

THE SOUTH AFRICAN ENGINEER CORPS'S WATER SUPPLY OPERATIONS IN KENYA DURING THE SECOND WORLD WAR: ITS WARTIME IMPACT AND POSTWAR LEGACY

Deon Visser¹ and Ezekiel Nyanchaga²

Abstract

War is often conducted in areas where water is not readily available, which forces militaries to create sufficient water sources in the theatre of war. During a war military activities often place much pressure on civil society's access to their traditional water sources. After a war the increased water supply created by the military may be exploited for the benefit of civil society. The Second World War propelled the belligerent forces into some areas where fresh water was in short supply, including East and North Africa. This article, firstly, explores the efforts of the South African Engineer Corps (SAEC) to exploit existing water sources in Kenya and to create new ones to meet the needs of the Allied forces during their campaign against the Italians. Secondly it tries to establish how the activities of the SAEC affected the lives of the local population during the war. Lastly, it attempts to determine the postwar legacy of the SAEC's water supply activities in Kenya.

Keywords: Kenya; water history; Second World War; Union Defence Force; South African Engineer Corps; 42nd Survey Section; 36th Water Supply Company; boreholes; underground water location.

Slutelwoorde: Kenia; watergeskiedenis; Tweede Wêreldoorlog; Unieverdedigingsmag; Suid-Afrikaanse Geniekorps, 42ste Opmetingseksie; 36ste Watervoorsieningskompanie; boorgate; opsporing (of aanwysing) van ondergrondse water.

1. INTRODUCTION

As a basic necessity of human life, water is an indispensable requirement for the conduct of war. In arid regions water has therefore historically exercised a decisive influence upon the course of wars. This is particularly true of large parts of Africa. Harold M Fridjhon observes:

“Water has always been the decisive factor in the strategy of African warfare. From the earliest recorded wars... the design of African battles can be traced from waterhole to

1 Associate Professor, Department of Military History, Faculty of Military Science, Stellenbosch University. E-mail: visser@ma2.sun.ac.za. I am indebted to the Postgraduate & International Office at Stellenbosch University for an Africa Collaboration Grant to support part of the interaction with the University of Nairobi. I am also deeply indebted to Ms Louise Jooste and her personnel at the DODA for their invaluable research support.

2 Associate Professor, Department of Civil and Construction Engineering, University of Nairobi. E-mail: info@samezconsultants.com

waterhole, from oasis to oasis, from bir to bir. And the advent of... masses of huge trucks, armoured cars and tanks has not modified the problem of water-controlled strategy; it has aggravated it... men can go for several parched days without water, but radiators must constantly be kept full lest several thousands of pounds worth of fighting machinery become just so many tons of useless scrap.”³

When war propels military forces into areas where water is not readily available, they are forced to develop water sources at great speed. When the war is over, such newly developed water sources often survive to the long-term benefit of civil society. The Second World War forced the Allied forces into vast, water-deprived wastelands in East and North Africa. In Kenya, a harsh, inadequately mapped area of almost 500 km wide, without lines of communication – i.e., infrastructure such as water supplies, bases and depots, hospitals, railways, roads and bridges – separated the rich farmlands of Central Kenya from the Italian territory. To take the offensive against the Italians in East Africa, the Allied forces first had to create lines of communication, amongst which the establishment of ample water supplies took first priority, along the approach routes to the Italian frontier areas.⁴ (Please see figure 1 for map of East Africa and Abyssinia, 1940–1941.)

The South African Engineer Corps (SAEC) played a crucial role in creating lines of communication for the Allied operations in East Africa. Introducing a summary of Maj. EW Dohse's presidential address to the South African Society of Civil Engineers, the official newsmagazine of the South African Forces, *The Nongqai* of May 1943, states:

“War, judged by normal standards, is a wasteful undertaking, but when peace comes again many men of the S.A. Engineering Corps will experience a feeling of satisfaction in the constructive work of lasting value which they have done during their war service. Since the epic days of the Abyssinian Campaign all South Africans have heard with pride of the achievements of our engineers.”⁵

This article commences with a brief outline of the coming of the Second World War to East Africa and the deployment of South African forces to Kenya. Thereafter it sketches the development of Kenya's water resources until the Second World War. Next, it explores the efforts of the SAEC to exploit existing water sources in Kenya

3 DODA, UWH (Civil) 123, M/19, HM Fridjhon – JF Oldfield, 8 July 1943. Also quoted (without reference) in K Anderson, *Nine flames* (Cape Town, 1964), pp. 16-17. Fridjhon was a second lieutenant in 1 Field Company, SAEC during the East African Campaign. See N Orpen and HJ Martin, *South African forces World War II, VIII: Salute the sappers Part I: The formation of the South African Engineer Corps and its operations in East Africa and the Middle East to the Battle of Alamein* (Johannesburg, 1981), p. 9.

4 N Orpen, *South African forces World War II, I: East African and Abyssinian Campaigns* (Cape Town and Johannesburg, 1979), pp. 25-26, 35-36; HJ Martin and N Orpen, *South African forces World War II, VII: South Africa at war: Military and industrial organization and operations in connection with the conduct of the war, 1939-1945* (Cape Town, Johannesburg and London, 1979), pp. 23, 58, 65-70.

5 EW Dohse, “Up North with the S.A. Engineers”, *The Nongqai (The Official Newsmagazine of the South African Forces)* XXXIV(5), May 1943, p. 387.

and to create new ones to allow the Allied forces to take the offensive against the Italians. It then endeavours to establish how the water supply activities of the SAEC affected the lives of indigenous Kenyans during the war. Lastly, it attempts to determine the postwar legacy of the SAEC's water supply operations in Kenya.

