a more resilient Karamoja, nature lovers regard it as an ecological disaster in the making.

President Museveni referred to the nomadic culture as ‘backward’ and ‘outdated’

“Sometimes it is as though everything here is consumed”, Simon Khedia exclaims. “That’s charcoal burning.” He stands halfway to Mount Moroto, right next to the Kenyan border, and points to a white strand of smoke, rising out of the valley. “And can you see the field where people are ploughing? That was once a forest.”

Khedia, born and bred in Karamoja, started working as a walking guide at an ecofriendly guest house in Moroto last year. He can be found here amid the unspoiled nature every week, walking with tourists. He knows better than anyone how deforestation is slowly stripping Karamoja bare. Trees are chopped down here and used as firewood for cooking, *manyattas* or for the charcoal business. An

increasing number of forests have to make room for the fields of new Karamojong farmers. “I am very worried about the future.”

Quite rightly so, because developments such as deforestation are disastrous for ecosystems. For example, see what is happening in the Kaabong district. The unbridled expansion of fields there is already leading to erosion, the loss of soil fertility and further down, in the lower-lying north, to even more flooding.

Moreover, it is not only deforestation that disrupts ecosystems. Consider the arrival of water reservoirs in Karamoja, where herders often stay for a longer period, resulting in overgrazing and water pollution. Especially also because wetlands act like a sponge for nearby pastoral farmers from South Sudan and Kenya, who cross the border to Karamoja when there is a lack of water in their own region.

The breakdown of the biophysical balance in Karamoja is disastrous for the region and for the attempts to become more resilient, not least because it may result in even more extreme weather. The fact that there is a considerable need to regulate the use of Karamoja’s ecosystems such as forests and rivers is also beginning to dawn on the Ugandan government. The government now wants to focus on sustainable water management, besides introducing various regulations for nature and forest conservation.

Uganda is currently divided into different catchments along hydrological lines, in which each water state has a committee responsible for the protection and regulation of water flows and the surrounding land. The art of this sustainable water management stands or falls with identifying the right balance between economic progress and ecological protection.

In other words: how do you ensure the population as well as nature becomes and remains sustainable? Committees who are assisted by a Dutch collective of aid organisations have been appointed in the two catchments of Karamoja, and management and intervention plans have been drafted. The next step is to find lenders and donors and companies that want to implement the proposed projects.

But aren’t the water managers too late with their plans? Simon Khedia stares at the *manyattas* and fields below in the green valley, and shakes his head: “The battle for the future of Karamoja has only just begun.” ●