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Kerio Valley, 1973–2013: A case study of Kenyan smallholder agriculture

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ABSTRACT

This article examines changes during the last 40 years in a smallholder irrigation-farming community in Elgeyo-Marakwet County, Kenya. Agricultural productivity has increased thanks to improved seeds and the practice of adding manure and crop residues to fields, a very rare occurrence in the 1970s. People's range of assets, housing conditions and communications have also improved. Development agencies have had limited impact on these developments, particularly in comparison with their ambitious plans for a radical transformation of the study area. Increased yields and improved living conditions are attributed to local initiatives rather than to external interventions.

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In Kenya smallholders are responsible for 75 per cent of agricultural production and 70 per cent of the national marketed agricultural produce (RoK 2010a). After independence the government of Kenya, as several other governments in sub-Saharan Africa and Asia, launched the so-called Green Revolution with support from international donors. Mechanisation, fertilizers, pesticides and hybrid seeds were expected to generate substantial agricultural growth (Otsuka & Larson 2013; Wiggins 2005). While this programme worked well in Asia, this was not the case in sub-Saharan Africa (Evenson & Gollin 2003; Otsuka & Larson 2013; Toenniessen, Adesina & DeVries 2008). International donors lost faith in African governments' commitment to development and required as a condition for continued loans that they implement the so-called structural adjustment programmes, which presupposed market liberalisation, and cut backs on public spending, which affected inter alia agricultural extension. The market panacea did not materialise as poor roads and market infrastructures inhibited rapid growth of the agricultural sector (Diao, Hazell, Resnick & Thurlow 2007). Investments in agriculture steadily declined, which resulted in a decrease in mechanised agriculture and in reduced funding for extension services (RoK 2004). Eventually the government of Kenya decided to turn page and in 2003 signed the Maputo agreement where 53 African heads of state agreed to invest 10 per cent of national budgets in agriculture by 2008. That year Kenya was investing 4.5 per cent of its national budget in agriculture (RoK 2010a). In 2004 the government had announced a Strategy for Revitalising Agriculture (SRA), which proposed a radical reform of the sector. Expectations were high and Kenya's international development partners promised support for the plans. An

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assessment eight years later showed that little had changed (Poulton & Kanyinga 2014). The growth rate for agriculture during the 2000s has been significantly lower than for the country's economy generally, occasionally even negative. National food security was unsatisfactory with the number of Kenyans requiring food assistance by 2010 reaching 3.8 million (RoK 2010b). Almost half the rural population fall below the rural poverty line (IFAD 2016: 138, 140). The rate in Marakwet is considerably higher, at 66.5 per cent (KOD 2015).

In 2006 the Bill and Melinda Gates and the Rockefeller foundations initiated the Alliance for a Green Revolution in Africa, which provides agricultural inputs and works with soil issues and improved market outlets, among other things.¹ Another recent attempt for massive international investment in African agriculture was launched in 2012 with the New Alliance for Food Security and Nutrition. A group of eight countries, 21 African and 27 multinational companies have committed themselves to lift 50-million people in Africa out of poverty by 2022. A sceptical discussion focused on both motives and feasibility is emerging (Moseley, Schnurr & Bezner Kerr 2015).

Against such calls for major investments to boost African agriculture, this article outlines changes that have taken place in Sibou village, situated in the Kerio Valley, Elgeyo-Marakwet County, Kenya, during the last 40 years. Has agricultural productivity increased? Has market access improved? What impact has external intervention had on people's livelihoods? In short, has life improved for people in the area?

Data for the study was collected by Wilhelm Östberg between 1973 and 1975 with follow-up visits in 1976, 1984, 1998, 2000 and 2013, and by Martina Angela Caretta between 2011 and 2013 and a follow-up visit in 2015. Östberg's main fieldwork was based in the highland parts of Marakwet but agricultural surveys were carried out in Sibou with a 10 per cent random sample of households, in addition to a large number of semi-structured interviews on clan histories, irrigation management, community relations and traditions as well as participant observation during intermittent visits to the area (Östberg 2015). Caretta conducted focus group sessions with roughly 100 farmers and repeated in-depth interviews with over 50 farmers, both men and women. The focus groups were selected to cater for variations in age, gender and occupation. All participants were active farmers. Four formal groups were also interviewed: the local water management committee, two women's groups, and a women's saving group (Caretta 2015, 2016; Caretta & Vacchelli 2015). Although our data was not originally gathered with the intent of being directly comparable, the material shares a common focus on agricultural practices and livelihoods. This is, therefore, one of rather few long-term studies of small-scale farming in East Africa.

After introducing the community under study and the surrounding area, we analyse how settlement patterns, farming practices, and the local economy more generally have developed. External development interventions are also introduced. The article provides insights into the drivers behind (relative) long-term change in rural Africa, but its primary aim is to describe how the study area has changed, and not changed, over a 40-year period.

Study site

The data for this article comes from Sibou, located near Tot, a small administrative and commercial centre in the Kerio Valley. The closest town, Eldoret, is situated half a day's drive away, along poor roads.

Figure 1. The study area around Tot centre and the different ecological zones (map by Stefan Ene and Pontus Hennerdal 2014).

Tot was founded c. 1949 as a tax collection point along the road through the Kerio Valley. Gradually the settlement acquired a chief's office, a few shops, a school, a police station, a government rest house, and a Catholic Church (Dietz, Van Haastrecht & Moore 1987; Moore 1986). In the mid-1970s the trading centres in the valley remained small and sleepy with few commodities to buy. Today Tot centre has grown into two rows of shops including tea and food vendors, a bar, a mechanic, two stores selling fuel, two seamstresses, two agricultural supplies stores, and a handicraft shop. There are also two secondary schools in the area and a health centre. In 2011 Tot centre became connected to the national electricity grid.