2. THE UNION DEFENCE FORCE AND THE SECOND WORLD WAR IN EAST AFRICA

The British military commitments in Europe and Egypt left them with hardly any resources to meet their war needs in East Africa, hence they turned to the Union of South Africa for assistance. Union Defence Force (UDF) Deputy Assistant Adjutant General, Maj. HH Coldicott, accompanied by Capt. BAR Jones arrived in Nairobi by air on 20 May 1940, well before Italy's entry into the war on 10 June, to establish General Headquarters, Mobile Field Force at Kabete, 30 km outside the Kenyan capital. The first of several South African Air Force units landed in Kenya the next day, soon to be followed by the 1st South African Division under Maj. Gen. GE Brink. By the end of the year some 30 000 South Africans were serving in East Africa in the 1st South African Division or with the 11th and 12th (natives) African Divisions.⁶

The Italians attacked in July 1940 before the British could mount an offensive. They probed the Kenyan and Sudanese borders, drove a small British force out of British Moyale on the Abyssinian border and penetrated up to 100 km into Kenya in some places. In August they invaded and overwhelmed British Somaliland with superior forces and also occupied undefended French Somaliland.⁷ The British subsequently built up their forces in Kenya and the Sudan significantly and advanced into Northern Ethiopia from the Sudan in November, but abandoned their effort in the face of stiff resistance to build up their forces further. By the end of 1940 the British had concentrated 77 000 troops in Kenya, mostly South Africans (27 000), and native East (33 000) and West (9 000) African forces, and a further 28 000 in the Sudan. The 1st South African Division took responsibility for the Marsabit sector on 1 December 1940, holding Marsabit itself and manning outposts on the northern frontier. When the 25th East African Brigade at Turkana came under its command at the end of December, the 1st South African Division were covering some 400 km of inhospitable land from the Sudanese border to the Moyale area.⁸

6 Orpen, pp. 4-10, 25, 28-29, 32; Martin and Orpen, pp. 23, 58, 65-70.

7 Orpen and Martin, p 38; A Wessels, "The first two years of war: The development of the Union Defence Forces (UDF), September 1939 to September 1941", *Military History Journal* 11(5), June 2000, <<http://samilitaryhistory.org/vol115aw.html>>; AE van Zyl, "3 Field Squadron, SAEC (ACF) Part I", *Militaria* 6(1), 1976, p. 2.

8 Orpen, p. 69; Orpen and Martin, pp. 48, 58; Bouch, pp. 140-141; Van Zyl, p. 5.

Given the lack of water, the British high command ruled out any major offensive against the Italian forces before the onset of the rainy season in May. In January 1941 Lt Gen Sir Alan Cunningham ordered the 1st South African Division to march across the Chalbi desert to the Abyssinian border with a view to promote a patriotic (Shifta) revolt against the Italians in the Galla Sidamo province of Ethiopia and outflanking the Mega-Moyale escarpment.⁹ The South Africans succeeded in pushing the Italian forces deployed south of the Abyssinian border back across the border and advanced into Italian territory, taking Mega on 18 February.¹⁰ Lt Gen W Platt advanced into Eritrea from the Sudan in the second half of January 1941, followed by an invasion of Italian Somaliland from Kenya in mid-February by Lt Gen. Sir Alan Cunningham. Three months later the Allied forces concluded their campaign in East Africa successfully with the fall of Amba Alagi in May 1941.¹¹

Cunningham relied almost exclusively upon engineering units of the UDF moving ahead of the fighting forces to develop water supplies, construct camps and depots and build roads, bridges and railways to keep the troops moving.¹² The UDF had specifically established several highly specialised SAEC units, *inter alia* water supply and surveying units, field companies, road construction companies and motor transport companies, to meet these needs. These specialist units of the SAEC were naturally amongst the first South Africans deployed to Kenya to construct large camps, hospitals, sewerage disposal works, electric light installations and water supplies in preparation for the huge body of troops that was soon to arrive. By December 1940 the SAEC had deployed five field companies, seven road construction companies, three works companies, two field park companies and a water supply, forestry, and field survey company to Kenya. The rest of the British East Africa Force provided just four field companies and a water supply maintenance unit.¹³

Water supplies were obviously the first priority, because everything else depended on it. Listing the “lessons” of the campaign in East Africa in March 1941, 1 SA Division Headquarters stated that “the strategy of this [East African] campaign to date has centred round the securing of water supplies”.¹⁴

9 Orpen, p. 70; Bouch, pp. 140-141; Van Zyl, p. 5.

10 RJ Bouch (ed.), *Infantry in South Africa 1652 - 1976* (Pretoria, 1977), pp. 140-141.

11 Orpen, pp. 313-314.

12 Dohse, p. 387.

13 Dohse, pp. 387-388, 410; Bouch, p. 140; Orpen, pp. 26-28, 35.

14 Department of Defence Archives, Pretoria (DODA), UWH (Civil) 124, NAREP – EA 6 (1 SA Div in EA), Lessons of the campaign to date, 26 March 1941.

3. THE DEVELOPMENT OF KENYA'S WATER RESOURCES TO THE SECOND WORLD WAR

The development of water supplies in early modern Kenya followed the patterns of British colonialism. Britain established control over Kenya by proclaiming it as her East African Protectorate in 1895 and turning it into the colony of Kenya in 1920. During 1895 to 1901 the British built the Kenya-Uganda Railway (Mombasa to Kisumu (Port Florence)), which was a turning point in the development of townships, the rise of commercial farming and the establishment of water supplies in Kenya. The Hydraulic Branch of the Public Works Department started its activities in the coastal town of Mombasa, and its services expanded correspondingly with the emergence of urban centres and the establishment of colonial posts in the hinterland.¹⁵

Before and during protectorate years, Africans derived their water supply from rivers, springs and wells, and transported it home in various types of receptacles, ranging from clay pots to buckets made from hides.¹⁶ By 1900 European officials residing in Mombasa utilised rainwater from tanks under their houses. The Asiatic and African population of Mombasa obtained water from wells close to cesspools, some of which had sewerage contamination. There was no safe surface water in the protectorate. Water had to be subjected to sedimentation and rapid filtration before consumption.¹⁷

The water supplies to major towns such as Mombasa, Nairobi, Nakuru, Kisumu, Eldoret and Kitale were first developed and managed by the railways by 1906.¹⁸ In their efforts to provide adequate water supplies for Kenya the colonial government invited AD Lewis, then the Director of the Department of Irrigation in the Union of South Africa, to study Kenya's water resources and make recommendations for its development. Based on his recommendations, the colonial government decided that boreholes offered the most economical way of developing Kenya's water supplies. The water boring programme commenced in 1926,¹⁹ but the colonial government failed to draw up a written national plan for the

15 Kenya National Archives, *A guide to the contents of the Kenya National Archives and Documentation Service* (Nairobi, 1995).

16 W Mats, *Towards a historical geography of intensive farming in Eastern Africa. Islands of intensive agriculture in East Africa* (London, 2004).

17 WJR Simpson, *Report on sanitary matters in East Africa protectorate, Uganda and Zanzibar* (London, 1915), pp. 40-42.

18 Kenya National Archives, Nairobi (KNA), AG/43/103, "Colony and Protectorate of Kenya (1913-1923): Muthaiga Water Supply".

