This contribution is concerned with a century of social history among the Manâsîr, a community of peasants behind the Fourth Cataract of the Nile that has recently been displaced from its homelands by the erection of the Merowe hydroelectric plant, including the damming of the river at Hamdab and the large reservoir which emerged. The starting point of my considerations is irrigation technology. After first describing the old ox-powered sâqiya system and its social order, I shall move on to the introduction of the diesel pump and the range of social innovations that came along with it. Its technological appropriation has been discussed elsewhere (Beck 2001); here, the focus is on the social incorporation of the diesel technology and its societal implications. The processes of appropriation and incorporation can be neatly separated on paper only; in reality they are one and the same, as seen from different perspectives. Here, I choose an approach that reveals a society which renews itself through on-going debates and negotiations about its technological practices. As radical innovations like the diesel motor, being at the very heart of peasant agrarian technology, always bear the potential for equally radical societal changes, these debates are about technology, but about visions of society as well.

1. In place of an introduction

Sudan’s public is currently presented with an image of the peasant communities near the Fourth Nile Cataract as primitive, traditionalist and opposed to innovation. This should be taken as what it is, namely a statement within the context of a propaganda campaign. The information brochures and video clips produced by the Sudanese state authority responsible for the Hamdab Dam and by other interested groups describe the inhabitants of the Fourth Cataract region as an archaic crowd living in poverty.¹ Those who resided in the region now flooded only enter modernity on arrival in their resettlement areas. Before resettlement, they are shown to have lived in coarse mud huts, in the new settlements they inhabit

¹ Compare the websites of the dam authority and the involved contractors, e.g. the journal Sadd Marawî, with more than 70 issues so far (http://merowedam.gov.sd/en/magazine-flip.html) or publications about the area before its flooding (http://merowedam.gov.sd/en/publications.html, both last accessed on 01/05/2012).
neat rows of houses built according to an overall plan; before, they drew water directly from the Nile, now their new homes are connected to electricity and water supply systems, they have sports grounds, hospitals, schools and an exemplary traffic infrastructure. All that is missing to complete the picture are garages and Korean compact cars in front of them. In other words, in their resettlement areas, they have access to everything they lacked in their previous villages: education, hygiene, cleanliness, order, health services, mechanisation, the whole array of civilised achievements that distinguish barbarism from modernity and thus modern Sudan from its past. The implicit message is that the resettled population should count itself lucky to have been released from this barbarian past and led into modernity – and all that without even having to make an effort by themselves.

It should not need pointing out that this is a narrative of those in power. Sudanese television and press, but also international commentators (e.g. Bartle 2009) who have been mainly shown that façade without being given opportunity to explore the ‘backstage’, happily use those images, perhaps also because they accord with their own notions of progress and modernisation. A project that bundles resources, organisational effort, political power and specialised interests on the scale of the Merowe hydroelectric plant, completely changing an entire landscape in the process, can be defined as a mega-project in every sense of that word. Projects of such scale appear to be endowed with an argumentative impact that is able to steer human imagination at a similarly grand scale. Beside this masterpiece of technical modernism – currently the largest hydroelectric plant in the whole continent of Africa, which doubles Sudan’s electricity generation in one fell swoop, finally providing the energy for modernising the country – the 70,000 local peasants 3 forced to abandon their homelands to make room for the new lake are easily overlooked. After all, it is to their own benefit. Especially if the area in question appears archaic, wild and rocky, offering limited opportunity for agriculture.

This discourse is designed to gloss over the birth defects of the dam project, namely that the dam is founded on extreme violence, and that the hopes of the displaced are buried in its foundations. Not a word about the tragedy of the people of Amri, driven from their lands by the rising floods of the Nile in 2007, not a line about how with the courage borne from desperation the Manâsîr, 40,000 peasants upriver from Amri, improvised dykes of sandbags and mud in the autumn and winter of 2008 to protect their villages from the slowly rising levels of the lake, and how eventually they succeeded only in saving their very lives, forced to watch their farmsteads, fields and date palm orchards, the work of many generations, disappear forever under the waters (see Hänsch, this volume).

The tragic irony lies in the fact that the Manâsîr had actually accepted the need to sacrifice their homeland for the common good of the Sudan. All they demanded was guarantees that they would be appropriately compensated for their fields, date groves and houses, and that they would be permitted to implement what came to be known as their “local option”,

2 The term ‘mega-project’ is taken from Gellert and Lynch 2003. In their study, those authors reveal a tendency inherent in mega-projects: “that everyone within the landscape reshaped by the mega-project loses, while those outside it either are indifferent or stand to gain” (Gellert and Lynch 2003: 23). Similar arguments are brought forward by Scudder 2006, based on a comparative study of dam-induced resettlement in 50 cases, by McCully 1996 and by the World Commission on Dans 2000.

3 For this figure see Failer, Mutaz and El Tayeb 2006: 73.
that is to rebuild their homes on the banks of the new lake. After all, many feared that before long their resettlement to centrally administered irrigation schemes would repeat the experience of the Halfa Nubians, who had to make room for the Aswan Dam in the 1960s, and whose resettlement project in Khashm el-Girba has by now turned into a run-down ruin of ill-conceived development. Guarantees, fair compensation, self-administrated local option – hardly excessive demands, one might say, in comparison to what the Manâsîr were willing to give up. The Dams Implementation Unit (DIU), however, apparently perceived them merely as people standing in the way of development and thus decided to press on without further negotiations, deliberately driving them out through the irresistible force of the rising waters (see Hänsch, this volume).

In the aftermath of the flooding of 2008, many Manâsîr have given up their hopes of recreating their familiar way of live in the old homelands by the bank of the new lake, resignedly moving to the resettlement areas instead. But the majority – consistently ignored by the aforementioned publications – has stayed and is currently settling under extremely makeshift conditions in higher areas that have not been flooded – development refugees in their own country.

Despite their miserable situation, they remain attached to their lands, hoping to rebuild their accustomed lifestyle. The question, thus, is this: if the resettlement areas are as alluring as they are made to appear, why do the peasants not occupy those ready-made nests, why do they not emigrate to modernity? As a matter of fact, many do, although the actual reality in the resettlement areas looks different from that shown in the glossy brochures. But most of them stay put. From a more basic perspective, one could even ask: why did they live in such a disadvantaged area in the first place? After all, if there is one thing that cannot be said about the Manâsîr it is that they are unaware of alternatives to their homelands. On the contrary, throughout living memory, virtually all their men have spent several years as migrant labourers in the cities of Sudan (Beck 1999) and the women, too, are familiar from personal observation with urban life and the amenities it has in store especially for them. In fact, many migrants have indeed chosen an urban life and its opportunities, but the majority have returned. Since humans do not have a natural inclination to live in a specific area, as if they grew from the soil, but are aware of alternatives and have actual access to them, their choice of location should be seen as an active decision. Those returning from migration have made a deliberate choice in favour of the riverside lifestyle within a stable community, an option that may lack many amenities and many of the advances of technological modernity, but that is certainly also marked by the absence of major class distinctions and thus promises a dignified life according to their own ideals, at arm’s length from the impositions of state authority and urbanism. For many centuries, the area behind the Fourth Cataract had been a remote territory, set in between states and their zones of influence, or at least at their very margins, offering refuge for those who had reason to live outside the major centres and not overly close to them. They were willing to pay a price for that: shortage of land, times of poverty, long distance from the markets, a certain technological backwardness and the derogatory views of townsfolk. Even those who moved away and stayed in the cities remain united by a utopian longing for a simple but close-knit, secure and autonomous life in their old homeland.
In spite of their marginal position, the Manâsîr should not be viewed as opposed to development. They were remote, but not unworldly or lethargic. A social history of the last hundred years reveals the opposite, repeated major efforts to develop connections with the outside world, to keep pace with developments there and make use of them – but under specific conditions and according to multiple societal disputes.

The key argument to be presented here as the background to the ethnographic study is this: technological practice is created from social debate, not imposed by externally developed technology implanted into society. This applies for the whole range of agrarian technologies as well as for dealing with mega-technologies such as a dam and its associated array of technologies of domination. Of course, technology has the potential to impact societies and lead to social change, but in contrast to techno-determinist notions, it does so in unpredictable manners through processes of incorporation or, as I choose to call it in my title, domestication, which I try to make sense of, in the case at hand, on the basis of social history and ethnography.

2. Irrigation – the domestication of water

In the Nile oasis, sitting, as it is, between two of the world’s most hostile deserts, human life is only possible on the basis of irrigation. Precipitation only occurs sporadically. Karima, the nearest location from Manâsîr country where precipitation is measured regularly, receives barely 25 mm per annum as a long-term average. This is far below the needs of rain-based agriculture. In this region everything depends on the Nile bringing its waters from far afield.

Thus, the Nile and its regime becomes the all-determining natural feature. In the minds of the 1990s’ peasants, only God was more powerful than the river. With their backs to the desert, their gaze was turned toward the narrow stretch of arable land at the river’s edge and the life-giving river beyond it. It formed the final point of reference in space; in its shadow even the cardinal directions lost their accustomed meaning. But since the building of the dam and the flooding of Dâr al-Manâsîr, the riverine regime has changed completely. Not one of the peasants can predict at what time of year the waters will rise, what level they will reach and when or how far they will sink. The regularities of the dam regime will only become appreciable after some years of observation. This turns agriculture into a gamble.

Before the dam was built, in a normal year the river would increase mightily in July and rise by six or seven metres in August and September, until it completely filled its bed, to then sink gradually and reach its lowest level in April and May. Traditionally, the peasants did not perceive of the river as a vessel that can be full or empty (as English language speakers would), but rather as an entity with its own distinctive character. During the flood it is great and mighty, and otherwise small. It gives and takes; it is spoken about nearly as if it had a will of its own. Albeit reliable never to dry out, it is never fully predictable. As a rule of thumb, the Manâsîr reckoned that the flood would take six days to reach their land from Khartoum. By listening to Radio Omdurman, they could prepare themselves roughly for the timing of the flood and its extent. But it often happened that the river surprisingly rose by over a metre during a single night, so that the more careless of the peasants faced
their “drowned motor” (bābür gharqân) in the morning. If the river rose prematurely, a common occurrence due to early rains in the upper Atbara area, it would take the summer season’s unharvested sorghum with it in the course of a single dramatic night. During the flood, the river would erode stretches of the bank, carry away low-lying land, create new eddies (kir) and pile up new sandbanks, so that its banks were never fully stable and new islands could develop even midstream. In some years (e.g. 1928, 1946, 1964, 1988, 1998) it rose more than normal and could ravage land far beyond its banks, as in the memorable flood of 1928, still remembered as sanat sail Bābûrî, because it drowned the entire family of a man called Bābûrî, uprooted date palms across all of Dār al-Manāsîr, destroyed the harvest, swept away waterwheels and killed many animals. Their horrors being remembered for long, such years provided the peasants with chronological markers for the past. With the river thus never being fully predictable, the peasants were in God’s hand. But since the construction of the dam they are in the hands of those who control its sluices. The peasants are fully aware of the fact that within the logic of the dam’s engineers they play the most minute role, dwarfed by the technical requirements of the dam and the generation of electricity, and that thus they cannot expect any consideration for their concerns.

According to a proverb used by the peasants, the river does not just give, it also takes. Its force is without consideration, totally oblivious of humankind’s wishes and its little tragedies, unaffected even by the strongest magic. A sip of water from the middle of the stream lifts any magic spell. Again and again, even the smallest children have it instilled in them never to underestimate the river, but nonetheless even experienced swimmers perish every year. All this makes the river sinister, and according to a widely held opinion its depths shelter wild godless powers. The river was an untameable otherworld, to be treated with respect by humans. Thus, the peasants could never quite believe that the state would manage to force it behind a dam. Only when the water had been drawn, channelled and directed to irrigation plots, it was securely under human control. Then, it was tamed for human use, had an owner and represented a value that could be estimated as roughly half that of the harvest.

The river was always in flux and its water far from being uniform. In winter, it was clear (sâfi, abyad), but during the flood (faydân, damîra) it turned thick and opaque with the washed out sediment from the Ethiopian highlands, which, throughout millennia of sedimentation, had eventually created the oasis. This thick water is known as mauya cakkra. Many peasants deliberately used it to fertilise newly claimed sâqiya soils, others tried to catch the sediment (tammî) with the aid of fascines and terraces on the lower-lying jarf floors and thus ameliorate shallow soils. But one aspect did remain constant: the river was never salty, but always described as sweet (hilû) and pleasantly flavoured, no comparison with the stagnant brew rotting away near the shore since the dam was built.

In one regard, the river was totally reliable: it always bore water, even though it receded far into its bed during winter. In contrast to many other irrigation systems, where far too much or far too little water is available in alternation, irrigation along the Nile could thus be planned and permitted agriculture throughout the year. This enabled the peasants to achieve a degree of continuity in production that is unimaginable in savannah agriculture. The agrarian scholar Hans Ruthenberg rightly likens this type of irrigation-based agriculture with a manufactory: in contrast to rain-based agriculture, the irrigation-based system is far
less susceptible to the vagaries of climate, the agricultural process is more continuous, the factors of production more controllable and production can be spatially more concentrated (Ruthenberg 1980). A further feature of traditional irrigation-based agriculture in Dâr al-Manâsîr was connected with the generally free access to the river as a source of water. The Nile was nobody’s property and thus no-one dwelling along it could be excluded from its use. The fact that according to the Nile Water Agreement of 1919, modified in 1959 and subject to renewed debate since the 1990s, the water was shared between the Nile valley states and that the Sudanese government considered it state property was at most of theoretical interest to the peasants. They paid a licence fee for their motor pumps and either drew water directly from the river, or, as sharecroppers, had it delivered by a pump owner. While this required cooperation among the peasants sharing in a sāqiya, often more than the peasants were able to offer, in contrast to the new settlement areas it did not necessitate any major hierarchic organisation with dams, water gates, detention basins, large canals and dykes, all more typical of large-scale irrigation systems. The kind of hydraulic bureaucracy needed for the construction and maintenance of such installations, the distribution of the water and thus its control, all characteristic of classic large scale systems after Wittfogel (1962), was rendered wholly superfluous by the moderate scale of agrarian organisation among the Manâsîr. The peasants’ traditional irrigation system was based on autonomous and consensual realisation of opportunities, whereas in large and centrally controlled systems, the peasants submit to a bureaucracy that controls their life chances – even if only by neglecting them.