The valley was not served by public transport in the 1970s, and the number of traders who came from the urban centres to buy farm produce was small. Things have changed: today a daily *matatu* (a taxi carrying about a dozen people) connects Tot with Eldoret town. Numerous motorcycles ferry people between the different small centres in the valley.

Despite these new services the road remains a problem, needing constant maintenance during the rainy season. An all-weather road from Tot has been perennial election promise from politicians and is listed in the County Integrated Development Plan 2013–2017, but is yet to happen.

Virtually all adults in Tot have a cell phone connected to the money transfer system *M-Pesa* (see Morawczynski 2009) and two branch offices are available in Tot. The mobile phones ease everyday activities and shopkeepers in Tot can order products from Eldoret and have them shipped the same day through the *matatu* service. *M-pesa* has also enabled farmers to be paid directly, a major advantage compared to when agricultural produce were sold through cooperatives and the Kenya Farmers' Association, and took months to be paid, or farmers were not paid at all as the money had disappeared along the way.

The village

Sibou extends along the slopes of the Elgeyo escarpment from about 2,200 metres above sea level down to the Kerio River at about 1,000 metres above sea level. The last census

counted 2,453 people living in 660 households (KNBS 2010), more than twice the number of households that lived here in the 1980s (Moore 1986: 30). The population figures for the area have over the years fluctuated considerably following political unrest, out-migration to settlement areas in the highlands, and in-migration associated with expected development initiatives in the area (Cappon, Van den Goorbergh, Mwangi & Saina 1985: 32–9; Dietz et al 1987: 37–41).

In the mid-1970s people lived on the slopes of the escarpment, in homesteads, which typically consisted of two round thatched houses facing each other, and grain stores. If the household consisted of more than one wife, or if an adult son or a relative lived in the compound, extra houses were built behind one of the houses or adjacent to the compound. Very few villagers lived in rectangular houses, but these were standard in the trading centres along the valley road. A count in 1980/81 registered only three newly constructed rectangular houses in Sibou, which at the time consisted of 288 households (Moore 1986: 30, 132). Housing conditions in Sibou have changed considerably in the last 40 years. Currently (at the time of writing, 2015) half of the houses have a rectangular shape, and are equipped with a metal roof. The furniture in the houses in the mid-1970s was simple: sleeping skins, a couple of stools, clay and aluminium pots, gourds, skin bags, enamel cups, plates and bowls (but also eating skins). Some households had a radio, bed and mattress, a table and chairs. Today a number of salaried people have equipped their houses with solar panels to get light to their houses at night and they cook with gas. Moreover, they can get an extra income by charging their neighbours' cell phones. Some have TV sets, armchairs, sofas and decorative posters with Christian motives.

Living conditions have therefore improved, and more opportunities and services are available.

The period between our data collections in the 1970s and in the 2010s was characterised by extensive raiding between 1975 and 1977 and throughout the 1990s. Brutal attacks on villages, especially in the late 1990s, forced the Marakwet to abandon their cultivations on the valley floor, and to retreat into the hills. Schools and health facilities in the valley closed. Trade came to a standstill. Large numbers of animals were lost, and people became dependant on relatives living in the highlands, or on food from relief agencies (Greiner 2013). Peace was restored in 2002 and people returned and started cultivating the lower slopes of the escarpment. Eventually irrigated fields were re-opened on the valley floor. Life returned to normal with surprising speed and confidence.

Farming in Sibou

Temperatures and evapotranspiration rates are high, which means that growing even reasonably drought tolerant crops like finger millet and sorghum without supplementary irrigation is a high-risk undertaking. Farming in the Kerio Valley depends on an extensive system of irrigation canals leading water down the steep escarpment to the cultivated fields on the valley floor. Along a stretch of about 40 kilometres of the escarpment, there are 91 main canals totalling 315 kilometres (Davies, Kipruto & Moore 2014: 492). When all branches are added the total length may be around 3,000 kilometres (Davies et al 2014: 521). Several accounts describing various aspects of this spectacular indigenous irrigation system are available (for references see Davies et al 2014; Östberg 2014).

Figure 2. (a) A homestead in 1973. The wife's house, with the fireplace, to the left, and the husband's house to the right (photo by Wilhelm Östberg), (b) Housing in 2013. Metal roof and TV antenna (photo by Wilhelm Östberg).

Soils have been described as fertile (Critchley 1979: 4; Dietz et al 1987: 14–6). However, soil analyses in various parts of the agricultural landscape indicate that, apart from adequate levels of potassium, primary nutrients (phosphorous and nitrogen) are in low supply. On the other hand, secondary nutrients (calcium, magnesium), as well as sodium and micronutrients, reach adequate levels (Caretta, Westerberg, Börjeson & Östberg 2015: 23–5). Caution has been raised that 'this landscape system is successful because of irrigation and both small-scale and shifting agricultural practices, not because the ferallitic soils present are especially fertile in their own right' (French 2014).

Figure 3. Droughts and bumper harvests 1984–2010 (source: Caretta’s field notes 2012).

A study of rainfall statistics in Chesongoch (8 kilometres south of Tot) covering the years 1972 and 1986 showed that 9 out of 15 years would have been a crop failure if supplementary irrigation was not available (Dietz et al 1987: 21). Without exception farmers today state that the area has grown drier compared to the 1970s and 1980s. However, no figures are available to substantiate this impression. Severe droughts are remembered in the area, as well as particularly good years.