19 KNA, AG/43/87, HL Sikes, Comments on the Lewis Report on irrigation, water supplies for stock and water law, 1926.

mobilisation of Kenya's water resources until the 1940s. Water development took place on an *ad hoc* basis in most cases, usually at township level.

The main factors influencing the availability and exploration of underground water supplies are rainfall, topography, rock texture and geological structure. In areas with a low rainfall (500 mm or less per annum), careful attention must be paid to favourable conditions regarding catchment areas, drainage lines, rock formations and geological structures in the siting of boreholes. Boreholes sunk in geologically favourable places often produce good water supplies, even in areas with an extremely low precipitation.²⁰ With the knowledge and equipment available to them at the time, the boring company, Thomson Beeby A. & Partners, soon discovered that sinking boreholes in Kenya, particularly in the arid Northern Frontier District, was very difficult. The regional geological conditions made it so difficult to find water underground that success was essentially a question of luck. Many boreholes had to be abandoned after cumbersome drilling up to a hundred metres or more because no water was found or the yield was too small.²¹

Kenya's water supplies had not been sufficiently developed by the Second World War to support the Allied offensive against the Italians. Military operations could in most areas only be conducted during the rainy seasons from October to December and from the middle of March to the end of May. The Kenya-Italian East Africa frontier stretched over approximately 2 000 km from Lake Rudolf (today Lake Turkana) in the Great Rift Valley westwards along the Abyssinian border to the Italian Somaliland border and from there southwards to the Indian Ocean. Much of the border ran through bushy terrain or semi-desert, except where it cut across a green, rocky escarpment at Moyale in the central section of the Kenya-Abyssinia border. A practically waterless desert barrier of almost 500 km wide separated the agricultural area of Central Kenya from the Italian territory. In the harsh northern frontier area water was to be found only at the historic waterholes where the ancient camel tracks met at Wajir and Marsabit. A few water sources dotted the deserts around Marsabit – the Kaisut to the south, the Chalbi to the northwest and the Dida Galgalla to the north and the east. This included the oases and waterholes at North Horr, Dukana, Maidahad, Maikona, Gamra, Korowe, Kalacha, Woroma and Balessa. In the southeast, beyond the ancient waterhole at Garissa, a waterless wasteland extended from the Tana River in Kenya across the Italian Somaliland border to the Juba River.²²

20 DODA, WD 235, GL Paver, *et al.*, *The location of underground water by geological and geophysical methods (prepared from technical work of the 42nd Geological Section, South African Engineer Corps)* (General Headquarters Middle East Forces, s.a., 1943), p. 1.

21 KNA, K.333.91, 81-11, 1929, Beeby A Thomson & partners, *Kenya water problems*, 1929.

22 Orpen, pp. 25-28, 67; Anderson, p. 41.

4. LOCATING AND DEVELOPING WATER SOURCES

At the onset of the Second World War the Kenya and Uganda Railways, Public Works Department, municipalities, district councils or civilian contractors still carried out all military works in Kenya. In September 1939, however, the British authorities took steps to establish a single engineering field company. A poorly-equipped water section eventually left Nairobi for Isiolo, halfway on the road to Marsabit, on 8 December to commence working on the water supplies, but was recalled for training a few days later. The water section ventured out again a month later, but had to turn back because of the condition of the roads.²³ In the meantime the military authorities employed a civilian water boring company, Craeluis, to find water, but it achieved very little success and was withdrawn when the highly specialised 36th Water Supply Company, SAEC, arrived in Kenya in June 1940.²⁴ The UDF had established the latter unit on 1 April 1940,²⁵ specifically to address the water supply challenges in East Africa. On 3 October 1940 the most specialised engineering unit involved in water supply operations in East Africa, the 42nd Geological Survey Section, SAEC, established on 1 August 1940²⁶ to optimise the location of underground water, also arrived in Kenya.²⁷

Since recent deposits often obscured surface indicators of underground water, the South Africans employed geological and geophysical methods to select sites for boreholes, as was the case with Southern Rhodesia (Zimbabwe) and most of the other colonial administrations.²⁸ The difference was that the South Africans brought cutting-edge knowledge and experience with them. Whereas engineer corps elsewhere took soldiers and then trained them as engineers, the UDF enlisted skilled and experienced engineers and technical personnel from civil society – the Departments of Irrigation, Mines and Forestry, the Surveyor General, the South African Railways and Harbours Administration, provincial and national roads departments, as well as municipalities, the mining companies and industry in general – and turned them into soldiers to staff the new SAEC units. By 1940 the Geological Survey Section of the South African Mines Department and the Boring Branch of the Irrigation Department had been working together very closely for 35 years to increase the success rate of the Union's water boring efforts, which led

23 Orpen and Martin, p. 32.

24 DODA, UWH (Civil) 123, JF Oldfield, "36th Waterworks Company S.A.E.C.", s.a.; Orpen and Martin, p. 40.

25 DODA, AG 518, AG(1)634/62, AG – Officer Commanding (OC) Voortrekkerhoogte and Transvaal Command, 14 April 1940.

26 DODA, CGS 49, 13/13, AG – QMG, etc, c. August 1940.

27 Orpen and Martin, p. 43.

28 DODA, UWH (Civil) 124, NAREP – EA 6, 1194, HF Frommurze – Director Field Engineering and Training, s.a.; Paver, *et al.*, p. viii.

to considerable advances in the scientific methods of underground water location, particularly electrical resistivity and magnetometric methods of surveying.²⁹ The 42nd Geological Survey Section was headed by officers with highly specialised knowledge, specially trained in the above-mentioned methods of prospecting for water and with considerable experience in applying it successfully in the Kalahari Desert and other arid areas in the Union. The rest of the unit comprised of non-commissioned officers and men specially selected to fit in with its tasking. Local knowledge and experience was added by attaching officers and other ranks from Kenya, Uganda and Nyassaland to the unit. The unit boasted the most modern equipment available, including magnetometers and electrical resistivity apparatus to gain information on subterranean geological structures.³⁰