3. Old irrigation machinery

Generally, two types of agricultural land are distinguished along the Nile, each with its corresponding regime of agricultural practice: the first is low-lying land that floods annually, known as jarf; the second is sāqiya, at higher elevation and requiring artificial irrigation (see also Haberlah, this volume). The harvest from jarf land was in many ways a gift from the Nile, as it could be obtained without much effort. When the river receded after the floods, women sowed lûba (various types of beans) and dukhn (millet) on the wet coastal strip, weeded out fodder for their domestic animals and waited for the crops to ripen. The necessary water and fertile Nile mud were delivered by the river itself. The fact that no irrigation was necessary also meant that no levelling or soil amelioration was required i.e., that all the labours associated with irrigation agriculture were unnecessary.

In contrast, land at higher elevation could only be cultivated with artificial irrigation. Before the spread of the motorised pump, two methods to achieve this were common in the Sudanese Nile valley, namely the shadîf, a human-powered counterpoise lift, and the sâqiya, a waterwheel pulled by a team of oxen. Of these, the shadîf (also nabarauya, nub. nabaro) was the older method, perhaps the oldest known device for lifting water. It consists of a gallows-like arrangement with a movable lever or crossbeam (yad, hand) which has a water container (dâlû) for scooping attached by a bar or rope to the longer end, and a stone or lump of mud as a counterweight (tugal) to the shorter one. The task of the person operating the device is to constantly move the crossbar up and down. During the downward
movement, the counterweight rises up while the scooping container is submerged and fills with water; the upward pull is mostly provided by the counterweight if the shadîf is calibrated properly. Irrigation with the shadîf is a time-consuming affair. A conventional shadîf is technically constructed so as to be able to lift 3 to 4 m³ per hour at a height of 2 m, irrigating in ideal conditions 1/3 to 1/2 faddân. The Manâsîr, however, reward such calculations with contemptuous laughter: “You bend over all day, your head in the fire and your feet in the ice, and in the end your plants burn anyway! Never have we heard of such a thing as a faddân [that could be irrigated with a shadîf]!” From the time before the introduction of the diesel pumps, it is reported that occasionally someone placed a shadîf in the jarf or temporarily used shadîfs to bring scooped water to a sâqiya when the water level of the river had sunk below its range. The shadîf could be used to water some vegetables during the flood, but it is certain that during the last two centuries it played a very inferior role compared to the sâqiya. Below the steep banks of the Nile in Dâr al-Manâsîr, its low lifting potential limited its use to a narrow niche. For systematic irrigation, a sâqiya was a necessity.

In comparison with the shadîf, the sâqiya (sâqiya bi dauâlîh, also short dauîlîh, wheel) is an impressive machine in every regard. Its origins lie in the Hellenistic technology of the Middle East; it is also known as “Persian Wheel”. It was introduced to the Sudanese Nile valley during the Meroitic era, probably in the second century AD, roughly at the same time as the camel. Already soon after, it was known in Middle Nubia up to the Fourth Cataract, and by the end of the Meroitic period in the 4th century AD, even south of the Albara (Adams 1977: 346-348; Abû Salîm 1980: 196-200). The social context of that innovation, however, remains unknown. The sâqiya certainly has a much higher lifting capacity than the shadîf, and moreover, is able to irrigate land at higher elevation. In regions where land was at a premium, the sâqiya technology must have permitted a sudden expansion of the cultivated area, as did the diesel pump nearly 2000 years later. A Sudanese sâqiya can move up to 20 m³ water per hour, depending on how high or deep the water level is, how many scooping vessels are attached to the rope and how energetically the draught animals are turning the wheel. Its main advantage over the shadîf, however, is that it can obtain water from a greater depth, in principle as deep as the scooping rope (alas) can reach. In the case of Dâr al-Manâsîr with its high riverbanks, eight or nine metres were quite a common

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4 Abû Salîm 1980: 48. In agricultural technology it is assumed as a rule of thumb that a shadîf can lift 2 to 6 m³ per hour from a depth of 1.5 to 3 m; see Achtnich and Lüken 1986: 308. The engineers of the Sudan Irrigation Department estimated, that a shadîf with a lift of 2 m could carry 3 to 5 m³ per hour and, used regularly, irrigate 1/2 to 3/4 of a faddân; see Allan and Smith 1948: 613.

5 1 faddân equals 4200 m²; see Calkins, this volume, footnote 3.

6 According to colonial sources, the number of shadîfs in the entire Berber province, now River Nile State, never exceeded 92 between 1904 and 1913, whereas the number of sâqiyas fluctuated between 2600 and 3500 at the same time; see Abû Salîm 1980: 247. Especially, during those years, after the ravages of the 1898/99 war, one might have expected a larger number of shadîfs, which could be easily and simply built in comparison to the sâqiya. But the very same characteristics make the shadîf very hard to grasp statistically, thus the number given above may not necessarily be accurate.

7 Generally the lifting capacity of the sâqiya is given as 10 to 20 m³, and its maximal lift as 9 m; see Achtnich and Lüken 1986: 308. The engineers of the Sudan Irrigation Department worked by the rule of thumb that a faddân growing cereals needed 800 m³ of water per month; see Allan and Smith 1948: 614. If 10 to 20 m³ were moved per hour, this would mean, mathematically, that the oxen had to turn the wheel for 40 to 80 hours per month to keep a faddân sufficiently irrigated.
height. If the water level sunk even lower, a subsidiary sâqiya (kalataud) was erected nearer to the water, lifting the water to the elevation reached by the main one. In such a case, at least half of the cultivated area had to be reserved for the draught animals’ fodder.

4. Ali Muhammad explains the sâqiya

The last sâqiya in Manâsîr country went out of use in 1975. It irrigated land at the upper end of Dirbî island and is still known throughout the vicinity by the name of its owner, as Sâqiyaat Muhammadâni. Since that time, no further sâqiyas were built, although during the 1990s, one might still occasionally have chanced upon one of the large cogwheels, a mute witness of older technology.

Fig. 1: Ox-powered sâqiya (after Abû Salîm 1980: fig. 23).

The sâqiya is a complex machine and thus not all that easy to understand. Already by the 1990s, young people knew only the general principle of its function. Although it was claimed that there were still masters able to construct a sâqiya, even old men who had used it to irrigate land during their youth often had difficulties in remembering its differentiated terminology, whereas the terminology of the motor pump was familiar to everyone (every man at least). I have heard many descriptions of the sâqiya, but the most detailed was that given by Ali Muhammad al-Khalîfa. Ali begins his description with the underlying principle of the transmission of power:

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“The sâqiya is like a gear mechanism, but made entirely of wood. It has two wheels, al-halaqa al-kabîra (the large cogwheel) and al-halaqa as-sughaira (the small cogwheel). The large wheel is enormous, as big as a man. It has 32 cogs, and the small one 24, all of wood. The cogs were called sandaqaiqa. They interlock like fingers [Indicates with hands held horizontally and vertically]. When the large wheel turns, it takes the small one with it. The small wheel turns faster than the big one. Did you see? When the large wheel has made 24 turns, the small one has made 32. [...]”

[Interjection: “That’s the large sâqiya, there were also smaller ones!”]

“Sure, there were ones with fewer cogs. What mattered was the ratio. [...]”

Then he explains the structure of the wheels and axles:

“Did you see? A simple gear mechanism [moves his extended hands against one another, fingers interlocked], and the large wheel was attached to a vertical wooden axle. [...] That was called mishshik. It turned along with the large wheel. And the little wheel, too, had an axle, a long trunk of a doum palm. Its name was tauraiqa. Attached to its end was the ‘utfa. So, the small cogwheel and the ‘utfa were linked by the tauraiqa. [...] The ‘utfa was a spindle, like another wheel. On the ‘utfa was a rope chain, al-alas, and from the alas hung the scooping vessels, al-qawâdîs.”

Now he describes the sâqiya in action:

“Look here! [Moves extended hands against one another] The large cogwheel is turning. Its cogs are in the small wheel [Moves interlocking fingers]. Like in the gearbox of your car! They take it along, they turn the small cogwheel! [Raises his voice] The axle is turning. It turns the ‘utfa, turns the ‘utfa, the rope chain is lowered into the water, and it turns [Draws an arc in the air with his hand], and on the other side the scooping vessels come up [Imitates scooping movement with both hands], and there it is [Shows palms]: The water! From deep down in the river! [Lowers his voice again] And the scooping vessels pour the water into the trough (sabalauka). The sabalauka is a hollowed-out tree trunk, like a basin. And from there into the channel (jadwal). A river, a true river in the channel.”

The listeners laugh. They know that what Alî describes as a true river in the channel was rather a meagre trickle. After a pause, during which those present discuss the quantity of the water moved and the extent of the area a sâqiya could irrigate per day (“One faddân per day.” – “One faddân, never! At most 50 small haud [irrigation basins] and that with difficulties!”), Alî describes how the sâqiya was placed near the riverbank:

“Did you see how the sâqiya lifts water? From the river, deep down. At the end of winter [from a depth equal to] the height of four men, three men. ⁹ And the sâqiya high up above the river [Raises arm over his head], on a platform above the bank.

⁹ Râjîl, the height of a man, in some areas with arms stretched upwards, but here only to the crown of his head i.e., c. 1.70 m.
The platform on two massive wooden bars, which were called *hamîr*. Timber and mud on top of them. On top of that stood the *sâqiya*. On the platform, the cows walked in a circle and turned the *sâqiya*.

[Question: “The cows walked all around the *sâqiya*?”]

“No, it was like this: The cows walked in a circle, the large and small cogwheels to the left, and to the right the ‘utfa with the alas and the scooping vessels and the river. So, the cow’s path passed between the cogwheels and the ‘utfa.”

[Question: “So the cows passed under the axle linking the small cogwheel with the ‘utfa?”]

“No, no! Above is the *dîyû*. The cows passed under the *dîyû*. [“Under what?”] The *dîyû* is a large [horizontal] bar, supported on both sides. Sometimes by wooden bars, sometimes by pillars of mud brick. It supports the *mishshik* [the vertical axle of the large cogwheel] standing upright. [Interjection: “The cat, the cat! *Al-kadîs, al-kadîs!*] *Al-kadîs* is a wooden block, the lower end of the *mishshik* rests on it. They called it “the cat”. Many things are named after animals: *al-husân* (the horse), *al-kalib* (the dog), *al-hamîr* (the donkeys), *at-timsâh* (the crocodile). In any case, *al-kadîs* always had to be greased with tallow. [Listeners laugh] It squealed like a cat! The upper bar (*dîyû*) and its side supports were the framework around the large cogwheel. But back to the connecting axle between the small cogwheel and the ‘utfa: The cows stepped over it. The *tauraiq* was in the floor [the platform].”

A debate ensues over how the whole framework of the *sâqiya* was supported and how it was strapped to large palm trees or *sunt* acacias. This is followed by stories of *sâqiyas* tumbling into the water, taking the cows with them. Eventually, Ali returns to the thread of his tale:

“Two more things. The *tukun* and the *karab*. The *tukun* is a rod tied to the large wheel. The driver sits on it. Tied to its front with a rope is the *karab*. The *karab* is another bar, [also attached to the large wheel], which is what the cows pull on. They are fettered into the yoke (*isnâq*). They always walk in a circle, the whole day. So the driver sits behind them and drives them on, night and day. His name is *aurattî*. And woe on him if he fell asleep! [Unrest among the listeners] His father was irrigating and if he ceased to hear the sound of the *sâqiya*, he came running! [Laughter among the listeners] With a palm rib in his hand!”

[Question: “Were the oxen blindfolded?”]

“No, no! We do that to the donkeys [when threshing wheat]. The oxen? No. They were shackled into the yoke, here [Thrusts a hand onto his shoulder]. They walked, walked, walked [Slows his voice] and walked in a circle and pulled. The stronger one on the inside. [...] The stronger one on the inside, pulling his weaker brother with him.”

A debate ensues about bulls that were so strong they could pull the *sâqiya* alone.
“Al-kudaiq! Al-kudaiq, that was a deep hole under the platform. From it, the gawāḏis were scooping. People would dig it deeper and deeper. It was the well of the sāqiya. When the river receded, people would dig a channel to the water. That was called danābāya (tail). You see how hard their work was? The deeper one had dug, the more the scooping chain had to be extended. The more it was extended, the further apart were the scooping vessels tied to it. The cows! The cows could not pull so much. In summer the cows pulled and pulled, until finally they had lifted a scooping vessel full of water.”

[Interjection: “Al-matara al-kûfrîya!”]