All farm work was done by hand in the 1970s, as it is today. No farmers in our samples from the 1970s and 2010s ploughed with tractors, or oxen for that matter. Fields are cleared using an axe and a machete, thorns are gathered with large wooden forks and burnt in the fields. Some are used for fencing. Finger millet and sorghum are sown by broadcasting, and women hoe the seed using a short hafted and acutely angled hoe. Women use the same implement when they weed the crop. In the 1970s men irrigated the land by moving water with the help of long shafted hoes to all corners of the field. Today women have also taken on this activity, while the work on the canals remains a male preoccupation (Adams, Watson & Mutiso 1997; Caretta & Börjeson 2015; Östberg 2014).

Very little money was used for the farming process in the 1970s, but it frequently entered into transactions of irrigation water. Among the households interviewed in 1974 none paid cash for farm labour. They invited help from neighbours for land preparation, weeding and harvesting and remunerated them with local beer and/or food. All households except three used work parties – *sukōōm* – at least three times during the cultivation year. The number of participants varied between 4 and 40 people, the mean number being 16, and the median 20. In addition to *sukōōm*, all families except one cooperated with neighbours by ‘exchanging hands’ – *ēēruun* – whereby the husband and wife, or wives, helped a neighbour with farm work and received similar services in return. The exchange could also involve three or four neighbours. However, this was soon to change. A survey among 30 households carried out in Sibou in 1983 reported 13 households receiving remittances from household members working outside and six other households had incomes from local casual work (Dietz et al 1987: 55) – new opportunities to employ people for farm work had appeared, and half the households had hired casuals (Dietz et al 1987: 55). In a 2008 survey carried out among 230 households in Tot division, 13 per cent gave business activities as their main occupation while 6.5 per cent earned incomes from government work (Kipkorir & Kareithi 2013: 15). While these three surveys are not directly comparable, it is nevertheless clear that the subsistence economy had become more market-oriented. While *sukōōm* and *ēēruun* continue to be widespread it is also common today to hire day labourers to farm the land.

Thus, the same farm implements are used today as 40 years ago, access to land is acquired in the same way as in the 1970s, and labour organisation follows the same pattern – although paying for farm work has become much more common.

The three zones-pattern

Farmers in Sibou make use of three very different ecologies, with corresponding differences in cultivation practices (Moore 1986: 15, 26), which we briefly examine in the following subsections.

Keew, the valley floor

At the base of the escarpment there are semi-permanent fields cultivated by individual households (Davies et al 2014: 515–6), which give way further out on the valley floor to communally held land. Every two to three years, at the outset of the cultivation season, a group of (male) kinsmen agree on cultivating a particular area of the communal land in the valley, clear and fence it jointly, and take water to the land (Adams et al 1997). Internally these large fields are divided between the participating lineages, or age-groups, if the land is located at the far eastern part of the village land close to the Kerio River. The shifting cultivation of the valley floor is thus also ‘shifting irrigation’. Margaret, a woman in her sixties, expressed it as: ‘the lineage will take the water with itself’ (Caretta field notes 2013).

In 1974 sorghum and finger millet was grown on the communally controlled and irrigated land on the valley floor, each household using on average slightly above two acres. In addition to this plot 75 per cent of the households interviewed cultivated another individually controlled field at the foot of the escarpment. Here they could benefit from a higher water table and extra opportunities for irrigation as the fields were close to the main canals. A wide variety of crops were grown in these fields – finger millet, cassava, sweet potatoes, groundnuts, tomatoes, sugar cane, cabbage, maize, onions, beans, peas – but any single household rarely grew more than five of these at most; cassava always being one of them. Forty per cent also grew permanent crops in these fields; all had bananas, most grew pawpaw and a third had mango trees. The average size for these fields was an acre and a half. Hence, it was common to have four acres of land in *lakam* and on the valley floor, which is somewhat above other estimates of farm sizes in the area at the time (Critchley 1979: 7; Moore 1986: 15). However, failed rains, pests, sickness and other calamities often resulted in not all fields being fully cropped.

Twenty years later, in the early 1990s, the cropping pattern remained similar (Watson, Adams & Mutiso 1998: 77). Today maize, finger millet and sorghum are the commonly grown crops in irrigated valley fields. The continued importance of millet in the Kerio Valley is somewhat exceptional in Kenya where maize is the predominant crop.

While the majority still live on the slopes of the escarpment to the west (see below) in the last couple of years some families, often younger couples, have moved to the semi-permanent fields of *keew*. For decades the administration has urged people to do this, with little success, but it is now happening. There are advantages with moving down from the escarpment. The fields are no longer two to three hours’ walk away from home, and good sanitary conditions are more easily arranged. The shops at Tot centre are closer as are the schools. The plots are bigger and the soil more fertile. Charcoal can (illegally) be made for which there is a steady market. Settling in *keew* requires more intense fertility management as land becomes permanently cultivated. This is reflected

in the phrase: 'the population is growing, but not the waterways' indicating that intensified cultivation in *keew* has shortened the time for each family's water allocation and consequently increased the need for a more effective use of water resources.

Lakam, the residential area in the hillsides

In the 1970s small quantities of finger millet and vegetables were grown on the slopes of the escarpment to the west. It was rare to add manure to the fields except for tobacco, which less than half the households grew. Some families terraced their fields, to prevent soil erosion. The average holding in this zone was below two acres of land. The crop was not irrigated and if one was late in planting that field was rested for the season. In 1974 this happened to a third of the interviewed farmers.