The various engineer units all worked together closely to locate, develop and maintain water sources in Kenya and to deliver it wherever the Allied troops needed it. An important part of developing water sources was to locate and improve existing water sources such as springs, wells, lakes and other natural collection points. The purification of the water from such sources was crucial because, as history has shown, disease could be a deadlier threat to military forces than enemy soldiers, and water is a common medium for the transmission of infective intestinal diseases such as typhoid fever, dysentery, cholera and diarrhoea. The germs causing these diseases leave the body in urine and faeces, which are washed into rivers, dams, springs, lakes and wells.³¹ Wells, often the only water sources of local communities in the arid areas of rural Kenya, were extremely prone to contamination and required much effort to provide safe water to the military. Apart from clearing out filthy sediment from old wells, UDF regulations prescribed detailed measures to prevent pollution from the ground surface. Wells had to be properly fenced in (an area of at least 21 m²), provided with an impervious lining, fitted with a cover and coping about 30 cm above ground level. The ground surface for at least 1,8 m from the top of the well had to be graded to slope away from the well opening. Ideally a well had to be provided with a pump to raise the water. If a windlass and bucket or other method was used to draw the water, casual containers had to be avoided because they could come from dwellings in which there were cases of intestinal diseases and could easily contaminate the water. Even if all these measures were in place, shallow wells were also susceptible to pollution from the upper layers of the soil. Hence the final step in safeguarding well water was proper filtration and chlorination.³²

29 Anderson, pp. 6-7; Dohse, pp. 387-388, 410; Bouch, p. 140; Orpen, p. 35; DODA, UWH (Civil) 124, NAREP – EA 6, 1194, HF Frommurze – Director Field Engineering and Training, s.a.; Paver, *et al.*, p. 235.

30 DODA, UWH (Civil) 124, NAREP – EA 6, 1194, HF Frommurze – Director Field Engineering and Training, s.a.; Orpen and Martin, p. 43.

31 DODA, General Staff, Defence Headquarters, Union Defence Forces, *Notes on Field Sanitation* (Cape Times Limited, Cape Town, 1927).

32 *Ibid.*, pp. 45 – 46, 48.

The central issue was to create water sources where none had existed before. This could sometimes be done by digging wells, but mostly required the sinking of boreholes. In this the 42nd Geological Survey Section and the 36th Water Supply Company played a crucial role. The former located sites for boreholes, where after the latter, often assisted by Field Companies of the SAEC, moved in, sunk the borehole, installed pumps and pipelines, and built reservoirs or erected tanks.³³ At the same time the Road Construction Companies built roads to allow the Motor Transport Companies to pump the water into tankers and transport it to the military bases and units in the field right up to the combat front. “The biggest users of water”, Major JF Oldfield, commanding officer of the 36th Water Supply Company, observed, “are the road builders. With seven Roads Companies at work, we were kept extremely busy along the proposed routes into Abyssinia.”³⁴ The two critical roads here were the road winding up the steep escarpment from Marsabit to Moyale, and the road descending the lava slopes from Marsabit to cross the Chalbi Dessert (via North Horr) to Ducana east of Lake Turkana.³⁵

Upon its arrival in mid-June 1940, the 36th Water Supply Company’s first mission was to assist with the construction of base camps at the railway station at Gilgil and at nearby Langa-Langa, northeast of Nairobi, in anticipation of the arrival of the bulk of the South African forces.³⁶ The military authorities also withdrew the civilian water boring company, Craeluis, which had very little success in finding water, and the 36th Water Supply Company deployed its eight drilling rigs without delay to cover the four important routes to the Italian frontier, namely the Kitale-Lodwar-Lokitaung road in the west, the road to Marsabit in the centre, crossing the Kaisut and Chalbi deserts, the Wajir-Buna road to the east of the latter, and the road to Garissa in the southeast.³⁷ (Please see figure 1 below.)

Detachments of the 36th Water Supply Company ranged far and wide in search of water, labouring under extremely trying conditions with the minimum water available for their own needs.³⁸ Fridjhn observes:

“...the water engineers [36th Water Supply Company] frequently found themselves many miles ahead of the fighting troops. With just a thin protective screen of infantry – and sometimes without – the sappers lumbered their boring equipment into the untracked bushland of northern Kenya... a vast sprawling no-mans-land.”³⁹

33 Orpen, pp. 35-36.

34 DODA, UWH (Civil) 123, JF Oldfield, “36th Waterworks Company S.A.E.C.”, s.a.

35 Anderson, p. 30.

36 Orpen, p. 29; Orpen and Martin, pp. 20-22, 36, 38; DODA, Pretoria, UWH (Civil) 124, 1206, “Chronology of events for the South African Engineers Corps in East Africa and Abyssinia”, p. 1.

37 DODA, UWH (Civil) 123, JF Oldfield, “36th Waterworks Company S.A.E.C.”, s.a.; Orpen and Martin, p. 40.

38 Dohse, p. 410; Orpen, p. 36; Orpen and Martin, p. 71; Anderson, p. 19.

39 DODA, UWH (Civil) 123, M/19, HM Fridjhn - JF Oldfield, 8 July 1943. Also quoted (without reference) in Anderson, p. 17.



Figure 1. East Africa and Abyssinia, 1940 – 1941.⁴⁰

Major CJ Venter, commanding officer, 5th Field Coy, SAEC reported on 11 February 1941 that he had developed five wells to solve the water problem in the Hobok area, just across the Abyssinian border, but this, he added

“...has only been accomplished by working my men to a standstill, owing to the small number available. They have worked constantly for 24 hours a day in shifts, and in addition to which I have to place 46 men on guard every evening for guarding the area during the hours of darkness... [because] there is at the moment only one Battalion of Infantry here and their perimeter is too large to cover my own perimeter as well...”⁴¹

40 Adapted from map in N Orpen and HJ Martin, *South African forces World War II, VIII: Salute the sappers Part I: The formation of the South African Engineer Corps and its operations in East Africa and the Middle East to the Battle of Alamein* (Johannesburg, 1981), p. 35.