“Sometimes people built a matara. That is a sāqiya well, but lined with stones. The matara kufrîya is different. It is old, from the Christians (salûbiyûn). The sāqiya al-kûfrîya does not sit directly on the steep bank, but a little behind it. It has a deep well shaft (matara), of bricks, fired bricks and stones. There is one in [...] Always only on the best soils! The sāqiya al-kûfrîya had a fixed location. The other sāqiyas could be put up here or there. People say that in their days, the Christians had no long tree trunks for the taurqiq and the platform. God only knows, none of us have seen it. The most important thing is that from the matara they dug a horizontal tunnel (juwîk) into the middle of the river and covered it with stone slabs, enormous stone slabs. Through it, water flowed into the well. In the middle of the river was an opening with a plug. It was called hambauq. Don’t you know a person in Shîrrî, who is called Abû Hambauq? [...] Yes, with a plug made from the trunk of a doum palm, with a rope coiled around, to make it tight. The rope made the opening tight [hits fist with palm]; it was like a filter against the mud. Before each cultivation season, they cleaned the tunnel, like they overhaul the motor today. Four, five men went inside [the tunnel] and cleaned it with their bare hands and with gourds. One man passed the mud on to the next.”

[Question: “How so, not under the river?”]

“Yes, yes. Under the water, right under the middle of the river: And the owner stood there, whip in hand, and guarded the plug. [Laughs] You know what people are like. Of course they were afraid, but it was their living (mînta).”

The conversation moves on to other topics, the lesson is over.
5. The organisation of the sâqiya al-Huqna

In a way, it is not the peasants who were the protagonists of the sâqiya system, but the draught animals turning the wheel. In conversation, the peasants are not the subjects and the oxen not the objects, but the oxen themselves are subjects: “The oxen watered the sâqiya”, “so many teams of oxen pulled the sâqiya”. How much food could be planted, how much land could be irrigated, all depended on how long the oxen pulled the sâqiya.

If a team pulled the wheel for four hours a day, it could keep two or three faddân irrigated during the winter season (shitwî), but during summer (saifî) only half that, one or at most two faddân. In 1996, Shaikh Mahjûb remembered his time as aurattî, around the late 1930s: “I was as old as Hamza is now”, he said and pointed at his 13- or 14-year old grand-nephew. “I had a yoke of cows and two tarâbla [peasants whose land he watered]. [...] Al-Huqna was irrigated by three or sometimes four yokes of draught animals. There were three seasons of cultivation, shitwî, saifî and mîsaur.” A few days later he elaborates: “Al-Huqna was pulled by three pairs of cows, two of the Rahamâb and one team of the Manâsîr, later the Manâsîr brought a second team. As-Sunaita was pulled by three teams and al-Harâz by four.” Before the flooding, the sâqiya al-Huqna was positioned, as its name indicates, in a small hollow hidden amongst rocks; its cultivated area was about 11 faddân, that of al-Harâz 16 faddân and of as-Sunaita eight faddân. “During shitwî we could irrigate all of al-Huqna to the farthest corner, but only rarely was all of it cultivated. Some of it always remained dry. Saifî we irrigated only part of it, perhaps half of it; in al-Harâz it was even less.”

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A week later, Shaikh Mahjûb added further detail about cultivation in the sâqiya al-Huqna:

“Al-Huqna was forest. Al-Harâz had long been cultivated when al-Huqna was colonised. In the past, they only cultivated the jarf [without irrigation]. The sons of my grandfather Bâbokkur, namely Muhammad, my father Mustafâ and their brother Muhammad Ali brought it under cultivation together with the Manâsîr, cutting the trees and making it fertile. Initially, the waterwheel was set up in three places [i.e. it was movable and could be set up in a different location for each season, depending on the level of the river], but later, when I was already a peasant, we built a matara [well] lined with stone. Then it stayed in the one place. [...] The land of the sâqiya and the waterwheel were shared in the same way as the jarf below: seven parts [belonged to] the Rahamâb, five parts the Manâsîr.¹³ The Rahamâb brought two teams of cattle for their seven parts; the Manâsîr brought one team for their five parts, and later a second one.”

When Shaikh Mahjûb drove the oxen as aurattî, the sâqiya was inhabited by the families of the descendants of Mansûr, the Manâsîr, on their 5/12 share of 11 faddân, and on the Rahamâb’s 7/12 by those of his brother Rahama. The Rahamâb formed three households, namely those of Mahjûb’s two uncles, Muhammad Bâbokkur and Muhammad Ali Bâbokkur, as well as of his already married cousin, Rahama Muhammad Bâbokkur, each with his family. Shaikh Mahjûb’s father Mustafâ Bâbokkur had died, and according to the then current tradition of levirate marriage, the deceased man’s brother Muhammad had married the widow, Mahjûb’s mother Fâtna bitt al-Fîl. Mahjûb himself lived with his grandmother Hasîna, owner of the team of cattle, across the river on Dirbî island, swimming the river with the cows to yoke them to the sâqiya in al-Huqna. Mahjûb and his team drew water for two peasants, probably his uncles, and in return received a third of the harvest from the planting basins supplied by his oxen. Only a third, because his peasants provided the fodder for his oxen. Had he been able to do so himself, he (or rather his grandmother Hasîna) would have been entitled to half of their harvest.

The teams that irrigated al-Huqna, however, also irrigated in al-Harâz or in as-Sunaita during some seasons, sometimes even one day in one sâqiya and the next in another sâqiya. The farming households that owned al-Huqna and cultivated it, also shared in the ownership of as-Sunaita and – to a lesser extent – of al-Harâz and sometimes cultivated there. But the cultivating households did not always possess the oxen needed for irrigation, or had none in the sâqiya in question. According to the descriptions, it was rather the exception for someone to own and cultivate just as much land as he irrigated with his own oxen. One household might cultivate more land than was watered by its oxen, another had no cattle at all, and a third might use its oxen to water land it was not cultivating. To organise production and to unite the various factors, such as irrigation water, the peasants’ labour, and cultivated land, as well as to calculate the respective shares in the harvest, the conventional taddân contract was used.

¹³ For reckoning in 12 parts to a whole see note 16 below.
6. The sâqiya as a relation of production

The sâqiya was not just an irrigation machine, but it also constituted a specific relation of production and beyond that a lifestyle. From a sociological perspective, it is best regarded as a broad interlocking ensemble, balanced by the forces of autonomy, voluntary cooperation and goodwill. Due to its sheer dimensions and its technical complexity, sâqiya technology required the cooperation of several households, as well as a complex division of labour. The relation of production constituted by sâqiya technology was called taddân, a partnership or sharecropping relationship.14

Every participant in the production process was entitled to a certain proportion of the harvest. In return, he had to fulfil a specific task. The person driving the animals was called aurattî, the owner of the team was the sâhib al-baqar, the owner of the land sîd al-ard or sâhib al-ard and the workers in the field, whose tasks were hacking, sowing, planting and directing water into the planting beds, were the tarâbla (sing. turbâl).

The owner of the land (sîd al-ard) made his irrigable land available. For that, he received the haqq al-ard or in older terminology al-karij, the lease, amounting to 1/12 of the harvest. In other areas, such as Dongola or Shendi, the sîd al-ard was entitled to 1/8 or even 1/6 of the harvest. Al-karij was calculated from the total harvest after deduction of borrowed seeds, if any. Normally, the soil belonged to the same people as the waterwheel, as it was usual to erect the wheel on one’s own soil. To combat weeds, the peasants often cultivated adjacent sâqiyas in rotation. If not all of them owned their cultivated part of the sâqiyas planted in rotation, they had, theoretically, to calculate the lease and pay the respective owner, but in the rotation system those sums would even one another out in the end.

The owner of the waterwheel (sîd ad-dauîb) either built it himself with the aid of his tarâbla and possibly in a communal effort (fazà‘a) with further neighbours, or he engaged a skilled master (usta, also basîr), who erected the complex mechanism. The main channel (al-jadwal ad-dakar) was always built communally. If the owner of the wheel did not work in the sâqiya himself, the peasants made a contract about the lease of the wheel with him. But as for the land, this was a mostly theoretical option. Usually, the peasants themselves owned a wheel, or managed to borrow missing parts for the season without having to pay for them. In the desired – but rarely achieved – ideal case, all parties involved would own a share in the sâqiya that was equal to their share of the irrigated ground.

Depending on the extent of the cultivated land, two, three or, ideally, four yokes of draught animals were needed to pull the sâqiya, taking turns every three or four hours according to a set order known as at-tattîq. For this, the day was subdivided in several equal sections, the length of which was determined with a simple sundial at daytime and from the position of stars at night. Thus, human arbitrariness was excluded from the

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process; the decision about the division of irrigation time was transferred from society to nature, thereby defusing a key source of potential conflict that could shatter the complex cooperation. The sundial was simply a vertically set stone or post, its shadow moving from west to east during the course of the day. The route of its passage was divided in sections, enabling the peasants to determine beyond doubt when the time to change the animals had come: namely just when the shadow had reached one of the markers.

The ordering of time and the shadow-casting stone itself were called at-tattiq. Ahmad Itmân subdivided the day as follows:

- **al-‘ishâwî**, from sunset to c. 10 pm
- **al-hijjâwî**, the middle of the night
- **ad-dughashâwî**, the time of incipient twilight
- **al-fîjrâwî**, dawn, sunrise
- **ad-dîhâwî**, before noon
- **ad-dîhrâwî**, noon
- **al-‘irsâwî**, time of the afternoon prayer (**al-‘asur**) until sunset.

The terms for the subdivisions of time differed slightly from informant to informant – some are derived from Nubian, as virtually the whole sâqiya terminology is, others from Arabic; some are named after the canonical times. Further, their number and thus length varied as well. In all likelihood, this reflects different local traditions and the specific conditions prevailing in individual sâqiyas, for example whether the day was shared by three or four teams. Nevertheless, the principle of tattiq always remained the same, as work was to be divided evenly between the teams of draught animals, and the use of the waterwheel could be calculated according to an independent chronological framework.

The Manâsîr yoked both oxen and cows. They took care to keep a cow for milk, if possible, but it is clear that, being overworked in the daily grind of the sâqiya, and frequently undernourished as well, the cow could not provide much milk. The cow was fettered into the yoke along with another cow or a bull, “the stronger animal on the inside, so as to lead the weak”. In exceptional cases an especially strong bull pulled the sâqiya alone. It was important to get the animal used to walking in a circle as early as possible – an animal could pull the sâqiya from two or three years of age already, at 10 or 12 years it began to get too weak. The number of four alternating teams per sâqiya was considered ideal, realising the device’s full potential without overworking the animals. But this ideal was not always achieved – a sâqiya in rocky terrain might not water enough soil to justify the use of four teams, or the peasants might simply not be able to muster enough animals. Therefore, many waterwheels were pulled by three or just two teams.

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15 Ahmad Itmân al-Hâjj on Ûs island (20/10/1996). Muhammad Alî Karâr from al-Jamâmî (31/08/1991) remembered six daytime subdivisions: **ash-sharqâwî** or **as-subhâwî** in the early morning (“when the sun is half visible”); **ad-dahâwî** before noon (**ad-daha**); **al-kisrâwî** (**kassar**), to interrupt, a short break-time serving as a reserve, “four qairât, four fingers’ breadth of shade”; **as-sinhirâwî** at noon, “the back of the day”; **ad-dihrâwî**, the early afternoon (**ad-duhur**); **al-‘irsâwî**, the time of the asur-prayer until the time of the maghrib-prayer at sunset. Muhammad Alî subdivided the night as follows: **al-‘ishâwî** or **al-hâjjâwî**, the time before midnight “until as-sihail (Canopus) has risen”; **ad-faqausâbî**, in the middle of the night; **ad-daghashâwî** or **hammarâwî**, the time of dawn.
The main duty of the sîd al-baqqar was to deliver water into the main channel, whence the tarâbla took it to water the planting beds (haidân, sing. hauð, basin). Another of his duties was to keep the main channel clear and free of weeds. Especially the channel floor had to be kept smooth at all times, so as to ensure the unhindered flow of the water.

The share of the teams of animals was 6/12 of the harvest, in local language 6 ‘adum. If an ox had pulled the sâqiya alone, he would receive a double portion. Of the rest, 5/12 went to the tarâbla i.e., those that worked the fields, also called sîd ad-durâ ca (lit. the owner of the hand). Another possibility was to first subtract the share for the land (al-karij) and then share out the rest equally among the owners of the animals on the one hand and the tarâbla on the other (tab. 1). If no karij needed to be paid, one half of the harvest went to the tarâbla, the other to the teams. Finally, there was a further possibility that the turbâl and not the owner of the animal provided the fodder. In that case, the turbâl received 2/3, the sîd al-baqqar only 1/3 of the harvest.

The aurattî, the person driving the teams of animals, was usually the son of the family. This was typical children’s work for boys from age six or eight until 16 or 18, when they had grown strong enough for the hard work of the turbâl, or, aged slightly over 20, went off to be migrant labourers. If a family did not have a son capable of the job, it would take in the son of relatives, who would “work for his food”. “A man and his son”, describing the ideal workforce in the days of the sâqiya, remained an ideal notion beyond those times. The other male members of the family became migrant workers.

In Manâsîr country it was usually the case that a yoke of cows could hardly irrigate more land than was needed to feed a man and his family, perhaps also his son and that family. Therefore, the owner of the animals was normally also the turbâl. But it was also possible for an affluent family – a rarity – to use a team (or several) for irrigation, leaving the work in the fields to other tarâbla. Those who had no animals and found no-one to water their land, had to depart and seek their fortune as migrant workers.

After the harvest and the threshing, the partners would meet up and divide their shares of the cereal harvest, using a wooden bowl known as qadaha. The straw, called qasab if from sorghum, al-lasad if from barley or wheat, had usually already been shared out in sheaves (habil) according to the same key.

<table>
<thead>
<tr>
<th>Total harvest</th>
<th>Share of the land</th>
<th>sîd al-ard</th>
<th>1/12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of the rest</td>
<td>Share of the water</td>
<td>sîd al-baqqar</td>
<td>6/12</td>
</tr>
<tr>
<td></td>
<td>Share of the fieldwork</td>
<td>tarâbla</td>
<td>6/12</td>
</tr>
</tbody>
</table>

Tab. 1: Distribution of the harvest among the partners.