Today most people live in *lakam*, the residential zone on the lower slopes of the escarpment, but the area looks very different. In the 1970s the compounds were seldom out of sight of each other, and the hillsides gave a barren, stony impression. Today the residential area is both more densely settled and looks greener. Mango trees are common and many

Figure 4. To obstruct soil erosion stone lines are arranged across the slope on hillside fields (photo by Wilhelm Östberg 1984).

residents have planted trees to provide shade and to halt soil erosion, which is common on the steep hillsides.

In 2013 all the farmers interviewed had one or two fields in *lakam*, not necessarily around their home. Residential plots in *lakam* varied between one-quarter and one-third of an acre, and these were often shared between different family members.

Māsoop, the highland zone

Half of the farmers interviewed in 1974 had land in the higher reaches of the escarpment where they grew hybrid maize, and potatoes. Three of the farmers experienced the forest department confiscating their land, claiming they had invaded a forest reserve. This may in fact also have happened (and we believe it did) to some of those who said they did not have land in *māsoop*. It made sense to have upland fields; the growing seasons do not compete, and it had become popular to prepare the staple *ugali* from maize rather than the lowland crops sorghum and finger millet. Maize was both subsistence and a cash crop. In the 1970s farmers were anxious to have fields both in the highlands and in the valley, and ideally to keep a herd of livestock in *māsoop*, away both from tsetse flies and livestock raiders. However, a survey from 1983 indicated that only a few out of 30 interviewed Sibou households cultivated plots in the highlands (Dietz et al 1987: 56).

Nowadays only about 20 Sibou families have plots in *māsoop*. In 2013 the government of Kenya vacated all people cultivating in the forest. The intervention was grounded in the district's environmental action plan, which notes that the forest reserve above Tot is 'heavily settled by invaders. Schools and churches are established at the periphery and inside the forest ... 8 000 ha are degraded' (RoK 2009: 30–1). This conflict between the administration and settlers along the forest edges has been ongoing at least since the 1940s.

Thus, while the three zones of the study area continue to characterise life in the valley, changes can also be noted: the regular interaction between highland and lowland of the 1970s, often manifested by families establishing households in both zones, have become less common, while there is an emerging trend to move down from the slopes of the hills to live permanently on the valley floor.

Agricultural production

The Marakwet have grown finger millet and sorghum for as long as people can remember. First trials with maize in the valley were initiated by the British in 1918, a short stemmed fast maturing variety, which initially did not attract much interest (Critchley 1979: 8). By the mid-1930s maize was still hardly grown (Dietz et al 1987: 82). However, it gained in popularity and in the 1970s most households had a maize field, often growing Coast Composite maize and the sorghum variety Serena (Critchley 1979: 12, 14).

The yields were low to moderate in the 1970s. Finger millet and maize yields reached about 6–800 kg/ha, sorghum a bit less.² Hybrid varieties and additional weeding easily doubled the production. Families counted on getting nine to ten bags of grains to live on for a year. Some families had grains stored, or money saved, as a buffer against bad years, and many could bank on food exchange relationships with highland relatives (Dietz et al 1987: 33).

The colonial agricultural service had introduced beans in the 1930s (Chebet & Dietz 2000: 179). Cassava was promoted in the late 1940s (Critchley 1983: 19; Watson et al 1998: 77) and in the 1970s virtually all families cultivated the crop, providing a valuable back-up if the cereals did not do well, and from the 1980s onwards several new fast-maturing varieties have been introduced.

In the 1970s bananas had long been popular and other introductions were groundnuts, cowpeas, sweet potatoes, sugar cane, chilli pepper and mangoes. None, however, was a commercial success. The markets were too far away, and the road unreliable. Mangoes were of high quality but brought in little cash, and not all households had mango trees. Lowland Marakwet basically remained a subsistence economy.

By 2013 things had changed. Virtually all farmers in Sibou now grow more crops than in the 1970s. Two harvests are taken: one of grains and beans grown between March/April and August/September during the rainy season and one with cowpeas, green gram, black beans, groundnuts, essentially for sale, between October and January taking advantage of the late rains. In addition to growing nitrogen-fixing crops farmers also incorporate leftovers from weeding into the soil, after irrigation. Some add cow and goat manure to the soil and/or ash produced by burning harvest leftovers. Soils on the escarpment are depleted and fertility management is an issue of concern to farmers, which was not the case in the early 1970s.

Grains are mostly for home consumption, as are collard greens. Cassava, bananas, green gram and groundnuts are sold in the neighbouring markets. Most farmers take at least one harvest of cowpeas and groundnuts a year. Some farmers also grow tomatoes and watermelon. The quality is deemed good and traders from Eldoret come with trucks directly to the plots to pick up the produce.

Mangoes, of high quality and much sought after in Eldoret, are taken by traders to Nairobi. Vast extensions of mangoes have been planted in the valley since the 1980s. In Tot division mangoes were grown over 120 hectares in 2001. By 2008 the figure was 280 hectares (Kipkorir & Kareithi 2013: 24). Almost all interviewees report to own mango trees and sell to trucks coming from Eldoret during the harvest season in January and February. The traders provide nets for picking mangoes and for transport to Tot centre where the nets are weighted and farmers paid on the spot. All family members are involved in the harvest. The price is, however, held down by the poor road and not all the harvest being sold.