41 DODA, WD 294, F/AL/6, CJ Venter – Divisional Engineer Officer, 1 SA Div Eng HQ, 11 February 1941.

Under these circumstances, the “major questions” among the men of the 36th Water Supply Company, Lt Col SH Ash observed, were “LEAVE and BEER (or lack of these)”.⁴²

The SAEC faced many challenges in developing water resources. The ground formation often did not permit the deepening of existing wells because any penetration of the solid lava layers on which the water rested perforated the floor of the well and made the entire water supply vanish into the bottom of the earth.⁴³ Sometimes the boreholes caved in, and sometimes the water was undrinkable, or they drilled up to 100 m or more without finding water. One borehole at Lokitaung yielded a promising flow, but then just dried up.⁴⁴ In addition to such natural obstacles, the enemy also frustrated the SAEC’s efforts. The 36th Water Supply Company sunk its first borehole, SA No 1, on 12 August 1940 about eight km from Buna, midway between Wajir and Fort Moyale on the Kenya-Abyssinian border.⁴⁵ Here, in their first contact with the Italians,⁴⁶ the South African ground forces, in the words of Harold Fridjhon, “tasted their first bitterness of war’s futility”, for no sooner had they “tapped a promising flow of water”,⁴⁷ when the Italians attacked and forced their Kenyan infantry screen, a detachment of the King’s African Rifles (KAR), to retreat in the face of superior numbers. As a result, the 36th Water Supply Company detachment was ordered to destroy their promising boreholes “lest the Italians benefit from their labours”.⁴⁸ Italian Caproni aircraft had also taken to bombing the boring machines and forced the 36th to pull back their rigs from the area temporarily. The South Africans subsequently discovered that the Italian pilots were locating the rigs by spotting the characteristic shadow of the mast. Hence they dug trenches radiating from the boring machines so that the sun threw a pattern of shadows which made it difficult to spot the rigs from the air.⁴⁹

Whatever the challenges, the SAEC persisted and delivered what was required. Lake Paradise, one of the crater lakes at Marsabit, Anderson observes, “may have lived up to its name when it was full of water, but... [when the SAEC arrived there, it] was just an odorous swamp”.⁵⁰ The 5th Field Company filtrated and super-chlorinated the water and managed to produce 91 000ℓ of clean water from the lake per day.⁵¹ Figure 2 below gives an indication of how dramatically the

42 DODA, WD 294, G242/30/17, GH Ash, Report on 36th Water Supply Company, SAEC, 17 June 1941.

43 Orpen, p. 35.

44 *Ibid.*, p. 36.

45 DODA, WD 294, “Boreholes”.

46 DODA, UWH (Civil) 123, JF Oldfield, “36th Waterworks Company S.A.E.C.”, s.a.

47 DODA, UWH (Civil) 123, M/19, HM Fridjhon - JF Oldfield, 8 July 1943. Also quoted (without reference) in Anderson, p. 17.

48 *Ibid.*

49 Orpen and Martin, p. 40.

50 Anderson, p. 36.

51 Orpen, p. 35.

SAEC pushed up the available water supplies at some locations by improving the local sources.⁵²

FIGURE 2: EXAMPLES OF THE IMPROVEMENT OF THE LOCAL WATER SUPPLIES IN KENYA BY THE SAEC.

Location	Original yield	Improved yield
El Yibo	455 ℓ/d	84 000 ℓ/d
Woroma	4 500 ℓ/d	68 200 ℓ/d
North Horr	5 450 ℓ/d	18 200 ℓ/d
Balessa	5 900 ℓ/d	73 400ℓ/d
Kalacha	11 400 ℓ/d	68 200 ℓ/d
Marsabit (wells, lake)	27 000 ℓ/d	236 000 ℓ/d

Improving existing water sources was crucial, but sinking successful boreholes at waterless or almost waterless outposts was decisive. The table below (figure 3) reflects the success rate of the SAEC's water boring efforts (150 boreholes) during the Allied campaign in East Africa, 1940 to 1941 (the statistics for Kenya alone have not been determined yet):⁵³

A borehole was regarded successful if it yielded over 455 ℓ potable water per hour. If boreholes selected by the 42nd Geological Survey Section yielding salt water are counted as successful, the success rate was 65%. The success rate of holes actually recommended by the 42nd Geological Survey Section was 80%. Sixteen boreholes were put down by SAEC between Lodwar and Loruth in 1941 - 1942, nine were successful, one was salty, three yielded too little and the last three were dry. Dixey observed that: "For a country with so small a rainfall and so little water on the surface, the results obtained are very good and indicate that North Turkana is a favourable area for development of water supplies by boring."⁵⁴

52 *Ibid.*, pp. 36, 102.

53 DODA, UWH (Civil) 124, NAREP – EA 6, 1194, "Military water boring results in the East African Campaign", s.a.

54 KNA, F Dixey, "Hydrological Report on the Northern Frontier District, Samburu and Turkana and Report on the hydrology of the Uaso Nyiro", 1950.

**FIGURE 3: RESULTS OF MILITARY WATER BORING IN EAST AFRICA,
1940 – 1941**

Item	Results for all boreholes	Boreholes selected by 42nd Survey Section	Boreholes not selected by 42nd Survey Section
Boreholes drilled	150	60	90
Successful boreholes	61	33	28
Percentage successful boreholes	40,7%	55%	31,1%
Average depth of boreholes	60 m	68 m	53 m
Average depth to water	45 m	49 m	35 m
Average test yield of fresh water	4 546 ℓ/h	4 910 ℓ/h	4 182 ℓ/h
Total test yield of fresh water	279 130 ℓ/h	162 295 ℓ/h	116 835 ℓ/h
Average yield in litre per meter drilled (for total metres drilled)	31,01 ℓ/m	39,78 ℓ/m	24,49 ℓ/m

5. IMPACT OF WATER EXPLOITATION ON LOCAL COMMUNITIES

The British, similar to Europeans towards indigenous peoples elsewhere in Africa, displayed an attitude of superiority towards Kenyans since their earliest interaction. Upon assuming office late in 1908, the Nyanza Provincial Commissioner found several matters requiring considerable attention. This he attributed to a lack of policy which defeated the very purpose of any government in the province, especially in a “primitive country inhabited by savages or semi-savage natives”.⁵⁵ The British perception of African inferiority and primitiveness led, amongst many other things, to the disregard of their water needs and hence skewed accessibility to water supplies. By 1911 Kisumu township had two sources of water supply, namely water pumped from the lake by the Railways Department, and rain water collected in tanks. The railway staff utilised the first source and the Europeans and settler population the second. Despite the abundance of water, Africans were not allowed to use surplus water from either source. The provincial commission noted with a typical colonial attitude that “[n]o European used the water and it’s a contentious question to whether it should be used by the natives”.⁵⁶

55 KNA, NZA/1/1/3, Provincial Commissioner, “Report of the progress and condition of Kisumu Province, East Africa Protectorate for the twelve months ending 31st March 1908”, July 1st 1908.

56 KNA, PC/NZA/1/1//6, Provincial Commissioner, “Report by the Provincial Commissioner for the twelve months ending March 31st 1911”, 31 March 1911.