16 The peasants calculate on the basis of ‘adum, literally bones, only using fractions as a secondary method. Each full unit (kaum), be it land or a quantity of, say, grain or dates, consists of 12 ‘adum.
17 The qadaha is a traditional eating bowl, long out of use by the 1990s. A standard qadaha held 1/4 qairât, 15 qairât make a sack of 105 kg grain.
The table summarises the most widespread and common form of taddân contract. The listed partners were the main protagonists involved in producing the harvest. Besides, there was a range of further services that were occasionally paid for in cash, but usually in form of part of the harvest.

The baqdâwî (pl. baqadda) was the potter who had produced the scooping vessels (qawâdîs) of the sâqiya. Before the harvest, he was allocated a haud (irrigation basin) by each turbâl in the sâqiya, to harvesting for himself. Baqadda were usually former slaves, owning no land but having good skills in the shaping and especially the firing of pottery.

The basîr was the mechanic of the sâqiya, responsible for its setting up and for repairs. Compared to the baqdâwî, a skilled basîr drew considerable reputation from his craft. He always maintained several sâqiyas in an area. During the erection of the sâqiya he received “a little, as soon as the first water flowed”, and after the harvest a mûrî18 of grain from each sâqiya per season. Something always needed repairing in a sâqiya, and a successful harvest depended considerably on the skill of the basîr.

Lastly, a good harvest also strongly depended on divine protection. For this reason, many sâqiyas maintained the tradition of the haud ash-shaikh, dedicated to the locally venerated saint, in the lower Manâsîr area Muhammad Uthmân al-Mirghani, and in the upper Abd al-Qâdir al-Jailânî. Haud ash-shaikh was the first haud the oxen had watered, drawing the saint’s grace (baraka) to the whole sâqiya and its grain, and from there to all those who consumed it.

The sâqiya was the centre around which the work and the entire life of several households along the river were organised. Other fields of economic activity, such as flood cultivation on jarf land, animal husbandry, date palm cultivation, migrant work, and timber rafting, were closely intertwined with the sâqiya. In some cases they delivered products required for the running of the sâqiya. Timber rafting for example provided the peasants with the mighty tree trunks needed for building the waterwheels and their platforms. Palm trees provided the bast and the palm fronds from which the peasants made the ropes that held parts of the sâqiya together. The women’s jarf cultivation produced a large proportion of the fodder for the animals. In turn, the other activities also relied on products of the sâqiya. The sâqiya provided fodder for the animals, fed the children of migrant labourers, watered the date palms. But unlike the sâqiya, these activities were organised by and within the household or family unit. Each family, more precisely the women of each family, cultivated its own jarf land and fed its own animals. Only the sâqiya and its division of labour extended far beyond the family organisation.

The striking characteristic of the sâqiya economy is the large number of those involved and the complex division of labour among them. The dimensions of the waterwheel alone, as the central technical component of the productive process, required the cooperation of many with different individual tasks, thus dwarfing the household-based economy with its simple division of labour. Even ignoring the specialists such as the baqdâwî and basîr for the moment, it was not exceptional for the living of 40, 50 or even more people to be

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18 One mûrî comprises 4 rubû, literally quarters. The rubû corresponds to the qairât. 15 rubû make a sack of 105 kg, thus one mûrî is 28 kg.
provided by a single sâqiya, not including those whose interest in the sâqiya was marginal, e.g. through a few inherited date palms.

7. Farming in the times of the ox-powered sâqiya

In the times of the ox-powered sâqiya, the main cultivation season was al-mîsaur, directly after the Nile flood (damîra) in August (tab. 2). During mîsaur the river ran high, the sâqiya had to lift the irrigation water only by a few metres; the scooping chain was shortened to the minimum, the animals worked at ease, able to irrigate a large area – per yoke of cows easily two faddân. A fully used sâqiya with four teams could keep 10, in ideal cases even 12 faddân in cultivation. “All who could,” said al-Hâjj Khalîfa, “did their best to cultivate during mîsaur.” But temperatures were too high for wheat or barley. Therefore, sorghum (maraiq) was sown, ripening after three months in October and November. Al-Hâjj remembers that during the 1940s and early 1950s his family, using a team of a bull and cow, harvested 40 to 60 rubuc, perhaps once even 80 rubû. 60 rubû would equal four sacks of sorghum, but al-Hâjj adds that sacks were unknown in those days. Instead, after threshing and winnowing, the grain was placed in a qusaiba, a clay amphora that was sealed with clay and cow dung to protect its content from vermin.19

As soon as temperatures had dropped in October, the peasants could sow barley (sha’îr). Barley was never as popular for food as was wheat, but could stand higher temperatures, required less water and – most importantly – grew rapidly. “You could harvest it after two months already,” said al-Hâjj, “it bridged the hunger until the wheat was ripe.”

In winter (ash-shitwî), peasants used sâqiya land to cultivate, besides barley, wheat (qamih) “as much as they could irrigate”. The river had fallen; it had uncovered jarf land, but on the other hand the banks were now so high that the land beyond could only be irrigated with difficulty. “One faddân per team,” says al-Hâjj, “but we rarely harvested more than 20 or 30 rubû.” That would make 1.5 to 2 sacks of grain. This is why, during the winter season the cultivation of the jarf, known as salûka20 cultivation, was especially important. All informants agree that during the 1930s and 1940s, salûka cultivation played a much larger role for the Manâsîr than cultivation with the sâqiya. There, the women sowed dukhn (pearl millet: Pennisetum typhoideum) and lûba (types of beans: Dolichos lablab and Vigna unguiculata); the jarf also produced the bulk of the fodder for the draught animals, straw from dukhn and lûba, when the cattle were brought back from the upland pastures to begin work.

Around the time of the wheat harvest in March and April began the hot season, as-saif, with the lowest water levels of the whole year. Those who could used a small sâqiya to cultivate maraiq on jarf land once more. But at this point the upper sâqiya usually watered only a small garden of vegetables, mainly waika (Hibiscus esculentus). The first dates ripened in July, but their main harvest was in August and September.

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19 This section is mostly based on a number of conversations, so to speak an extended interview over several days, from 09–12/02/1992, with al-Hâjj Khalîfa Ahmad on Shirî island.
20 Salûka is a planting stick, formerly used to punch plant holes for seeds in the jarf, but completely out of use today.
In comparison with the later period of irrigation by diesel pump, the agrarian calendar appears to be reversed. While in those days of ox-powered irrigation mîsaur was the main cultivation season, it was later either not used for planting at all, or merely to produce sorghum straw as animal fodder. In contrast, after the introduction of the diesel pump, the saïfi season became more important, being the time when peasants grew maraiq, the main component of their diet. It is obvious that during the time of the sâqiya the agrarian calendar was mainly determined by how much water the drawing oxen could lift at a given time, whereas other considerations gained centre stage later. That the cultivation of the jarf remained important later, but mainly for producing animal fodder rather than food for the farming family, is also explained by a change in dietary preferences. Over time, dukhn and lûba were considered animal fodder; wheat became the most popular food grain by far. But it is also connected with the fact that unlike land at higher elevations, the jarf became more and more fragmented and could not be expanded, so that the quantities that could be planted here played an ever smaller role in the overall diet.

<table>
<thead>
<tr>
<th>mîsaur</th>
<th>August</th>
<th>cultivation of maraiq by sâqiya</th>
</tr>
</thead>
<tbody>
<tr>
<td>September</td>
<td>cultivation of dukhn in the jarf</td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>first maraiq harvest</td>
<td></td>
</tr>
<tr>
<td>shîtî</td>
<td>November</td>
<td>maraiq harvest</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>cultivation of dukhn in the jarf</td>
</tr>
<tr>
<td></td>
<td>January</td>
<td>first dukhn harvest in the jarf</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>first lûba harvest in the jarf</td>
</tr>
<tr>
<td>March/April</td>
<td>wheat harvest</td>
<td></td>
</tr>
<tr>
<td>saïfi</td>
<td>April/Mai</td>
<td>cultivation of maraiq by sâqiya</td>
</tr>
<tr>
<td>July</td>
<td>maraiq harvest</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 2: The agrarian calendar in the times of the ox-drawn sâqiya.

Furthermore, the cultivation calendar at the time of the ox-powered sâqiya appears stretched. This is mainly to do with the cultivation of barley. As al-Hâjj says, barley was not popular as a foodstuff, but its low requirements made it an ideal grain for the sâqiya. And as an intermediate catch crop it bridged the hunger until the wheat harvest. “People took [their living] from anywhere they could,” says al-Hâjj, “when one thing had been eaten up, the other would soon be ripe. People patched everything available together to make a living.”

During the times of the sâqiya, the intervals of irrigation were longer than today. “The peasant had water every day, today you only get water every six or seven days and so you water everything at the same time”. Whereas one would irrigate once every week in the 1990s, one would only manage every 10 or 12 days in the times of the sâqiya. As a result, the grain was constantly thirsty and its productivity remained low. “Where in the past you
Kurt Beck

had a harvest of 20 to 30 sacks [i.e. a whole sâqiya with four yokes of animals], today [with the diesel pump] it is 60 to 70 sacks on the same land.”

Shortage of water and shortage of fertiliser went hand in hand. In the salûka lands, the river constantly deposited new mud (tammî), but on sâqiya land, the peasants had to maintain and improve fertility themselves. In part, this was achieved by rotation and fallow, but the most important technique to maintain soil fertility was the addition of fertiliser, zibâla (dung) and marauq. Marauq is a mineral fertiliser, a salty soil that occurs naturally in the highlands or could be scraped together on former sites of habitation and ruins. Today’s memory of the time of the sâqiya is dominated much more by the collection and transport of marauq than by the driving of the teams of cattle.

“My father tasted the soil with his tongue. If he found it salty, he told me and Hájj Ali [the brother]: Go, get your donkey! [...] We scraped marauq all day. The winter up there [in the desert] was bitterly cold! We drove the donkey all day, downhill, uphill, and filled the rahlânî [a carrying frame for the donkey, with two baskets; see Haberlah, his volume]. I remember: When walking, we always ducked behind the donkey, to get out of the wind. In the evening, we returned home – hungry, shivering with cold [...] and the water was running from our eyes. Then they told us: Go! Cut fodder for your donkey!”

Al-Hâjj’s father maintained a strict regime. He was what is today called a true peasant, or sometimes a sammad, headman of a sâqiya. He owned fertile ground in an old family-owned sâqiya and was partner in a waterwheel with one yoke of animals. But not all were true peasants. Shîrrî island, as the centre of the Manâsîr, had a more differentiated social structure than other areas. Here lived merchants and an old farming elite. Many owned slaves for work or sufficient land and yoke animals, so that they could employ tarâbla as sharecroppers and thus escape the daily farming labours themselves. Others were mostly migrant workers. They left the land in winter to work primarily as masons and returned only when the rainy season interrupted building work in the southern cities. Their wives dedicated their time to salûka cultivation in the jarf, but wheat was brought by the masons from their travels. According to stories told today, when being at home they had ample time for drinking and idling.

Hassan as-Sâdiq remembers a relatively carefree childhood. His father was one of the wealthier merchants on Shîrrî. He owned yoke animals and land, which he had cultivated by tarâbla.

“We children swam in the river and jumped into the water from the tall sunt acacias. We ran here and there. I remember: All except the schoolchildren were barefooted and only wore a shummâra [a loincloth]. When the ground became hot in summer, we made soles from palm leaves. [...] We did not go home to eat. We stole dates and the fruit of the doum palm. We killed birds with a stone and cooked them. [...] Only the families of true sammad with oxen and a wheel worked regularly. [...] Only true peasants had wheat. The others ate kisra [from sorghum] with salt, and only once a
week a sauce of the leaves of *waika*, before the *waika* itself was ripe. [...] Often there was nothing to eat at home when the men stayed away on long visits and drank.”

8. The crisis of the hungry 1950s

The 1940s and 1950s were the period of the most severe agricultural involvment in Manâsîr country. The peasants sat between their rocks on narrow lots that were barely able to sustain their families. There was plenty of land, but it was located too high to be irrigated with the ox-powered *sâqiya*.

After the Mahdiyya the land was totally destroyed. Manâsîr country had had to endure several campaigns and the major battle of Kirbakan in February 1885. The peasants had fled repeatedly. What had not been requisitioned by the storm troops of the Khalifa Abdullâhî had been ravaged by the Anglo-Egyptian army. For the years of growth after the destructions of the Mahdiyya and the Anglo-Egyptian reconquest around the turn of the 20th century, I estimate the total Manâsîr population at c. 2500. They cultivated between 400 and 450 *faddân* of *sâqiya* land.

A short boom in the 1920s brought a noticeable increase in standard of living to the cities of Sudan and also to the rural areas. The infrastructural works for the Gezira scheme, begun immediately after the First World War, had attracted workers from all of Sudan. In March 1921, the Sudan Monthly Intelligence Report for Berber Province noted “departures in considerable numbers from Abu Hamed district, especially [from] the Monassir and from the towns”23. The workforce for the project was scarce, the wages high – by the end of the 1920s, the daily pay for an unskilled worker had risen to 10 and 12 Piasters, while the cost of living had remained low (Daly 1986: 440). The workers could afford to work for two weeks and then take two off. Among the Manâsîr, a fixed pattern of migration had already established itself. Accounts consistently refer to depopulation. Only old men, youths and women stayed in the *sâqiya*, the majority of men sought their fortunes as migrant workers in the irrigation areas of the Gash Delta, in the cotton fields of the Gezira and in railway work.