Davies et al (2014: 517) report a third type of irrigated farming in Marakwet, in addition to the fields of *lagam* and the large farms on the valley floor, based on partial flood recession irrigation around the Embobut and Kerio rivers. It is male farmers, at least as shown by our data, who engage in this, and they grow tomatoes and watermelon in the first place. As the plots lie higher than the river, a generator, pump and pipes are required to water the crops. A group of ten cooperating farmers invested 59,000 KSH (approximately US \$700) in 2013 and could already recover their money when they sold their first harvest of watermelon at 200,000 KSH.

Agricultural productivity in Sibou has increased between 1973 and 2013. The table in Figure 5 (showing farmers' subjective estimates from *keew* and *lakam*) provides a sense of how much agricultural output has increased during the last 40 years, but also how much it can fluctuate season to season depending on weather conditions.

Crop	1974	2010s
Finger Millet	3 sacks	6,5 – 3 sacks
Maize	5 sacks	7-3 sacks
Cassava	Harvested gradually. No figure.	10 – 5,5 sacks
Sorghum	3,5 sacks	8 -4 sacks
Groundnuts	2,5 sacks	6,5 – 3 sacks
Beans		2,7 – 0, 5 sacks

Figure 5. Average output for one acre in 1974 and 2011–13. Farmers’ estimates.

There are several reasons behind the production increase. In the 1970s land was abundant and it paid to save on labour input, with resulting low yields. Crops were often planted late and only weeded once; at the time this was a recurrent complaint among agricultural field staff, and confirmed in our 1974 survey. Since there was no external market for finger millet there was no point extending the fields. A typical remark from valley farmers at the time was that they cultivated ‘for the family, not to sell. It is not like the highlands where people open new lands all the time’.

Today, declining soil fertility on the escarpment has become an issue of concern to many farmers who add manure and crop residues to the soil on more intensively cultivated land. Crop rotation is standard practice. But the main factor behind the improved harvest, our informants agree, is the improved seeds.

This section has documented that the range of crops grown in the study area has increased, as have the yields. The area gives a much greener impression compared to 40 years ago. In addition to the estimated production figures, a clear indication that the area is more intensively cultivated now is the fact that new irrigation canals continue to be constructed (Davies et al 2014: 518; Östberg 2004: 34–7). The relative success of cash crops has made men take a more active role in the fields. In the 1970s their contribution had been focused on land preparation and irrigation. Today women irrigate fields when men are absent but they do not participate in the direct maintenance of the canals and division of water. To get access to irrigation water single women ask male relatives to negotiate on their behalf.

Livestock and other assets

Almost all households in the 1970s kept poultry and many had a flock of some 15 to 30 goats. Fewer kept sheep, and still fewer cows. All animals were local breeds (Critchley 1983: 20; Dietz et al 1987: 24). Very little milk was sold, unlike in the highlands where the sale of milk was an important income for many families. Keeping animals in addition to farming was, and is, considered part of a Marakwet way of life but recurrent raiding from neighbouring groups has held back more active livestock keeping. Trypanosomiasis is another inhibiting factor for keeping livestock in the lowlands. Nevertheless, goats, and to some extent cattle, constitute a source of cash as well as providing a measure of security during exceptionally dry years, now as in the 1970s. Money for paying secondary school

fees are often financed by selling animals but also by organising fundraising meetings where relatives, neighbours and other acquaintances are invited for drinks and food and expected to contribute towards the school fees of the hosts' children.

In the mid-1970s more than half the men kept beehives. It was common to have about 20 and many men had 30 to 50. Honey is needed for *kipketin*, the mead that lubricates all Marakwet celebrations – though less commonly among members of the Africa Inland Church (AIC) who are not supposed to use alcohol. Honey was also used as medicine and it was a reserve food to be used when ordinary crops failed. Today few men in Sibou keep beehives and honey is usually bartered or purchased from the Pokot. *Kipketin* continues to be important in Marakwet culture.

Cash in the mid-1970s was derived from selling animals, fruits, vegetables, tobacco, hides and skins, honey and handcraft, home-brewed beer, charcoal, and remittances from family members living outside the valley, and by day-labouring. The profit from each of these activities was not big but together they were important in the families' economies. Bananas were a steady provider of petty cash but were also exchanged, as was cassava, for maize and beans in the highlands or for milk from the Pokot. Selling home-brewed beer (and the distilled *Chang'aaa*), was common in the 1970s, and this continues. As it is prohibited it occurs at home. In the mid-1970s a busy *kilapuu* – bar for local brews – was a notable feature of Tot.

The most important sources of cash in 2013 are, in order mangoes, other cash crops, small business and petty trading of food crops, and second-hand clothes in Tot centre and at neighbouring markets. Many people have two occupations: farming combined with a small business or petty trading selling soft drinks, sugar, salt, cooking gas, kitchen and school ware. Some Sibou residents earn incomes as schoolteachers, policemen, nurses or drivers.

Development interventions

The colonial administration had introduced new crops, as described above, and in the course of this work also established demonstration plots along the valley. It furthermore installed permanent structures at particular difficult passages of the water canals on their way down the escarpment. After independence the Provincial Irrigation Unit, the Arid and Semi-arid Lands Development Project and various organisations added further enhancements.

During the last 40 years three organisations have initiated projects aimed at boosting agricultural productivity in the valley: the Ministry of Agriculture, the Kerio Valley Development Authority (KVDA), and most recently the Red Cross. Their activities, as they have influenced life in Sibou, are briefly presented in this section.