In the British perception, Africans were unable to conserve water and it was therefore essential to control water usage in African areas. In 1928, the Provincial Commissioner in Kavirondo observed that a proposed scheme would result in colossal wastage “unless some means were taken to check it... A native who had to pump water would only pump the minimum necessary for his requirement and there would not be much likelihood of waste.”⁵⁷

The British estimate of the water requirement of the different groups varied dramatically in accordance with their subjective racial perceptions. Howard Humphrey in Nairobi (1934),⁵⁸ McKeag in Meru (1937)⁵⁹ and the District Commissioner at Kilifi (1940)⁶⁰, estimated the water requirements for different races as indicated in figure 4 below.

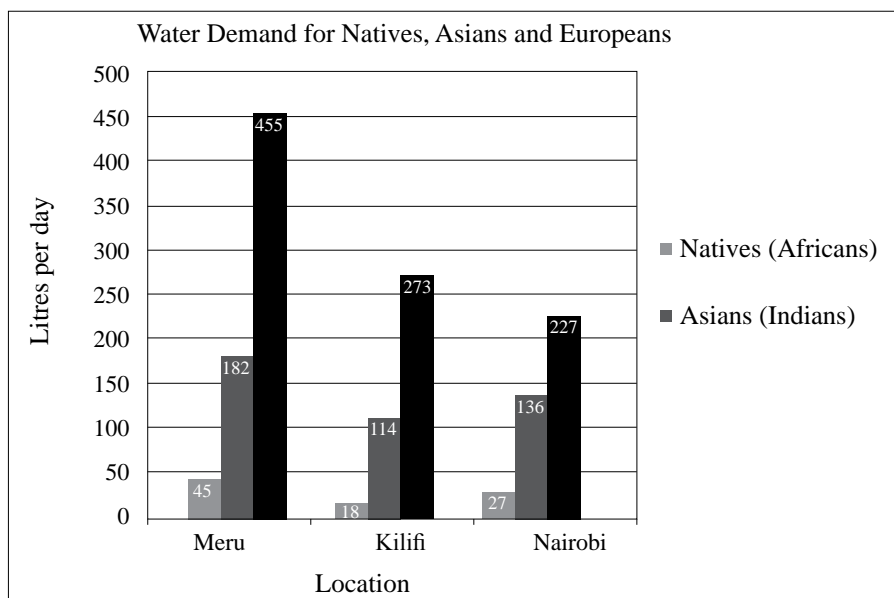


Figure 4. Estimated water requirement for the different races in Nairobi, Meru and Kilifi, ca. 1934 -1940

57 KNA, PC/NZA/3/9/3/2, PC/NZA/3/9/3/1, “Colony and protectorate of Kenya Water Supply 1929”.

58 KNA, VQ/7/9, HCL Howard, “Report on Ruiru water scheme 1934”.

59 KNA, DC/MERU/2/15/11, PW:8/4/7/1447, VM McKeag, “Statement of population and its distribution”, 2 November 1937.

60 KNA, CA/17/89, “Colony and protectorate of Kenya (1929-1949): Water supplies in Kilifi district including Malindi”.

The Africans' right of access to water was constantly violated, in particular where Europeans were involved. The inarticulate, voiceless Africans were not heard. Their supposed representatives and local administrators (i.e., the District Officer and the District Commissioner, and to a lesser extent the Provincial Commissioner) were part of an elaborate "con scheme" in which the Africans were not only dispossessed of their land, but also of other resources, especially water.⁶¹ A case in point is the contest between the Jipe sisal estate of Lord Gorgon and the inhabitants of the Taveta district. The latter resisted the building of a canal that would abstract water from the River Lumi, as it would deny them their usual access to water from that source. However, Lord Gorgon brushed aside their objections and built the canal. The implicit message from the Chief Native Commissioner was clear: he had run out of patience with the Provincial Administration's insistence on the local natives' interest; European interest was paramount and superseded all other considerations.⁶²

Amidst this historical disregard for African water rights, the Second World War caught the Kenya water sector unawares. When the war commenced, the British launched a major recruitment drive amongst Kenyans to swell the ranks of several regiments of the KAR and to satisfy their wartime manpower needs in other capacities. Several military camps consequently sprung up in Kenya, which created an unprecedented demand for water and led to serious shortages. Worst hit was the capital, Nairobi.⁶³ Military requirements took priority over all civilian requirements in terms of resources and supplies, and overshadowed the work of the civil administration throughout the war, in every district. In Kakamega, for example, military priorities delayed the maintenance and expansion of the local water supply system, which entailed the installation of a new intake, a chemical treatment plant, a rising main and a storage tank, until after the war.⁶⁴ The water shortages became so intense that some military units in Nairobi had to be moved to other locations to relieve the pressure. It also led to the first major water rationing, while the media carried propaganda on water conservation.⁶⁵

The shortage resulting from the Second World War demonstrated the discrepancy in water provision. Even in areas where water was plentiful, the colonial authorities regarded showers as a luxury for Africans, an unnecessary wastage of water. Hence the showers in the African areas were fed through a special series of valves during the day to reduce the flow. At night, from 18:00 to 06:00, the water supply to African showers was cut off entirely.⁶⁶

61 KNA, CA/17/116, PW.8/17/3/03, District Commissioner, 1948.

62 *Ibid.*, Stirling & Scott, General Notice 1563, 1948.

63 J Smart, *A jubilee history of Nairobi* (Kenya, 1950), p. 307.

64 KNA, PC/NZA/3/1/346, "Colony and protectorate of Kenya (1931 – 1950): Indian Association".

65 KNA, "Nairobi water position still serious", *The East African Standard*, 4 and 6 July 1945.

66 *The East African Standard*, 6 July 1945.

Against the background of the historical British neglect of African water needs and the wartime pressure on Kenya's water resources, the British District Commissioner in the Northern Frontier District of Kenya appealed to the South African forces in December 1940 "that provision be made [at Marsabit] for allowing the natives their usual access (or alternatives) to water sources being taken over by the military authorities".⁶⁷ Though the District Commissioner does not elaborate on the motivation behind this request, the reasons for it seem obvious: from a humanitarian point of view it was unthinkable, even in the face of persistent racial discrimination and military necessities, to deprive the local population and their livestock of access to water supplies beyond reason; from an imperialist perspective, the British certainly did not want to feed any antagonism towards colonial rule; and, lastly and perhaps most importantly, the British could hardly afford to turn the local population against their war effort and create a breeding ground for pro-Italian sentiments and actions. Apart from everything else, the British war effort depended on the manual labour provided by indigenous Kenyans and the contribution of the locally recruited KAR (of which several battalions were raised)⁶⁸ at the battlefield. Economic incentives would definitely have aided recruitment for both the labour force and the KAR, but to optimise their war effort, the British had to play for the "hearts and minds" of the indigenous population. Water disputes have after all historically been a common cause of conflict and war!