In the second half of the 1920s, the Governor of Berber Province, H. C. Jackson, described the District of Abu Hamed and, by inclusion, Dâr al-Manâsîr as the poorhouse of the province. “The country is rapidly becoming depopulated,” he wrote about the migration of young men to Kassala and to Makwar in the Gezira (Jackson 1926: 7). At that time, the Manâsîr were semi-nomadic; it was common for a family to have sedentary as well as

21 Hassan as-Sâdiq, Shîrrî, Umm Laqadîb (14/02/1992).
22 The relevant sources for my estimate are the following: Report Berber Land Commission 1904 by J. F. Kershaw, president of the Cadastral Commission of Berber Province, 05/08/1904, Sudan Archive of Durham University 542/6:3-48; Ryder, Settlement Officer in Shendi and Berber, Memoirs, Sudan Archive of Durham University 400/8/1-25. The information on cultivated areas is taken from a tour report by Major Hayes Sadler: Report on Monasir, by Bimbashi W. Hayes Sadler, 1st Inspector Berber Mudiria [Province], January 1901, Appendix A, 3-6, to SIR (Sudan Intelligence Reports) No. 79, Sudan Library (Maktab as-Sudan) Khartoum University.
23 Sudan Monthly Intelligence Reports (SMIR), Sudan Library, Khartoum University.
24 Governor Berber 05/10/1934, National Records Office Khartoum (NRO), NP 1/1/7.
nomadic members (Jackson 1926: 5). There was practically no cultivation yet on the east bank of the river. “There must be few places in the Sudan [...] where agricultural conditions are so hard,” Jackson remarked and continued stating that the peasants were so poor that they practically never consumed meat and even picked at their wheat “like chicken” (Jackson 1926: 7). But he also noted signs of incoming cash, new houses of mud (jâlûs) instead of the earlier straw-roofed huts (Jackson 1926: 9) and the increasing consumption of sugar (Jackson 1926: 7). He noted especially the relative affluence of the nomads in comparison to the riverside peasants (Jackson 1926: 17). Between 1921 and 1926 the number of their sâqiyas averaged at 223. The number of fruit-bearing date palms in 1925 was in the range between 18,000 and 20,000.  

After the 1920s boom, when cash had been loose across the region, the global economic crisis also hit Sudan. Sinking wages and a reduced availability of employment in the cotton growing areas and cities during the Great Depression drove many migrants back to the sâqiya in the 1930s. “There are signs that this has brought about an increase of sakia cultivation, particularly in Abu Hamed District [which included Manâsîr country],” noted Governor General Maffey in his report (Woodward 1932-33: 124).

In 1930 the Manâsîr irrigated 450 faddân of sâqiya land. District Commissioner Innes estimated the cultivable land of a typical sâqiya at two faddân, behind them rose the bare rock. He wrote: “The average village boasts at most thirty feddans, some 20 waterwheels, and is separated from its neighbour by nearly an hour of rocky emptiness” (Innes 1931: 186). In the years 1936 and 1937 the Nile level was moderate, but in 1938, high water levels caused the peasants to put more sâqiyas in action. 1939 and 1940 were bad years on the Nile. In the early 1940s, too, the number of sâqiyas stagnated at the level of the 1930s.  

<table>
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<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Jarf (faddân)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivated sâqiyas land (faddân)</td>
<td>450</td>
<td>537</td>
<td></td>
<td></td>
<td>8600</td>
<td></td>
</tr>
<tr>
<td>Licences for sâqiyas</td>
<td>232</td>
<td></td>
<td></td>
<td></td>
<td>446</td>
<td></td>
</tr>
<tr>
<td>Area under date palms (faddân)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1600</td>
</tr>
</tbody>
</table>

Tab. 3: Extent of cultivation in Dâr al-Manâsîr in long term comparison.

The extent of cultivation had increased slowly, but so had the population. In 1921 the number of men fit for military service was estimated at 1600 (suggesting a total of perhaps 6500 or 7000 inhabitants), in 1931 at 2500 to 3000 (i.e. a total of 10,000 inhabitants).  

Manâsîr country had already been described as the poorhouse of Berber Province in the 1930s, but in the 1950s, true destitution became widespread. The 1955/56 census counts 20,955 Manâsîr. It should, however, be noted that this number includes upland nomads.

25 NRO-CivSec 1/14/45-47: Devolution Berber Province.
26 NRO-Northern Province 2/43/475: Tribes of Northern Province – Fighting Strength.
and also nomads living in other districts and provinces. Unfortunately there are no numbers of that time for the population along the river, but it can hardly have been more than 15,000 people.

Potentially arable land still existed, but hardly within range of the sâqiya. The technology of the ox-powered sâqiya had reached its limits. The generous crop rotations of the early years of the 20th century, when only one of three or four sâqiya was cultivated per season, belonged to the past. The good soils were occupied, developed, already overpopulated and fragmented – and even the bad land was already subdivided. The mobile peasants of the turn of the century, using their cattle to irrigate here and there at will, had settled down. And they had difficulties eking out a living for themselves and their families from their shrinking shares in the land.

The accounts of those now aged 60 or 70 refer to a degree of poverty that is hard to believe today. “Only the true peasant ate wheat, and only once a day.” 30 – “The whole country was hungry, only when the migrant workers returned with their wheat could people eat their fill.” 31 – “Meat? Never! Sour kisra [of Sorghum] with salt. And once a week kisra with sabaranuq [leaves of waika, not its fruit!]. And often not even kisra”, recounts Hassan as-Sâdiq. Irregularity of meals and hunger are the stereotypes repeated most memorably when the generation of today’s 60-year olds speak about their childhood and youth. Poverty is dripping from all their tales.

In “Agriculture in the Sudan”, a 1948 handbook written for administrative purposes, but also for the interested public, the administrative officers Tracey and Hewison say about the peasants of the Northern Province: “many of them are on the verge of poverty”, “their diet is frequently inadequate, as a consequence their physique is poor”, “they are therefore incapable of regular and sustained physical effort” (Tracey and Hewison 1948: 741). Tracey was Governor of the Provinces Berber, Halfa and Dongola, at that time united as the Northern Province, and Hewison held the post of Government Inspector of Agriculture in that province. Both knew what they wrote about, and neither had any interest in exaggerating the level of poverty.

The same book informs its reader about the living conditions of irrigation peasants in the Nuri area, halfway to the town of Karima, where the Manâsîr went for the weekly market. Tothill, the editor, had conducted research on the standard of living among the peasants of that area in the early 1940s. 32 According to the report, each peasant in the sample group owned a little land (one to three faddân), and all owned date palms (Tothill 1948: 216-218). Each peasant cultivated between a half and a whole faddân twice or thrice per year, but all found themselves in debt regularly (Tothill 1948: 218-219). They had virtually no wheat to

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30 Hassan as-Sâdiq, Shîrrî (10/02/1992).
32 Thirteen households (“having been selected as fair average samples for the area”, Tothill 1948: 210) were interviewed about their family composition, their food habits, income, property and residence, and an inventory of their movable property was made. Additionally, the peasants were asked to compare their current situation with that a decade earlier. The data on the individual households, published virtually uncommented, speak for themselves. Considering the fact that the book was not meant just for the administration’s internal use, but for a wider public, it is an unusually frank colonial document. These officials clearly had a reform agenda.
eat, and instead consumed sorghum *kisra* with a thin sauce, often just with salt; they barely ate fruit or vegetables; meat was consumed once a fortnight, once a month or even just on important feast days. A striking aspect, already familiar from Hassan as-Sâdiq’s report, is how irregular and totally insufficient the meals were: only two meals a day, sometimes just one, “*kisra* in the evening when he has grain” (Tothill 1948: 212), a quarter litre of sheep or goat milk for a whole family per day (Tothill 1948: 215). Tothill describes the living conditions of the peasants with words “poverty and malnutrition” (Tothill 1948: 210). Similarly poor across the board are the “household effects” listed in the inventories, for instance: three beds, a box, a clay water container, an aluminium cooking pot, a prayer mat, a wash basin, two teapots, a glass, a spoon, a saddle (Tothill 1948: 214-215).

The answers to Tothill’s question regarding the standard of living “ten years earlier” additionally underline the fact that the 1940s already were a time of increasing agricultural involution (Tothill 1948: 219-220), in spite of the wartime boom in demand for agricultural produce. Conditions must have been even tighter in the 1950s, when that boom had ended, but population continued to increase. Additional land was still available, but could not be irrigated with the ox-powered *sâqiya*.

9. Diesel technology

When the handbook “Agriculture in the Sudan” was published in 1948, there was general agreement that irrigation farming in the northern Nile valley was headed for a dark future, “a slow process of impoverishment”, as summarised by the editor, Tothill (1948: 220). The hunger for land and its resulting fragmentation had reached an extent that made physical survival difficult for the peasants. Migrant work had become an established pattern. Only one male family member stayed at home on the *sâqiya*, to tend for the families of the men seeking work outside their native Nile valley. The rural areas of the Nile valley were inhabited by women, children and old men, an over-aged dying region. Tothill and his co-authors argued that the slow process of impoverishment could only be halted by a radical land reform (Tothill 1948: 220-221). But during the following twenty years it turned out that while the ox-powered *sâqiya* had indeed reached the end of its tether, the local irrigation agriculture had not.

The way out of the dead end of farming involution was offered by diesel technology. In the Nile valley, the waterwheel had competition from mechanical pumps since the beginning of the century. The first pumps were still powered by steam engines; the first was installed in 1905 in Zaidab as part of a private project to settle African Americans supposed to be willing to return to Africa, which never materialised (Tracey 1948: 760/1). A few years later, from 1917 onwards, steam pumps were installed as part of government projects at El-Gurair, Nuri, Kittiyab and Qandatu. But these machines were unwieldy monsters; their use by local peasants was unthinkable. It would take another half century until the peasants were to find a technical dimension that was appropriate to their scale of organisation.

The first diesel-powered pumps appeared in the 1930s. They mainly irrigated the large capitalist cotton projects on the White and Blue Nile. At the then level of technology, a common 10-inch pump could lift over 400 m³ per hour. It is obvious that the market was
geared nearly exclusively towards large projects. Handy 2-inch pumps, more appropriate to the peasants’ needs with a capacity of 20 m³ per hour, remained rare. In 1963, when the government attempted to gain an overview over the state of irrigation agriculture through a large-scale Pump Scheme Census, pump irrigation schemes in the Northern Province had an average area of 230 faddān. Excluding the largest irrigation project in the Northern Province at that time, Zaidab, which alone watered 1/8 of the total area, there still remained about 200 faddān as the average irrigated area per pump system. That was far beyond the scale of local peasants’ cultivation areas, around 10 faddān, and a development of mechanised irrigation according to this model would indeed have required a radical land reform and the merging of small cultivation areas, as promoted by the authors of “Agriculture in the Sudan”. The following table gives an overview of the development of mechanised irrigation until the 1960s.

<table>
<thead>
<tr>
<th>Year</th>
<th>sāqiya pumps</th>
<th>motor pumps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1923</td>
<td>9980</td>
<td>65</td>
</tr>
<tr>
<td>1937</td>
<td>6859</td>
<td>112</td>
</tr>
<tr>
<td>1944</td>
<td>9456</td>
<td>206</td>
</tr>
<tr>
<td>1953</td>
<td>5697</td>
<td>608</td>
</tr>
<tr>
<td>1963</td>
<td>not available</td>
<td>1249</td>
</tr>
</tbody>
</table>

Tab. 4: Numbers of sāqiya and motor pumps in Northern Province, 1923–1963.

The 1249 pumps of 1963 irrigated about 230,000 faddān. This was the time of large irrigation schemes, occasioning some authors to talk of the beginning of a capitalist development in the Nile valley peasant’s irrigation economy (Allan and Smith 1948; Wynn 1968; Omer 1985). But as it turned out, the further developments did not only ignore Tothill’s prognosis of slow impoverishment and his transformationist proposals, they also deprived the technodeterministic capitalist scenario of its point. When the peasants actually encountered a technology calibrated for their needs in the market, they began a tempestuous process of technological appropriation. At the end of that process stood a reversal of the capitalist development towards large irrigation schemes and an upturn of the locally based irrigation economy accompanied by an expansion of cultivated terrain at an enormous scale.

10. The pioneers of the diesel engine

“Nonsense, the first diesel motor was brought here by Muhammad Ahmad al-Fakī”, says ad-Dasûkî about his uncle. “An English Lister, original Lister. It powered a 2-inch [pump]. They brought it from Berber by railway and from [the train station] al-Kâb by rowing boat. Only after that, did ‘Umîda Ni’mân bring his motor, and Sâlim ash-Shâir one for the mill.” Ad-Dasûkî is defending his uncle’s honour of having brought the first diesel

33 Department of Statistics 1965.
34 Ad-Dasûkî Hassan al-Fakî, Shîrrî (14/07/1995).
engine for irrigation to Dâr al-Manâsîr. This honour is contested, since the pioneer is rightly accorded the respect due to a cultural innovator.

Today, the introduction of diesel technology is treated as a historical watershed, the veritable start of a new era. “Zaman as-sâqiya bi'l-baqqar – the era of the waterwheel with oxen” and “ba'ad al-bâbûr – after the motor” are the two epochs of local economic history. Of course, this is the Manâsîr’s retrospective view. When the rowing boat with the first motor put in at Shîrrî, nobody could have predicted in what social upheaval Muhammad Ahmad’s technological experiment would result.

Muhammad Ahmad al-Fakî belonged to the peasant-bourgeoisie elite of Shîrrî island and is described as a model innovator, comparatively affluent, socially influential, educated, with a broad horizon. He came from one of the island’s most fertile sâqiyas, owned a shop and had political ambitions. He was one of the Abâbsa, a family that had for centuries belonged to the societal elite of the Nile bend near Abu Hamed and that had produced several important religious scholars (Spaulding 1995: 12/13; Qâsim 1997: 1442-1444). He had spent part of his youth in Mogerat island near Abu Hamed, where his family owned further lands, and in the former provincial capital at Berber, where he married his second wife. This is where he had learnt about diesel technology. But this pioneer had embarked on an adventure that initially threatened to end badly.