Agricultural extension

By 1976, 10 hectares of cotton was grown, and plans were made for 2,000 hectares, eventually to be expanded to 5,000 hectares (Dietz et al 1987: 89); 204 hectares were ploughed in 1979 and the following year 120 hectares. In the following years the acreages dropped for a number of reasons, and a new start was made in 1983 (Dietz et al 1987: 90). And so it continued, with ups and downs.

In the 1970s a cooperative of 200 cotton-growing farmers had been formed. It was initially successful when the members were paid directly on delivery, but when payment was made at the district office, routines became cumbersome and the cooperative collapsed. Currently cotton is not a priority in the area, and the plan to build a ginnery has not materialised.

On a more moderate scale, but realised, the Catholic mission at Chesongoch hired an agriculturalist between 1977 and 1979 who came to initiate demonstration plots, provision of seeds and agro-chemicals, educational programmes, tree nurseries and a host of other activities all over the Marakwet lowlands. The project identified varieties particularly well suited to the area, and this effort is as useful today as it was 40 years ago.

In the mid-1970s two agricultural extension workers and an animal health assistant were posted to Tot. Currently there are four extension officers at Tot. They distribute improved seeds once-off (green gram, beans, cowpeas and improved varieties of sorghum).

Kerio Valley Development Authority

When the KVDA was established in 1979, a major transformation of the valley was envisaged, including new permanent irrigation canals and a railway line through the valley to enable export on a large scale. More schools and health facilities were to be provided, as were improved agricultural extension services, new cattle dips, tree nurseries, provision of improved seeds, veterinary medicine, large-scale conservation efforts, green belts, mineral exploration, and other initiatives (Dietz et al 1987: 63, 93).

Over the years a number of KVDA projects have been initiated in the Tot area. A successful initiative was the establishment in 1986 of a tree nursery, producing grafted mangoes, three types of citrus, papaya, and other trees.

Other projects have been less successful, for example (1) The KVDA opened a demonstration plot where a wide range of crops was grown. When these were exported local dis-appointments ran high. A number of people had expected to be provided with free food in return for irrigation water. The farm was eventually abandoned after conflicts arose from how the land deal was originally concluded, and continued disputes about the land between the Kaapisyooy and Kaapsireen clan sections, and finally when raiders attacked the area. The canal constructed by the KVDA, using water taken off the Syapan canal, is long since defunct (Davies et al 2014: 506–7). (2) Twenty acres were planted with maize by the health centre in Tot, but the project was discontinued in 2005 after only two seasons. (3) Forty-seven families were given plots in 2007 on the KVDA-farm in the Kaa-chêëpsoom section of Sibou to grow sugar cane. The project was discontinued when export to urban areas proved unmanageable. (4) In 2008 about 125 acres of bush, 45 minutes walk from Tot centre, was cleared in *keew*, on land controlled by the Kaapisyooy section of Sibou to produce seeds for the Kenya Seed Company. However, the KVDA failed to lead water to the land and the crop dried up. The following year the land was divided into 90 equal portions among farmers, who led water from the Kaapisyooy canal to the land and began cultivating. (5) In 2011 rice was planted along the Embobut riverbanks and the KVDA invested in a shelling facility by Tot centre. By 2013 it was no longer in operation and no one in Sibou cultivated rice.

Given all this, the KVDA cannot be said to have successfully contributed to developing agriculture in Sibou. The provision, on an irregular basis, of improved seeds has been useful, but apart from this, farmers do not count on either the KVDA or the local agricultural extension office as an important resource to enhance their yields.

Red Cross

In 2012 the Canadian Red Cross in collaboration with the Kenyan Red Cross initiated an irrigation project. The Kenyan contribution was financed through the 2011 SMS-based drought fundraising campaign Kenya4Kenians.³ The project was also meant to be a peace-building initiative between the Marakwet and the East Pokot communities. The land to be irrigated is situated on both the Marakwet and the Pokot sides of the Kerio River.

Water is piped from the Embobut River in Marakwet and distributed through sprinklers. On the Marakwet side the Kaapisyoo communal land is used. This means that one stated aim of the project, to provide land to the most deprived families and to single mothers, is not attained as the Kaapisyoo are among the better-off groups in the Tot area. This is not incidental but typical of how agencies have operated in the valley. They favour groups and individuals with access to above-average resources and education, living in or close to the centres. In the Marakwet case there is one particular consequence to consider. The extensive irrigation system, the sine qua non for reliable farming in the valley, relies on work contributions by all (men) in an area. They plan the new season's irrigation, realign, repair and clear canals, agree on irrigation schedules, and negotiate access to land and water (Adams et al 1997; Östberg 2004; Ssenyonga 1983). With the Red Cross project providing permanent piped water to selected fields, equipped with sprinklers, a dynamic and flexible system is being replaced by permanent installations benefiting those invited by the project. It will also risk further undermining the position of women whose role in irrigated agriculture is already subordinate (Adams et al 1997; Caretta & Börjeson 2015). So, how likely is it that the Red Cross project will be successful?

The landowners formed a committee in 2012 and worked three half-days every week for three months to clear the land to be cultivated. In October 2012 the project was formally launched in the presence of the director general of the Kenyan Red Cross. Hybrid seeds, pesticides and fertilizers were provided but could only marginally be utilised as the irrigation infrastructure was not yet in place.

The Red Cross management asserted that when the project is operational farmers will no longer have to rely on rains: they will be cultivating remunerative cash crops – onions, green gram, cowpeas – all year around. By January 2015 a first season of maize cultivation had successfully been concluded. The following season some fields were not cultivated and farmers were planting a mix of crops (millet, maize, tomatoes, green grams, onions and watermelons) and at different times making efficient marketing unmanageable. The Red Cross announced it would pull out by March 2015, with no tested management structure yet in place, and that the Kenya Seed Company was to take over the marketing support.