Similar intentions and water utilisation policies no doubt prevailed elsewhere in East Africa, but the question is whether they were carried out diligently under pressure of military needs and priorities where water rationing was at the order of the day, and the SAEC measured and handed out every drop of water against signature.⁶⁹ The South Africans indeed took the needs of the local population into consideration. Reporting on the water sources available around Marsabit, commanding officer 12th Field Coy, Major GF Newby, recommended that "the Village Well should be ignored because it forms the source of supply of the inhabitants".⁷⁰ He subsequently reported that the well was allocated "only for D.C. [District Commissioner], villagers and occasional small units".⁷¹ At Tass, 24 km south-southeast from Mega on the Kenya Abyssinia border, springs in the mountain side yielded an estimated 45 500 ℓ of water per day, of which 32 000 ℓ were

67 DODA, WD 294, F/AL/4, "Water supplies at Marsabit: Notes for C.R.E. 1st S.A. Div.", 6 December 1940.

68 Orpen, pp. 32, 34 -36, 70.

69 DODA, WD 294, F/AL/4, "Water Supply at Marsabit", 1 S.A. Div. Adm. Instruction 17, 5 January 1941.

70 DODA, WD 294, F/AL/4, Officer Commanding (OC) 12th Field Coy, SAEC – OC 2 SA Inf Bde & C Div E, 1 SA Div, 4 December 1940.

71 DODA, WD 294, F/AL/4, OC 12th Field Coy, SAEC – C Div E, 1 SA Div, 29 December 1940.

allocated for military usage, while 13 500 £ were set aside for “native purposes”.⁷² In the Segunti Valley in the Marsabit area a large number of wells, up to 12 m deep, with small individual yields collectively watered thousands of cattle. Some wells were left dry after a day’s consumption.⁷³ Since it was the main water source for the cattle at Marsabit and since there was very little surplus water, if any, Capt. AS Posthumus of the 12th Field Coy recommended on 27 December 1940 that “it should be left for its present purpose unless [the] water supply position deteriorates to any great extent”.⁷⁴ It is not clear whether the South Africans eventually exploited this source, but they predictably put military needs first.

Undisturbed access of the local population to their traditional water sources was clearly not always due to goodwill and compassion alone. In the Segunti Valley the water of the “Village Well” might have been left alone partially because it was contaminated as the villagers “quartered... animals... on [the] pervious timber and earth roof of [the] spring”.⁷⁵ In the case of the wells in the Segunti Valley, Capt. Posthumus indeed recommended that they be reserved for local use because they were “badly contaminated and road access to... [them] very difficult”.⁷⁶ At least two “native supply” sources at Tass, a “crude reservoir in Luggah” and “a crater at El Romso”, were left undisturbed for the locals to continue using it as before simply because they were “not worth developing for military purposes”.⁷⁷

Placing military needs first, the South Africans sometimes denied the locals their usual access to their traditional water sources and directed them to alternative sources. Capt. Posthumus, for instance, suggested that the wells in the Segunti Valley “may be able to carry the cattle which should be evacuated from Paradise Lake and Balessa Bangoli”⁷⁸ to make more water available to the military. At Woroma, some 23 km south of North Horr in the Dukana area, “arrangements were concluded with the Kenya Police that all camels be removed from this area and watered at Balessa Karauwi”.⁷⁹ Such arrangements, which would certainly have been made elsewhere as well, certainly inconvenienced the local population and disrupted their traditional daily activities.

On the other hand, the local people, of course, also reaped the benefits when the SAEC improved existing water sources for military purposes. Along the approach road to Mega, for instance, the 5th Field Company

72 DODA, WD 294 F/AL/7, “Report from Div. E.O. at Mega”, 26 February 1941.

73 DODA, WD 294 F/AL/4, AS Posthumus, “Reconnaissance of Segunti Wells”, 27 December 1940.

74 *Ibid.*

75 DODA, WD 294, F/AL/4, OC 12th Field Coy, SAEC – OC 2 SA Inf Bde & C Div E, 1 SA Div, 4 December 1940.

76 DODA, WD 294 F/AL/4, AS Posthumus, “Reconnaissance of Segunti Wells”, 27 December 1940.

77 DODA, WD 294 F/AL/7, “Report from Div. E.O. at Mega”, 26 February 1941.

78 DODA, WD 294 F/AL/4, AS Posthumus, “Reconnaissance of Segunti Wells”, 27 December 1940.

79 DODA, WD 294, F/AL/3, OC 12th Field Coy, SAEC – OC 2 SA Inf Bde, etc., 23 January 1941.

"...recondition[ed]... many old wells... of the round type used by the natives for watering their cattle... contain[ing] centuries of filth... The Italians had refused the natives access to these water points, and when the Engineers arrived on the scene they found the local inhabitants in a very bad way. So... [they pumped] the stinking water into canvas tanks for use in the radiators of their motor transport... and for watering the cattle, and then they... climb[ed] down into the wells and clean[ed] out the filth, let the new water seep through and purif[ie]d it."⁸⁰

6. LEGACY OF THE SAEC'S ENDEAVOURS IN KENYA

The water supply of the Kenyan capital, Nairobi, benefited significantly from the heavy presence of the military in and around the city during World War II, because military needs enforced rapid development in that regard.⁸¹ The SAEC made a small contribution to this by sinking a few boreholes in or around Nairobi,⁸² but the British army made the major contribution to the development of Nairobi's water supplies after the war, *inter alia* by sinking a number of boreholes in the old lake beds.⁸³ The SAEC's real contribution was in the remote rural areas and coincided with the first formal water development plan for Kenya, which was put forward by the Director of Water Development in Northern Rhodesia (Zambia), Dr F Dixey, in 1943. This plan, known as the "Dixey Scheme", covered the water scarce areas of the Northern Frontier District, namely Moyale, Marsabit, Wajir, Garissa, Lodwar, Isiolo, Samburu and Mandera,⁸⁴ the very region where the SAEC improved many existing water sources and sunk several boreholes during 1940 and 1941.⁸⁵ Since the civilian authorities took over the military installations, the SAEC in fact laid the foundation for the "Dixey Scheme". By 1943, the Garissa administration centre had no water supply and drew muddy water, in tins, from the River Tana. The District Commissioner recommended obtaining water from the River Tana with a windmill, using the piping left behind by the military,⁸⁶ presumably the SAEC. By 1952, the military supply at Garissa, which was the chief source, was approximately 34 000 £⁸⁷ per day. The borehole that the SAEC had sunk at Hagar Dera⁸⁸ was useful for watering livestock and hence also opened up the area for grazing.⁸⁹ The same

80 Anderson, p. 36.

81 KNA, "Water for Nairobi from old lake beds: how army is working to relieve shortage", *The East African Standard*, 30 May 1945.