At first, the motor met outright rejection. For a full six years it remained packed in its box, “in the middle of the yard, at the spot where they had carried it from the boat”. Ad-Dasûkî was born in 1949; the box is among his earliest memories. “When I was little and learnt to see things, I remember that it was always there in its box. It stood there and we children played on the box. Only much later, in 1955 or 1956, I am told, was it connected and started working.”

Why was the motor not installed for such a long time? Should it not have appeared to the peasants as liberation from the torments of the ox-powered sâqiya? “People were afraid. They were afraid of the spare parts. What if it breaks? Who will water our grains then? Who can repair it? Where are the spare parts? And, and, and ... The other peasants, the partners in the sâqiya, simply rejected it!”

The mechanism of the ox-powered sâqiya was well known to everyone; it could be built and repaired where it stood with local materials. Those were the advantages of the ox-powered sâqiya that are always mentioned when conversation touches upon the comparison between the two technologies. Far superior efficiency, however, was the massive advantage of diesel technology: “Everyone came to see”, says ad-Dasûkî. “Where in the past you’d have harvested 30 sacks, you now harvested 60, after all the grain used to be thirsty all the time [under the regime of the ox-powered sâqiya],” says Abdalla. But initially, no-one could handle the diesel technology and moreover, it required spare parts and materials that were available only in Berber or even in Khartoum. The diesel technology broke up the closed cycle of the self-sufficient farming economy: “In the past, everything we needed to work was here, in its place, right where we picked it up, the cows, the maraqua, the daulât. The sâqiya, all wooden, not a single iron nail! [...] The straps of cattle hide, the ropes from bark bast, and the scooping vessels from the local potter [...] And now? You have to search, search, search for every little thing. No diesel, no chemical fertiliser, no lubricants, no spare parts! And if you finally get a spare part, you open the box and how often you may just as
well toss it into the river! In its original packaging! It does not fit; you’ve seen for yourself, still in its original package and already broken! Especially the Indian type!” Behind this obvious annoyance, there are rational considerations, scepticism against technological dependence.

But “al-muzârîq qalbû tâ’ir – The peasant’s heart fluttered,” says ad-Dasûkî. This is more than scepticism or justified reserve. Those stories that are really concerned with the first arrival of the diesel motor (and not just with the comparison between diesel-powered and ox-powered technology) and that manage to capture the atmosphere at the time of its introduction, reveal the peasants’ deep-rooted fear of the dying grains. Rarely has this been expressed more dramatically than in a poem from the 1960s, when the first motor pump came to as-Sâdda:

\[
\begin{align*}
shîl al-hajār amâiqû & – barra min al-makhzan (Take the grinding stone – throw it out of the storehouse!)
\end{align*}
\]

\[
\begin{align*}
al-‘aish niha fārâqāhu & – arba‘a ha’dâqâb shahr (The grain, it has run out – what a black day!)
sandaqaiqatahâ fî‘l-Khartûm & – dî mâ bitâ‘aishnâ (Its spare part is in Khartoum – it will not feed us!)36
\end{align*}
\]

The excerpt from the poem recounts the angry speech of a father against his son, perhaps a migrant worker, who wants to install a diesel pump and considers it his chance to return home to the sâqiya. The father dramatically points out the consequences or what he considers them, death and disaster because of a small matter. The grain has run out, the stores are empty. This day can only be compared to arba‘a ha’dâqâb shahr, the Wednesday at the end of a month, the unlucky day on which the Pharaoh drowned in the river. To throw the grinding stone from the storehouse is an act of desperate resignation. And what is to blame? A spare part for the motor, here described in sâqiya terminology as sandaqaqita, a wooden cog from the sâqiya wheel, a small thing that could be replaced in no time on a sâqiya, but for the motor can only be obtained in Khartoum. This technology, that is the moral, leads directly to starvation.

Thus, the introduction and spread of diesel technology was not a smooth process, the superior terminology simply gaining dominance without further ado. Oral tradition preserves a hint of the conflicts, the technological dramas, that had to be fought: between young and old, between supporters of a closed self-sufficient economy and worldly pioneers of technological dependence, between the willingness to take risks and the concern with security, between migrants seeing pump technology as a means to return home and locals unwilling to put their existence, however limited it might be, at risk.

Furthermore, since the irrigation economy was founded upon sharecropping, partnership and many complex interdependencies, decision-making was not an individual or even family affair, but involved a larger field of persons and was thus a process entailing much conflict. The cooperative organisation of the sâqiya required consensus from all, and thus led to broad debate. Obstruction by a single person could easily block the introduction of

35 Abdalla Ahmad Abdalla, Salmiyya (23/10/1995).
36 Sâlim Ahmad, al-Kâb (05/07/1995).
the new technology on a sâqiya. Once the motor pump was running and could prove its own success, mere visual observation became its key support, “everyone came to see,” says ad-Dasûkî, but the tales of its first arrival in a neighbourhood always mention fear and usually refer to organisational feats and to persuasion.

“At long last, after six years in the box,” continues ad-Dasûkî, “the mechanic from Berber came, connected it and made it work for the first time”. A certain at-Tayyib al-Hisain, himself now belonging to the notability of Shîrrî, whose uncle had worked on the railway in the Rubâtâb area and had transmitted to his nephew not just mechanical knowledge, but also a passion and an instinct for technology, was hired as sawwâq (driver) for the motor. His task was to start the motor, to refill it with diesel and to keep it lubricated. But ad-Dasûkî stresses that the sawwâq also had to sit beside the motor all the time, guarding its smooth operation and especially the functioning of the water cooling. He was a kind of mechanised version of the aurattî who had driven the oxen in the ox-powered sâqiya. The owner, Muhammad Ahmad, only provided diesel and spare parts.

“Then the famous poet Sâlim ash-Shâcir brought a motor for his mill, also a Lister, and ‘Umda Ni‘mân brought another one. Then they could swap spare parts. If one motor broke down, they would get a part from its brother, install it, wa yalla! [...] Then came many more; they installed motors even on the islands.”

The spreading of the motor dispelled the other peasants’ fear of the thirsty grains. They became familiar with the motor (al-bâbûr) and learnt to appreciate its productivity. “In the beginning they could not even pronounce its name,” remembers Ibrâhîm, ad-Dasûkî’s brother, “they said bajûr and bambûr.” The peasants took their time to appropriate the technology by observing its use among neighbours. The new technology had entered their experiential horizon and achieved convincing results within their very own environment. Ad-Dasûkî reports: “At-Tayyib al-Hisain became a mechanic. He had not learnt [formally], but just from watching when the master came from Berber. Later, he looked after a whole series of motors, all in Shîrrî and Salamât. All that had motors employed him as their mechanic.” But the respect for the new technology is clear. The peasants took obsessive care of the motors. Unlike today, when more or less every peasant starts the motor himself, then goes to irrigate the fields and finally returns to switch the motor off, then each motor had its own sawwâq, whose only task was to “guard” the motor when running.

In the late 1960s, motorisation rolled across Manâsîr country like an avalanche. In a first phase, the motors replaced the waterwheels, always one motor in place of several wheels. During the subsequent development, the motor served to increase the extent of irrigated land. In the first phase, the process of motorisation was borne by entrepreneurs, but later its use became more generalised among the peasants. By 1975, when Muhammadânî on Dirbî island finally decommissioned his ox-drawn sâqiya, all sâqiyas had been converted to diesel pumps, and the peasants had energetically tackled the task of colonising new land that had hitherto lain beyond the reach of the ox-powered sâqiya.
11. The social domestication of the machine

The appropriation of a new technology comprises more than overcoming the fear of the unfamiliar, gaining technical knowledge and learning new skills (Beck 2001: 71). Beyond these factors, a new technology provokes a new integration, a reorganisation of the environment. This applies also to the recipient technological environment: For instance, the diesel pump required an extension of the existing channel systems and rendered the keeping of oxen superfluous. This, in turn, affected the balance between the growing of fodder and the keeping of animals, resulting in the mid-term in a radical reorganisation of animal husbandry, the abandonment of cattle and their replacement with sheep, the abandonment of ploughing for the hoe etc. A new technology also calls for a new institutional foundation. The motor with its new implications did have to be embedded not just in the technological system, but also in the societal division of labour – the initially fear-inspiring monster had to be tamed as part of a social process.

At first sight, the diesel motor and its pump took over the place of the ox-powered waterwheel completely. The taddân contract, the organisational principle of the sâqiya with its combination of water, land and labour appeared to be simply grafted onto the new technology. The sid al-baqgar, owner of the oxen, became the sid al-bâhûr, owner of the motor, providing – as before – the water in the main channel; the turbâl, working the land, remained the turbâl. And the basîr, mechanic for the waterwheel, became the basîr (sometimes honourably muhandis, engineer) of the machine. Only marginal figures, such as the baqdâwî, the potter of the scooping vessels, were pushed out of the irrigation economy by the new technology, and obviously, rafting of timber decreased drastically. But even for the aurattî, who had driven the teams, a motorised variant of the task was found, as sawwâq. The congruence even in terminology, the effort to think of the new in terms of the familiar, is striking.

Observed superficially, the division of labour in the diesel-powered sâqiya was merely a motorised variant of its ox-powered predecessor, a substitution. Nevertheless, the old consensus about the division of labour in the sâqiya, the taddân contract, was on the brink of breaking over a debate on the just distribution of the harvest. In fact, the greater water-moving capacity of the diesel pump enabled the early entrepreneurs to achieve considerable innovation dividends, and made the peasants into sharecroppers on their own land. At that time, a capitalist development was indeed possible.

“The motor ran day and night,” reports ad-Dasûkî. “In those days, they irrigated every 12 to 14 days, where today we do it every seven to 10. And what quantities of water! The channel could not hold it. Higher channels needed to be built. The water broke the channels down – a flood! Everyone came to see it. [...] The motor watered [the sâqiyas] al-Abábsa, al-Mitaira and our Wad ‘Isâ. 43 faddân!37 One half was cultivated, the other half exposed to the sun [left fallow], but there were three cultivation seasons per year.” This meant that all peasants on the three sâqiyas became Muhammad Ahmad’s tarâbla. Ibrâhîm38, ad-Dasûkî’s

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37 Sâqiya Wad ‘Isâ (No. 16 Shîrrî) at 16 faddân, sâqiya al-‘Abâbsa (No. 17 Shîrrî) at 10 faddân, sâqiya al-Mitaira (No. 15 Shîrrî) at 17 faddân; in the 1990s, the latter was irrigated by two motors, the other two by one each.
38 Ibrâhîm (Ruby) Hassan al-Fakî, Shîrrî (15/07/1995).
brother, remembers the moral debates that ensued over this. “The peasants were agitated. They complained: Outrageous! There are 30 of us, and we are to receive only half the harvest and the motor alone the other half, as much as all of us together? [...] Before, they had their own oxen. But now they were to deliver the share of the motor. [...] No, no,” he concedes, “they did not refuse outright, what could they have done? But there was much bad blood.”

A typical example for the social profile of the early innovators is Ahmad al-Hâjj al-Amin. The family owned land on Shîrrî, but Ahmad was one of the first in Shîrrî to complete school education and became a teacher. In the 1990s, he ran the family saqiya, was director of the School Board for Dâr al-Manâsîr and traded in spare parts. “I brought one of the first motors and installed it in Shîrrî. That was not long before the end of the Abbud government, when Sirr al-Khatim took over [autumn 1964]. [...] Then I was transferred to Kîrbakân, to set up the boarding school there. I took the motor with me and installed it on Araj [island]. I made a 10-year contract with the peasants, half [the harvest] for the work and half for the motor. [...] In the beginning they did not trust the motor, they were afraid. I convinced them. Eventually, I convinced them to cultivate during mîsaur [the season of the highest flood] and to cultivate everything, every last haud [irrigation basin]. I irrigated in place of three waterwheels. The season brought 107 sacks of sorghum, just as the share for the motor, each sack at 3 Sudanese Pounds (SDP). Now calculate! The motor had cost me 300 SDP, including delivery, 10 barrels of diesel, lubricant and oil. Everything beyond that was pure profit! [...] The peasants also started to calculate. They wanted motors for themselves. Suddenly, they were not afraid any more. I, I have taken the fear from them! [...] To cut a long story short, one day, after two or three years, they came and said that they wanted to install a motor themselves. I released them from the contract. Ten years, remember! But what else could I have done?”

Ahmad al-Hâjj’s report supports the pattern according to which the innovation is discussed. He is the heroic bringer of culture; he takes the fear from the others and embodies the entrepreneurial type. He makes the water available to the peasants, he takes the risk, and they reap a record harvest! 214 sacks of sorghum on little more than 30 faddân during the flood cultivation period is a considerable yield even at today’s scale. Ahmad al-Hâjj’s calculation also allows an idea of the scale of the attainable innovation dividends. 3.0 or 3.5 SDP per sack of sorghum and 300 to 400 SDP as the price for the motor, depending on its type and what was included in terms of piping, diesel etc., are realistic numbers for the late 1960s.

How would Ahmad’s story be presented from the point of view of the other side, the partnering peasants? One of them was Abdalla Abû Qurûn. Abdalla is a descendent of the Hammadțiyyâb saints among the Manâsîr. Until the flooding of the area, he maintained the qubba of his grandfather, located beside the saqiya and habitually visited by women who wished for offspring through the baraka of the dead saint. Abdalla was born in the early 1920s, “sanat sail Bâbûrî [in the year of the flood of Bâbûrî i.e., 1928] I was already losing my milk teeth.”