At this point a lingering conflict erupted. Young members of the Kapsireen clan, bordering on the Kaapisyoo (the clan controlling the land the Red Cross project utilises), destroyed water furrows and the intake of the water pipe – giving their exclusion from the Red Cross project as a reason for their action. One man was killed and tension

grew. It was contained for some time but by July 2015 there were repeated attempts to prevent water from reaching the Red Cross farm and in May 2016 armed land disputes broke out (Koskei 2016). Kapsireen destroyed canals so that water would not reach Tot centre. Throughout the remainder of 2016 the situation deteriorated further; the security situation did not permit the water canals to be repaired, cattle raids were resumed, killings became more frequent, houses were burnt, and people retreated into the hills like they had done in the 1990s. Provision of food and water became very difficult.⁴

It is tempting to see the recent fights over land and water as resistance against top-down planning, favouritism of certain groups, and as an attempt to defend local forms of natural resource use. James Ferguson argued convincingly, in his classic *The Anti-politics Machine*, that 'what is most important about a "development" project is not so much what it fails to do but what it does do; it may be that its real importance in the end lies in the "side effects"' (1990: 254). During more than 200 years the Marakwet have developed a system for how land and water are shared and exchanged, which has enabled them to subsist in a harsh environment with relative political stability (Kipkorir 1983; Östberg 2004; Ssenyonga 1983; Soper 1983; Watson et al 1998). Now a system of permanent irrigation is introduced without a proper feasibility study being undertaken. The stakes are high, and one cannot but think that the often-quoted call by Robert Chambers of 'putting the last first' (1983), and that development must grow 'from below and within' (Chambers, Pacey & Thrupp 1989; Hobart 1993; Scoones & Thompson 1994), remain urgent.

Fiona MacKenzie (1998) has shown how lack of respect for local agricultural practices in Kenya goes back to colonial times, and how it came to exacerbate class and gender differentiation within farming communities. In the Marakwet case William Adams showed how the colonial administration attempted to control and improve a supposedly wasteful irrigation system said to cause soil erosion and land slides, despite the fact that it had been operative since the 1700s. Adams noted that the post-independence projects 'have been almost universally ignorant of their predecessors' failures' (1996: 166).

Concluding discussion

Where does all this take us? The changes we have recorded in Sibou both confirm and challenge the overall picture of societal and agricultural modifications that have taken place in rural Kenya during the last 40 years. While the sub-Saharan Africa population has grown, farm sizes have decreased, rural infrastructure remains poor, and agricultural productivity has been stagnant if not declining (Wiggins 2005). During the period 1961–2000 the Green Revolution delivered only minor contributions in most sub-Saharan regions, and such yield growth as was realised was contributed by modern varieties with little contribution from fertilisers and other inputs (Evenson & Gollin 2003). In Kenya, agricultural growth declined compared to the immediate post-independence period and the policy during recent decades to increase investments in the agricultural sector has not changed this, although there have been occasional years with good results (Dietz, Foeken, Soeters & Klaver 2014). The hopes that most commentators nourished for a fresh start after the 2002 election, and in particular when the National Rainbow Coalition government published its Strategy for Revitalising Agriculture, were soon dashed and the strategy was prematurely dismantled (Poulton & Kanyinga 2014).

Almost half of the Kenyan population still live below the national poverty line, and this proportion has not changed from the early 1980s (World Bank 2008). Acute under-nutrition is high in Kenya (Dietz et al 2014). There are of course both crops and areas showing far better results than the overall picture, and in Sibou we could register both increased agricultural productivity and improved living standards.

A number of factors speak in favour of Sibou. It has access to adequate land and irrigation water. The percentage of salaried and educated people is higher here than in most other places in the valley. It borders on Tot, the administrative and commercial centre of lowland Marakwet, and it is easier to get access to farm inputs and information than anywhere else in the valley, and it is the best venue for marketing crops. Opportunities are offered in Tot and many Sibou farmers have made good use of them. As we proceed, this seemingly minor point will form our main conclusion.

The core of agricultural production in Sibou remains grains for home-consumption but mangoes, tomatoes, watermelon, cowpeas and groundnuts have also become important in the local economy. These crops were introduced on a somewhat ad hoc basis through the agricultural extension services offered by the government, the Catholic Church, and the KVDA. This goes to prove that uncoordinated and discontinued interventions can yield decisive results. Other factors that made farmers increase their production were that the road out of the valley was (partially) improved and that they were paid directly on delivery for their produce. The earlier cumbersome payment routines for cotton, for instance, had killed that crop. Rice, sesame, and peppers are other examples of crops that farmers abandoned when the administration failed to provide reliable market outlets.

One may speculate that the long tradition not only in Sibou but generally in Marakwet of working on large-scale farms and settlement areas around the towns Eldoret and Kitale helped to stimulate farmers' interest in diversifying crop production. Furthermore, Davies et al link the inherent flexibility of the irrigation complex to a readiness for taking up new opportunities, for instance 'cropping and new markets' (2014: 488). We agree.