82 DODA, WD 294, "Boreholes".

83 KNA, "Water for Nairobi from old lake beds: how army is working to relieve shortage", *The East African Standard*, 30 May 1945.

84 KNA, F Dixey, "Hydrological report on the Northern Frontier District, Samburu and Turkana and Report on the hydrology of the Uaso Nyiro", 1950.

85 DODA, WD 294, "Boreholes".

86 KNA, GRSSA/6/3, District Commissioner, Garissa, memo on water supplies in Garissa District, 1944.

87 KNA, DC/GRSSA/6/13, Ref: PW. 8/4/60, RC Mills, "Water Supply Garissa", 5 February 1952.

88 DODA, WD 294; Orpen and Martin, p. 70, "Boreholes".

89 KNA, GRSSA/6/3, District Commissioner, Garissa, memo on water supplies in Garissa district, 1944.

is probably true of other boreholes sunk by the SAEC in other locations in the Northern Frontier District where there were no water sources before the Second World War. In some areas, however, some boreholes were subsequently rendered less effective or even dysfunctional by the geological structure. The water level in a military borehole in Kabete (where the SAEC also drilled) dropped from about 17 to 43 metres.⁹⁰

The Second World War brought about critical changes in the socio-economic milieu within which Kenya existed. After fighting together the European and African relationships eased due to closer interaction. With the infrastructure that the military had left behind, more water supplies and more housing, the population of the townships increased significantly. The British government, under the Colonial Development and Welfare Act, invested in the British colonies to boost economic and social development.⁹¹ Consequently, the colonial government, in 1946, launched an ambitious investment programme under the Development and Reconstruction Authority, which sparked off rapid development of urban water supplies.⁹² The African Land Development Board in turn emerged with policies specifically aimed at intensifying production in arid and semi-arid rural areas.⁹³

7. CONCLUSION

The SAEC's water supply and development operations in Kenya had a significant impact on the successful Allied operations against the Italians; without their contribution the Allied offensive would at the very least have been considerably delayed, with significant implications for the Allied campaign in North Africa. The historic British colonial attitude that Africans had less urgent water needs than Europeans and that European water needs took priority over African needs, lingered on during the Second World War. This, *inter alia*, denied Africans full access to shower facilities in urban dwellings and also placed their needs second in rural areas. The SAEC did take the water needs of indigenous Kenyans into consideration and made explicit provision for their access to their traditional water sources, or, if required, to alternative sources. They did, however, unavoidably, put military needs first, which inconvenienced and disrupted the Africans' daily lives by, amongst others, forcing them to water their cattle at alternative sources. Water was also severely rationed, which limited the water supply available to Africans. On the other hand, the SAEC improved many traditional water sources in terms of

90 KNA. "Water for Nairobi from old lake beds: how army is working to relieve shortage", *The East African Standard*, 30 May 1945.

91 DK Fieldhouse, *The West and the Third World: Trade, colonialism, dependence, and development* (Oxford, 1999).

92 Colonial Office, *Annual Report on the Colony and Protectorate of Kenya for the year 1948* (London, 1950).

93 KNA, PC/NFD/1/1/8, Provincial Commissioner, "Annual Report Northern Frontier District", 1946.

both quantity and quality, and successfully sunk boreholes in areas where no water sources existed before, which offered some benefits to the indigenous people, *inter alia* in terms of their health. A case in point is the SAEC's cleaning of the filthy wells along the approach road to Mega, purifying of the water and giving back to the Africans the access to these sources taken away from them by the Italians. After the war the indigenous population benefitted from the new and improved water sources left behind by the SAEC, especially in the arid and semi-arid Northern Frontier District. Apart from safer drinking water, boreholes in areas such as Hagar Dera offered new watering points to African livestock and hence opened up new grazing areas. The boreholes and other fruits of the SAEC's work also laid the foundation for the Dixey water development plan launched in the Northern Frontier District in 1943. This scheme and subsequent postwar water development operations in Kenya no doubt also benefitted from the geological surveys carried out by the SAEC in Kenya during their stay and the specialist knowledge that they deposited in British colonial structures and most likely even the local private water boring industry. They also left behind a number of wartime employees with knowledge of and experience in water boring and other water development activities. On their part, the members of the SAEC took a significant amount of new knowledge and experience back to the Union for the benefit of postwar water boring and water development projects in South Africa.

The SAEC's Second World War activities indeed produced a lasting legacy in Kenya. The findings and conclusions of this study are, however, incomplete and preliminary. More research needs to be carried out in the Kenyan National Archives with regard to the wartime and postwar impact of the SAEC's water supply and development operations in Kenya. Similarly, more archival research is required in South Africa to determine the impact of the wartime exodus of its water specialists from the Union, as well as the postwar impact of the wealth of knowledge and experience gained in East and North Africa during the Second World War. Some fieldwork in Kenya is also required to determine what is left of the wartime water developments and what, if any, change in economic activities took place around new or improved water sources after the war. Interviews with Kenyan and South African survivors of the Second World War could also help shed more light on the various issues referred to. Fieldwork in some of the relevant areas in Kenya, however, currently presents a serious challenge to researchers as a result of the security risk created by cattle-rustling and piracy. People involved in these activities are heavily armed with AK47s, hand grenades, mortars and other modern weapons,⁹⁴ which makes it extremely dangerous for researchers to move in the affected areas without military escort.

94 KNA, CA/17/89, CP Karanja, *Memorandum on cattle rustling*, <<http://www.nckk.org/index.php/information/112.html>>, accessed 14 June 2011; "Kenya: Pirates are a danger to our national security", *Maritime Sun News*, <<http://www.maritimesun.com/news/kenya-pirates-are-a-danger-to-our-national-security/>>, accessed 14 June 2011; VG Simiyu, input at research workshop, Saldanha, October 2010.