For three years in the late 1940s he was a policeman in Port Sudan; his mother died, he returned and married, but there was no room for him on the sâqiya and he went as an agricultural worker to Kassala, where he later ran a restaurant for other workers and where he first encountered diesel motors. In the late 1960s, his older brother died, the father was already dead some time, Abdalla took over the sâqiya – a completely normal biography, but Abdalla had learnt something of the power of organisation, perhaps among the stevedores in Port Sudan.

“Ahmad al-Hâjj al-Amîn [...] had installed a motor for them, an English 5 HP Lister. Apart from that one, here in the islands there was also that of Khalîfa Abû Âbish in Dirbî and one in Bîrtî on Kîr Shimîn, brought by Silîmân Wad Qamar, one in the flour mill at Bîrtî, and that of Ali al-Hasan Dirqâwî on Sûr. [...] Most importantly: They worked bi it-tifâqiyya [contract], as tarâbla, fifty-fifty. [...] He watered the sâqiyas al-Haush, at-Tawîla and the two Harânain. [...] When I returned from Kassala, I saw how they worked. I assembled them and said to them: Listen, brothers! We work for the motor. On our own land! With our own hands! Half is for the motor! What if we install our own motor? Then we work for ourselves! [...] We got together and brought a motor from Atbara, an Indian 8 HP Lister. Including the pipes, delivery, oil, a barrel of diesel and the karâma [sacrifice] it cost us 300 SDP. That was nothing for as many people as we were! We had our oxen [to sell] after all. [...] That was shortly after the Hashim al-Ata coup [July 1971]. We irrigated the sâqiyas al-Haush and at-Tawîla over there, the people on al-Harânain bought their own motor.”

Like Ahmad, Abdalla tends to downplay the conflict between the early motor owners and the peasants. In other accounts, more drastic expressions occur, such as “taradûhu – they chased him away” and similar terms. Ahmad said, “they began to calculate,” after he “had taken their fear off them”. In his tale, Abdalla claims the achievement of having calculated for the peasants, but most of all, to have organised them: “I assembled them”, “we got together”.

12. The social logic of technological appropriation

Until the flooding in 2008, getting together and organising indicated the local peasants’ principle, according to which the motors had been appropriated. Ittifâqiyya, accord, is the key concept. Although some of the pioneers are still alive, the entrepreneurial type is a thing of the past. Today, hardly any motors have a single owner. Instead, the peasants of a sâqiya own the motors and other material necessary for irrigation, such as pumps and pipes, collectively, even though the licence and the official responsibility towards the administration rest with one individual.41 Partnership and sharecropping has become the key to

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41 Each diesel pump requires a licence to remove water from the Nile. To the administration, the licence holder is also responsible for the taxation of the irrigated area. The licence and tax are in his name, “bi ismî”, which is irrelevant for the true ownership of the engine as it fails to reflect who really pays those taxes internally. According to popular opinion, the administration is doing well by maintaining such ignorance regarding the internal conditions of a sâqiya, rather than getting involved in those internal complexities.
understanding the irrigation economy, as they were in the days of the ox-powered sâqiya. While technological change has led to social upheavals and interest-driven conflicts during the process of technological appropriation, the peasants eventually incorporated the diesel engine into their irrigation economy in place of the ox-powered sâqiya, without breaking the established social division of labour. After being the object of heated debate for some time, the taddân contract, tangible expression of that division of labour, has regained its egalitarian implications and thus its moral legitimacy.

“After the first motor, there was no stopping, anyone who had stopped would have perished,” comments Shaikh Mahjûb on the process and thus puts his finger on the complex of facts known as the “technological treadmill” in rural sociology. As soon as a superior technology has established itself, even its opponents cannot resist any longer. Even peasants who considered their needs covered by the ox-powered sâqiya for a few more years were eventually sucked into the maelstrom of innovation. In 1975, even Muhammadâni on his island had to accept that the standards had changed and closed down his ox-drawn sâqiya.

But this merely explains the reasons for the technological appropriation and does not elucidate the particular mode of social incorporation of the new technology, since the diesel motor could have been incorporated into the social organisation of the irrigation economy in alternative ways. For example, the peasants could simply have resigned themselves to having their water provided by an entrepreneur, granting him his share of the harvest. In fact, during the technological upheavals of the 1960s and 1970s, that appeared to be the most likely development. But such an outcome did obviously not accord with the moral convictions of the peasants as to the just division of the fruits of their labour and was thus not enforceable. Innovation had to be worked out in a techno-political process. This is what I call domestication.

During the course of little over two decades, the handful of diesel motors of the late 1960s became the 1000 diesel motors watering about 6000 faddân of winter crops in the winter of 1990/91. Thus, a diesel motor irrigated six faddân on average. The largest by far in 1990/91, with an 8-inch pump, irrigated 45 faddân and belonged to 15 partners; in the most common class of the 2-inch pumps, some motors only watered 1.5 or 2 faddân.

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42 The expression “technological treadmill” goes back to the American rural sociologist Willard Cochrane (1958). It implies that early innovators can skim a considerable innovation dividend. As a result, more and more others adopt the innovation. The innovation increasingly becomes the standard and those who resist it soon find themselves in low-yielding technological backwater. Hence the pressure to accept the innovation or to perish. At the same time, the innovators are already hunting for new yield-increasing innovations to produce a new innovation dividend for them, an endless race, but as regards the increase of incomes, also an eternal cycle. The peasants of Northern Sudan have their own term for this process, sâqiyaat Jiha, the sâqiya of Jiha. Jiha is a joker of northern Sudanese legend. His sâqiya moves water like any sâqiya, but instead of using that water, Jiha channels it back into the river.

43 According to information supplied by the agricultural administration, Shîrrî Council (04/09/1991), in the winter of 1990/91, 993 diesel motors operated to irrigate a total area of 6083 faddân. The motors nearly exclusively powered pumps with a diameter of 2 inches. Only three larger projects owned pumps with a diameter of 3 inches and more. The number of motors does not include the subsidiary motors, naqqâl, that bring water to the main engine in sâqiyas that are especially difficult to irrigate. In addition, there were perhaps 50 or 60 diesel engines powering grain mills, as well as a few used to fill water tanks and occasionally generate electricity.
During the 1990s, the Manâsîr had returned to the scale of the ox-powered sâqiya. Involution with its implicit mechanism to let as many as possible participate in limited resources, had closed in on them once again.

On the one hand, this means that during the course of technological change, nobody succeeded in gaining a disproportionate share of social wealth at the expense of others. On the other hand, this means that the motors are severely underused and thus do not work economically, another feature of agricultural involution. This is not just the view of the Agricultural Extension Service, whose representatives argue that a common diesel motor with a 2-inch pump is working below capacity at less than 20 faddân of irrigated terrain.\(^{44}\) The peasants themselves are also fully aware of this. While they argue that their motors are “tired” and work less well than new ones, and that their banks are steep, they evidently know that the motors are idle most of the time and would have the capacity to irrigate considerably larger areas. A stereotypical saying in this context is: “Ashân al-wâhid ma yibqâ faqî akhûhu – So that nobody can rise above his neighbour.”

What became of the pioneering entrepreneurs? In 1995, ad-Dasûkî continues his tale: “Yes, it is still the same motor [laughs], but then, it isn’t. It is muwallad [bastardised], there are so many different parts built into it that it cannot be the same motor. But it still works like on the first day.” Ad-Dasûkî and his 17 siblings had inherited the motor; he shared its administration with his brother Ibrâhîm. In the early 1990s, the motor irrigated only the sâqiya Wad Īsā. On the other sâqiyas that had initially been irrigated by Muhammad Ahmad’s motor, the peasants had installed their own. The land of the sâqiya Wad Īsā was worked by the heirs of the original owners: The three original parts of ad-Dasûkî’s grandfather al-Fakî are worked by ad-Dasûkî’s cousin Ahmad, three peasants are installed on the three parts of one of the original partners of ad-Dasûkî’s grandfather, Mustafâ ‘Awwad as-Sîd, and four peasants, the Hamzâb, on six parts of the original second partner.\(^{45}\)

But compared to the 1960s, the relationship between the partners has changed substantially. Whereas Ibrâhîm can say about the tarâbla of that time: “They complained, but what could they do?”, as they depended on the irrigation water, it is now his and ad-Dasûkî’s turn to complain as the owners of the motor, unable to hold sway without accords and consensus. “When the Hamzâb don’t work, I can speak to them, but I have to speak calmly: Make an effort! Keep your channel in order! Keep your grain clean! The other peasants have harvested so much and you only so much. Use more fertiliser! But if I pressurise them, they will simply say: Keep your water! We get our water elsewhere. Or: We install a motor of our own. Or: We leave our land fallow.” Ad-Dasûkî has to address his partners “softly”; he has to negotiate with them, because the presence of so many motors has broken up the monopoly that his father and uncle still enjoyed. “Last summer, we did not want to cultivate, only some vegetables and the palm trees. The diesel got too expensive for us, just available from the black market. [...] But the tarâbla wanted to cultivate, after all they do not pay for the diesel. We were worried that the tarâbla would finally look for a different motor. Thus, we agreed to irrigate two thirds.”\(^{46}\) One day, ad-Dasûkî will speak too loud,

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\(^{44}\) Group interview in the Regional Ministry of Agriculture, Ed-Damer (25/08/1991), presided by Ibrâhîm Ahmad  ḤAb al-Latif, Deputy Director, Ministry of Agriculture.

\(^{45}\) Remember, every sâqiya consists of 12 parts.

\(^{46}\) Ad-Dasûkî Hassan al-Fakî, Shîrrî (14/07/1995).
and the Hamzâb will install a motor of their own to water their eight faddân independently, as other peasants have done before them – “so that nobody can rise above his neighbour”.

13. The new foundations of irrigation economy

When Muhammad Ahmad al-Fakî stood in his courtyard, contemplating the motor in its box, even in his wildest dreams he probably never imagined the ground-breaking upheavals and debates that it’s unpacking and installation would trigger across Manâsîr country. The motor had revolutionary potential, akin to what Friedrich Engels had suggested for the steam engine. The Manâsîr are quite justified when, in their memories, they repeatedly link the motor with revolts, coups and revolutions in Sudanese history, even with independence, definitely appreciating it as an indicator of a new era. The diesel motor has become a driving force in every sense of the term; through it the peasants have accepted a link with the industrial world – but without abandoning their own visions of society.

In any case, since the 1970s, the diesel motor has become the industrious heart of irrigation-based agriculture. Compared with the thin trickle that the yoked oxen produced in monotonous toil in the sâqiya, the diesel pump provides “a flood”. This enabled the peasants to enlarge the range of their cultivated areas immensely, as now also those soils that were marginal or unreachable under the sâqiya regime, those whose “water was too heavy”, could be brought under cultivation. And it was on those soils that a large proportion of the demographic growth could be accommodated.

Abdalla Abû Qurûn remembers how thinly his island was populated under the ox-powered sâqiya: “When I started travelling [began to be a migrant worker], there were five sâqiyas here on Araj [island] – each with three or four families on it. On the western bank between Mushra Albil and Kirbakân only four. And today, look: [counts, adding up lines in the dust] 16 motor pumps on Araj alone and on the west bank 14! [...] People used to sit in the uplands and eat kauraib [grass seeds, especially Panicum turgidum]. Below, they cultivated their jarf. [...] The men were away as migrant labourers, only the women and children were here and those who owned a sâqiya with cows.”

According to Abdalla’s count, there were a total of 120, at most 150 people in Araj and opposite along the west bank during the late 1930s. When Abdalla recounted this in 1995, 1065 people lived here on about 220 faddân of irrigated land and there was not an inch of non-irrigated land on the banks of the island or the western bank.

The diesel pump did not just enable the expansion of the agricultural area by colonising new soils; it also permitted the intensification of cultivation and the introduction of new food plants. Under the ox-powered sâqiya, grain was often half starved of water, leading to accordingly low yields. Under the diesel pump with its “flood”, a sufficient water supply for the grain became far less problematic. Furthermore, this opened up the possibility of cultivating more demanding crops, for example by abandoning the all-tolerant barley in favour of the more popular wheat in winter, and by adopting high-yielding varieties from

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47 Abdalla Abû Qurûn, Araj (10/07/1995).
the repertoire of the Green Revolution. High-yielding wheat of the Giza family like Giza 155, Candor, Dibaira, Schnapp, and Takamul will produce a harvest even with insufficient water supply, but sufficient watering allows them to reach their full potential – higher yields and shorter maturation periods. The possibility of irrigating areas at higher elevation by motor pump also facilitated the peasants in deciding to plant locations near the river – hitherto the most important grain-growing areas – with date palms. Before, palms were only grown along the main channels and on the immediate waterfront, known as asha (see also Haberlah, this volume), where after a few years of irrigation they could expand their roots down to the water table. After the expansion of grain cultivation onto higher elevations, the peasants planted date groves on former grain areas and used their half-shade to grow fodder plants like birsīm (clover), with growing shade also lūba, the irrigation water for which also nourished the young palm trees. Prior to the Hamdab Dam flooding, the expansion of date growing had been the dominant visual feature of the landscape. The scattered tops of old palm trees rose over the dense coastal strip of palm trees aged thirty years or less, thus providing a living witness of technological change.

The most striking result of the motorisation of irrigation, however, was undoubtedly the abandonment of cattle raising. In the early 20th century, there were 770 heads of cattle per 430 faddān of agricultural soil in Dār al-Manāsir i.e., just over one team per two faddān, after deducting the calves. In the 1990s, there were only about 50 heads of cattle per 10,000 faddān. In contrast, the number of sheep had undergone a veritable explosion. At the beginning of motorisation, the farmers cautiously clung to their cattle; in many cases the sale of the teams may have helped to finance the motors. But with the increasing transition to sheep keeping, a return to the ox-powered sâqiya was soon rendered impossible. Sheep and goats are much more adequate for the small plots and the extreme seasonal fluctuations of fodder supply in irrigation-based agriculture than are cattle, whose food supply had been a constant problem for peasants during the sâqiya regime. In the early 1990s, on average over 20 % of the peasants’ incomes were derived from the keeping of goats and especially sheep.49

But the abandonment of cattle husbandry also meant that of the plough. Paradoxically from an evolutionary perspective, the motorisation of irrigation led to the result that the tilling of the soil began to revert to complete dependence on the peasants’ muscles. The use of oxen to pull the plough (mihrāt) and even more importantly the levelling tool (wasūq) was never fully abandoned, but reduced drastically.