The use of certified seeds constitutes a notable change. In 1974 only one out of 25 farm households had bought seeds from a shop – tomato and cabbage. One single farmer had bought one bag of hybrid maize seeds. All other seeds came from home stores and from relatives, neighbours and friends. Just a few years later improved seeds became available through the agricultural project launched by the Chesongoch Catholic Church (Critchley 1979: 12). Provision of seeds went hand in hand with active extension work. The project had access to a vehicle and used it actively. Demonstration plots were opened. Meetings and field visits were arranged regularly. The project sold seeds at retail prices and also supplied shopkeepers in Tot and Chesegon with seeds. Farmers noted the greatly improved returns from certified seeds and proved willing to buy at real prices. The idea had become established and is now standard practice. Another decisive change compared to the 1970s is that farmers use manure and crop residues in permanent fields, and pesticides against pests in watermelon, tomatoes and (much more rarely) maize. Just as they had become convinced that improved seeds were profitable, experience told them that successfully growing tomatoes required pesticides, and they acted accordingly.

Is Sibou a special case? There are, as we have noted, several factors that make it more likely that improvements should happen in Sibou compared to a number of other villages in the Kerio Valley. There are, however, other places with similar conditions and where livelihoods have improved, like Arror to the south (irrigated farming, population

concentration, schools, dispensary) or Chesegon to the north (same factors plus a weekly border market with West Pokot). Life is generally improving in the valley, albeit not as visibly as in the immediate vicinity of Tot. Looking a bit further afield there is the classic example of Machakos district where small-scale farmers, supported by external resources, have managed to transform an eroded environment to green terraced hillsides where vegetables and fruits are successfully grown for the Nairobi market (Tiffen, Mortimore & Gichuki 1994). A study applying a 25-year perspective in 20 villages in western Kenya captured no major change in poverty levels; 14 per cent of the households remained poor, while 19 per cent managed to overcome poverty. On the other hand, another 19 per cent had become poor during the same period. Changes in family dynamics (sickness, death, inheritance/land division) caused some households to fall into poverty (Krishna, Kristjanson, Radeny & Nindo 2004). A longitudinal study from Gitting village in Hanang district, Tanzania, showed a marked increase in prosperity. More than half of the households were considered poor in the early 1990s while most people in the village were of average wealth by 2013, with only 10 per cent considered poor. Rising crop prices allowed farmers to invest in cattle, modern seeds and farm implements, further increasing the value of their farm work. As in Sibou, families have invested in improved housing, education and other assets (Brockington 2013; Brockington, Loiske, Mnzava & Noe n.d.). Similarly, Kagera farmers, also in Tanzania, registered an 18 per cent increase in consumption levels between 1991 and 2004. In addition to successful farming, combining food crops, cash crops and keeping livestock, it also turned out to be crucial to live 'in well-connected villages' where business and trade provided income-generating opportunities that the poor could also take up (De Weerd 2010: 332). Furthermore, exposure to other ways of life was useful to make farmers diversify and increase their incomes (De Weerd 2010: 342). Similar factors were thus at work here, as we found in Sibou. While the performance of small-scale farming in Kenya as reported in official statistics is disappointing, case studies show that given the right conditions farmers are able to improve their lives substantially.

Enfin

In 1959 the author and polymath Elspeth Huxley wrote after a visit to Tot:

The end has begun ... progress will make them into clerks and storekeepers ... and perhaps one day the furrows will be all steel and concrete. A tractor is coming shortly with a European to control it, to experiment in ridge-and-furrow cultivation ... (1959: 174–5)

Our experiences from the 1970s and up to the present resound with Huxley's impressions from the late 1950s: improvements are expected to be on their way and soon life in the valley will be transformed. While living conditions have improved the major shift in Marakwet life that Huxley, and much later the KVDA, foresaw is still to materialise.

What remains the same, and in a far longer time perspective than the four decades discussed here, is the indigenous irrigation-farming complex, which offers, in the words of William Adams and David Anderson 'a model that has far outlasted any modern development' (1988: 533). The canals date back to the 1700s (Davies et al 2014; Sutton 1990), and the system is still expanding. Since the 1980s no less than 30 new canals have been constructed (Davies et al 2014: 518). On a more general note, Adams and Anderson conclude that improvement 'will be judged in terms of the ease with which it fits into existing

activities rather than on the basis of promises about its theoretical economic potential' (Adams and Anderson 1988: 534). This is what our account of 40 years of change in Sibou demonstrates. It also agrees with a more general insight that development of small-scale farming in Africa takes place within existing farming systems and that adjustments are often small and incremental but may add up to quite substantial changes (Wiggins, Argwings-Kodhek, Leavy & Poulton 2011). For centuries farmers have managed major communal undertakings like the irrigation canals as well as identifying, clearing and fencing large joint farms on the valley floor, and one may well have thought that options for large-scale projects would be particularly favourable in the Kerio Valley. The external actors, however, proved unable to adjust to the remarkable capacity of the Marakwet for undertaking major projects. Therefore experiences from Sibou speak in favour of facilitating local farmers' own efforts to improve their lives. Low-cost services like certified seeds and grafted fruit tree seedlings, and the payment facility *M-Pesa*, is what more than anything else helped Sibou farmers to improve their lives. The large-scale Green Revolution-type interventions initiated in the valley have still to prove their worth.

Notes

1. See <<http://agra-alliance.org>>.
2. For reference figures of the time see Acland (1971: 116, 131, 189).
3. SMS fundraising has gained popularity in Kenya in recent years. In emergencies, members of the public contribute small sums of money for relief aid. The money is channelled through non-governmental organisations (NGOs).
4. Personal communications with Florence Jemutai Cheptum and Edwin Suter Zablon as well as intermittent news reports from Kenya NTV, Kenya Citizen TV, KBC Channel 1, and Northrift News published on YouTube.

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