A further result from the abandonment of cattle was the absence of cattle dung. Dung as fertiliser (kaffān), however, is indispensable to maintain soil fertility where one crop follows the other in quick succession; especially the newly colonised higher areas needed large amounts of it for many years to build up their fertility. Although the droppings of goats and sheep provided a replacement to some extent, the soils additionally required what the peasants call “salt” (milīh), mineral fertiliser. During the more limited cultivation of the sâqiya era, this was provided as maraqa, the “salty” upland earth scraped up by the peasants and carried down to the irrigated areas. When the peasants first used industrially produced mineral fertiliser, they saw the difference between barely fertilised and fully supplied soils: “When the artificial fertiliser arrived, we cultivated in al-Harāz. [...] I planted 1/8 [of

16 faddān] and harvested 16 sacks [of wheat]! What a difference! You would scrape and scrape the marauq, and carry and carry it, but it was never enough.” Marauq has now been abandoned fully, but the peasants still consider dung as indispensable besides artificial fertiliser for the long-term development of a soil. However, dung also introduces the seeds of weeds to the planting beds and is therefore not suitable for certain crops. These include the extremely slow-growing shammâr (cumin), which will not survive competition with weeds. In the 1980s, shammâr became the most important export besides dates, but its cultivation only became viable once artificial fertiliser was already established.

The peasants tend to regard the changes brought on by the “motor era” as aspects of progress. They may remember the heroic days of timber rafting, the self-sufficiency of the sâqiya and the fine bulls with a certain nostalgia, but by the 1990s, the notion of actually running an ox-powered sâqiya would only raise sympathetic laughter.

Thus, one radical innovation, the diesel engine, prepared the ground on which others, minor ones, could grow, a veritable transformation of the agricultural foundations of peasant life. During that transformation, the social structure, and most centrally the question how the fruits of labour were to be distributed and appropriated, was the subject of serious debate. Throughout the 1970s, it had remained open how these conflicts would be resolved. When the pioneers installed their motors, nobody could have predicted that the irrigation agriculture would remain egalitarian, based on small plots and organised by consensus. In fact, experts’ prognoses for peasant agriculture had ranged from capitalist or centralised development to impoverishment and doom, as we have seen.


14. Partnership and participation

These are changes that belong to the innermost technological circle of agriculture, a technical revolution that profoundly transformed a centuries-old agricultural system within two decades. Beyond that inner circle of technological change, however, lies an outer circle that is best described as a breakthrough into the broader society, now aiming to participate in the process of modernisation. The diesel motor broke up the closed farming economy, or at least its relative closeness, as the image should not be overstressed. Migrant work had already drawn the young men away for a long time; rafting had provided the wood for the sâqiya from the lower Atbara area; the market at Karima in the Shaiqiyya area had provided tea, sugar and clothing; many of the calves and oxen for the sâqiya were not raised locally, but brought from the cattle market at Tanqasi; and the administration had influenced the peasants’ lives. But all these contacts could be negotiated through the train station at al-Kâb and the darb as-sultân, the Royal Road, constructed in 1907 on government order, in the context of the first cadastral survey. Initially, it ran above the fields, from hamlet to hamlet, but by the 1990s it cut straight through the irrigated fields – in itself a historical witness to agrarian expansion. The government inspector would travel along the darb as-sultân by camel, visit the shaikhs and the ‘umda, the tribal leader of the Manâsîr, and inspect the fields. The ‘umda collected the taxes and presided over his law-court. The peasants would walk, use camel or donkey for transporting goods, or travel by boat on the river. The first motors were still brought by railway to the station of al-Kâb, whence they continued by row-boat, or they were unloaded from trucks at the border of Shaiqiyya land and then towed upriver. To provide diesel, Shell opened an agency at the al-Kâb train station, and the ferrymen shipped the barrels to the motors; if they did not possess a boat, then still a rare commodity, the peasants would let the barrels float and walk alongside them on the shore. If the barrels were caught in an eddy, they would wade in to swim and dislodge them. Today’s Manâsîr describe the Manâsîr of those days as muqaffalîn, “secluded”. This is more than a topographical description, as muqaffâl is also the linguistic equivalent of “narrow-minded”.

This situation of isolation changed during the 1970s, the period when the Manâsîr entered the wider world. In 1969, after the Coup by the Free Officers around Nimairi, a socialist government had risen to power; in 1971 it conducted an administrative reform (al-hukum ash-sha‘âbi al-mahallî, People’s Local Government Act) directed against the institutions of the old Native Administration from the colonial era. Abdalla Abû Qurûn, descendent of the Hammadtûyâb saints, describes a complex causal connection between the ‘bloom’ of his island of Araj and the developments in broader society. “[...] When al-hukum ash-sha‘âbi al-mahallî came, we opened the road for cars, and after that the land began to flourish. The land began to flourish, we were connected!”51 All over Sudan, Rural Councils and People’s Courts were instituted. Previously, administration and judicial matters had been under the control of tribal leaders. In Manâsîr country, al-hukum ash-sha‘âbi al-mahallî meant the transfer of power to a bourgeois-peasant elite, especially the teachers. In 1971 the ‘umda was disempowered, a new law court was constituted from

members of the aforementioned elite, and the same circle of individuals also took over power in the Rural Council, the new administrative organ of Manâsîr country. Thus, a group of able organisers, seeking contact with the outside world, had risen to influence and power. In 1972 and 1973 secondary schools were built and opened near the train station at al-Kâb and on Shirrî island. In 1973, the Rural Council building on Shirrî was inaugurated, and in 1974, the major road-building project on the western bank, as mentioned by Abdalla Abû Qurûn, was undertaken. The Manâsîr organised themselves according to ‘auni dhâtî (self-help) and initiated a whole series of infrastructural measures, including some that only came to fruition in the 1980s, e.g. the telephone connection (1985) and the river ferry near Shirrî (1989).

Ahmad al-Hasan, one of the peasant-organisers, recounts how the Manâsîr opened the road to the outside world: “In 1963 I bought a sifinja [Bedford truck] for 2700 SDP. I was in Kassala then. I worked in Kassala. When I came back, I brought the truck with me. Many here owned a share in it. [...] The truck served the route from Shirrî to the train station at al-Kâb, a ticket cost a quarter piaster. Then we applied at Athbara [at the railway administration], that Dakhfalî be opened for us. [...] There were two trains per week, and we had two trips per train, one for goods and one for people, during the date season three. [...] And then we opened the direct road to Athbara through the uplands. Everyone helped! [...] Yes, all by hand, with picks! And the rocks we smashed with hammers. We took supplies from the river and worked on and on. At night we made camp in the desert. If we came to work near shepherds, they would slaughter animals for us. It went on like this until we reached the road [between Athbara and Shaqiyya country]. In 1974/5 we opened the road along the western bank. Wad Dafâ’alla from Amri with his truck had already opened the route as far as Kîrbâkân. We worked our way from Kîrbakân to Umm Safâyâ, the whole stretch up to the edge of Dâr al-Manâsîr. We marked subsections, and the people of an area would work on their stretch, then the next and so on. [...] Only the people of as-Silaimâniya and of Ùs remained aloof. So we bypassed them and moved the track upland away from the river.”

Like the pioneer of the motor, Muhammad Ahmad al-Fâkî, Ahmad al-Hasan belongs to the bourgeoisie of Shirrî. He was president of the Village Council, assessor at the People’s Court and financial secretary of the Rural Council. In the 1990s, he was respectfully referred to as za’im ahlû (leader of his people). Even his political opponents spoke of him with respect. He broke open the isolation of the land behind the cataracts. Fatahnâ, “we opened”, is the term used for the opening of tracks, but the term also means “to conquer”.

From road-building, via the construction of schools, hospitals, the Rural Council building, the ferry pier and of the many 1990s mosques, the peasants achieved it all with their own hands and their own means – but most of all by their own will and by cooperation. The peasants’ efforts for modernisation often met the disinterest or even opposition of state

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52 Dakhfalî lies by the railway, some 10 kms in the desert north of Shirrî. Since the construction of the railway around the turn of the 20th century, it had been a waypost, in the early 1970s, it was upgraded for loading goods. For the inhabitants of Shirrî, Dakhfalî was closer than al-Kâb, but their real reason for preferring it was the traditional rivalry between al-Kâb, which had for long seen itself as the gateway to the world, and Shirrî, especially between the resident merchants, competing for the export and import business from and to Dâr al-Manâsîr.

planners who rejected long-term investments in an area that might be flooded anyway. On the other hand it was owed to state initiative that an administrative reform disbanded the Native Administration, that an agricultural bank was instituted (Beck 1997), that schools were opened. But those initiatives did not determine how peasants made use of them locally, what they accepted and what they rejected, and which opportunities they adapted for their own use. In this context, nothing could be more wrong that to relate the history of modernisation in Manâsîr country as a tale of state penetration or exogenous modernisation. The idea itself implies some modernisation agency’s external perspective on the peasants.

When the Manâsîr tell their own story, it tends to consist in an organised effort to self-opening, a story of the active appropriation, if not conquest, of the outside world, a self-modernisation according to their own conditions. It is not a coincidence that the metaphor of the road holds a central place. Isolation is overcome, the road is “opened”, Ahmad al-Hasan “blazed a trail”. The second striking aspect of their grand tale, already stressed by Abû Qurûn, the Hamadtûyâbî, in his epic of the collective appropriation of the motor, is the role of organisers and of common effort: “everyone helped”, “a leader of his people”, who encouraged the more pessimistic and fearful neighbours to collective action.

In the small-scale and interdependent world of the Nile valley peasants, cooperation is the key to success. At local scale, the obstruction of a single individual could paralyse an entire sâqiya, and the large self-help projects could only be achieved by common effort. For this, ittifâqiya, accord, is necessary. But not many things are less likely in a world of land shortage with its many petty disputes on inheritance and property. All are aware of this and the peasants fear nothing more than the small conflicts that arise from envy or injustice which can act like dynamite in their narrow world if left unmediated. Fitna, discord, and fartaqa, secession, that which ad-Dasûkî fears when speaking to his peasants “too loudly”, can spell the failure of any endeavour. Everyone has a story with this moral to tell from own experience, but will not do so happily, as that already risks to conjure up the spirit of discord. It is not by accident that the historical tales always stress cooperation and the achievement of the organiser who has bestowed unity and cooperation.

15. Hopes drowned

In this context, I would argue that the historical experience of the diesel motor’s introduction is also the source of a consciousness of the possibility for successful collaborative action. That fact that the motor stands for the expansion of the farming economy and that it is inextricably linked with the step into the wider world, makes it possible to throw it into debate as a symbol of progress. The motor is tangible proof that through common action, agreement and cooperation, the peasants’ overall “cake” can be made bigger, so that eventually everyone will profit from the collaborative effort. In a way, this is the counter-argument to the selfish orientation of rivalry among the peasants – which flows from the realities of the endless petty land and inheritance disputes of minutely parcelled out

54 On property law, ownership conflict and land shortage, see Salih 1999.
agriculture. In contrast, the historical consciousness of the successful introduction of diesel technology provides the frame of reference for an optimistic orientation along shared endeavours, leading to success through ittifâqiya. Without this orientation – by no means uncontested, but certainly real – among the peasants, the organisation of cooperatives, the shared acquisition of a truck or tractor, the mobilisation necessary to reach a long-term communal goal, such as the building of a hospital, would be unthinkable. The motor is the basis for a discursive context that can be used again and again in counterbalance to the orientation arising from land shortage, according to which one person’s advantage must necessarily be the disadvantage of others. This, too, represents the path-dependency of technological history, since the path of technical change is plastered with socio-technological experiences and technology’s own body is made in cultural forms.

During the 1990s, some major cooperative projects that would have been beyond anyone’s wildest imagination in the 1970s came into existence. The land in the immediate floodplain of the Nile was by now fully cultivated, further expansion was prevented by the bare rock. The sâqiya had irrigated the coastal strip, but the diesel motor irrigated the entire floodplain. Some communities of peasants had begun to use truck engines to water upland valleys, former riverbeds and arable land beyond the rocks i.e., areas outside the reach of the common small diesel motors. The new scale of engines also called for a new scale of cooperation and for technical solutions that far exceeded the technology of the small diesel motors. Everywhere, from al-Firsîb near Birtî to Umm Safâyâ at the other extremity of Manâsîr country, farming communities experimented with such new scales. Some of those large projects were already prospering, others were at experimental stage and further ones, such as al-Hawîla, which was to rewater an old riverbed that forked off the Nile near al-Kâb and only rejoined it near Shirri, were still dreams.

And all that, a landscape created by struggle and vision, by the work and hopes of generations, was submerged during the few dramatic weeks in the autumn and winter of 2008/09, that have been so aptly described by Hänsch (this volume). Drowned along with it were many hopes. Many of the peasant families have resigned themselves into migration to the government’s resettlement schemes. But there are those – the majority, as far as I can see – who do not choose the easy path to the promises of somebody else’s modernity, but cling tenaciously to their rocks, not giving up their hopes to recreate their self-determined lifestyle and to participate in modernity according to their own vision of society.

55 About the notion, common to peasant societies, that the good things are limited and therefore the benefit of one must be the loss of another, see Foster 1965.
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