Locational development profile for Weiwei Location, West Pokot District

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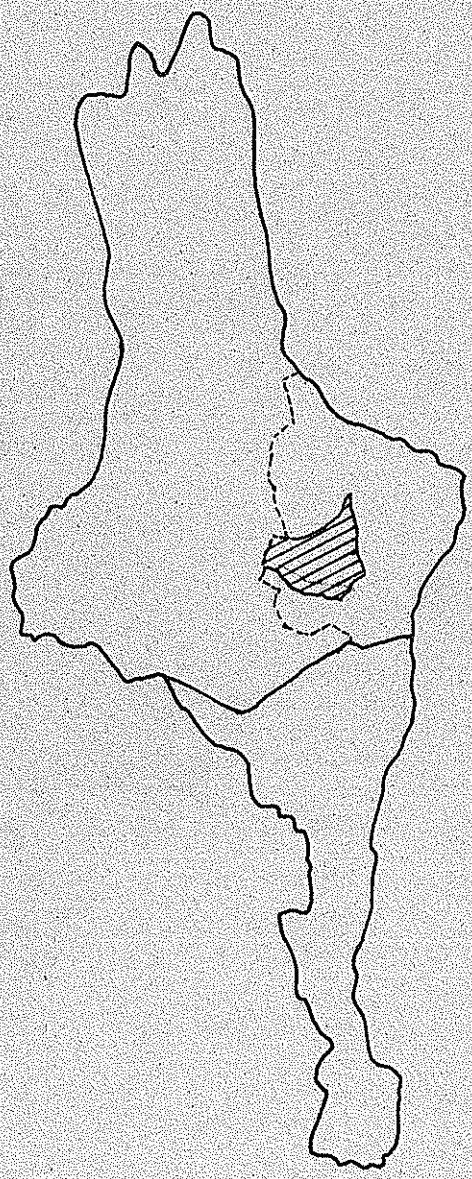

W E I W E I L O C A T I O N
W E S T P O K O T D I S T R I C T
K E N Y A

Regional Development Research
West Pokot/Elgeyo Marakwet
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CONTENTS

0 PREFACE AND SOURCES

This Locational Development Profile is part of a group of profiles about locations in West Pokot and Elgeyo Marakwet Districts. They give a summary of the history and situation of administration, population, physical geography, economy and social geography. The various profiles are written for people working in the location and for government employees at the divisional and district level.

The information presented will not be 100% complete nor 100% reliable. Readers are invited to use the text as a work edition and to make as many additions and corrections as they like. It will be very useful if you present your comments to the ASAL Programme Advisor P.O.Box 287 Kapenguria.

Chaundy[1] is our source for the history of Weiwei Location from 1931 to 1946.
Recently quite a bit of research has been done in Weiwei Location. For paragraphs 4.2 and 4.6 we used the results of an anthropological research done by Elizabeth Meyerhoff in Katuw area in the southern part of Weiwei Location in the middle of the seventies. Also we made lenghty quotations of Irene Dubel and Marjanne de Kwaasteniet's "Government assistance to traditional irrigation systems." Amsterdam, 1983, especially for the paragraphs 3.3, 4.4, 4.5 4.6 and 6.5. They did their research in 1982 as students of the Department of Human Geography of the University of Amsterdam[2].
Hogg did research on irrigation for planning purposes in West Pokot during 1984. We used his data for the paragraphs 3.6, 4.3 and 4.4.
Besides we used material from our own interviews. Simon Lopeyok interviewed 20 shopowners in Sigor and both Simon Lopeyok and Rachel Andiema talked to 185 labourers of the KVDA farm. We want to thank the ones who posed the questions but also the people who were willing to answer our many questions. We also had access to all types of archival material on Weiwei Location [3].

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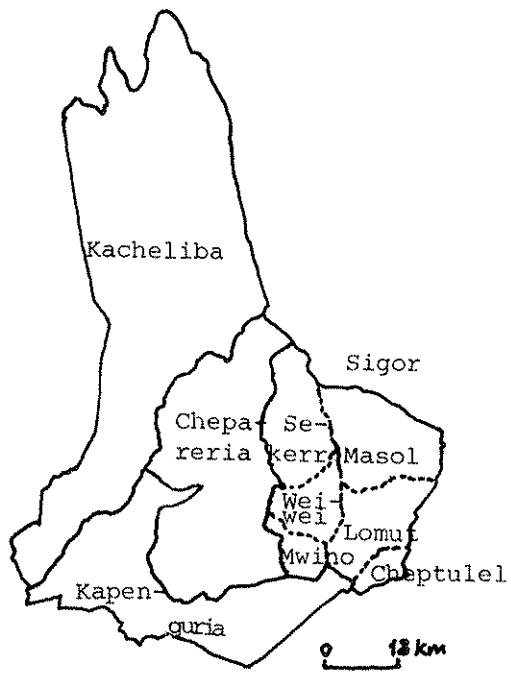
1) For complete titles and for other literature used for this Locational Development Profile see the Bibliography.
2) They were associated with the Provincial Irrigation Unit,Rift Valley Province.
3) In 1982/83 Ton Dietz and Annemieke van Haastrecht were affiliates of the Institute for Development Studies of the University of Nairobi. Mirjam Schomaker was affiliated with the Kerio Valley Development Authority. We all had official research permits issued by the Office of the President.

1 INTRODUCTION

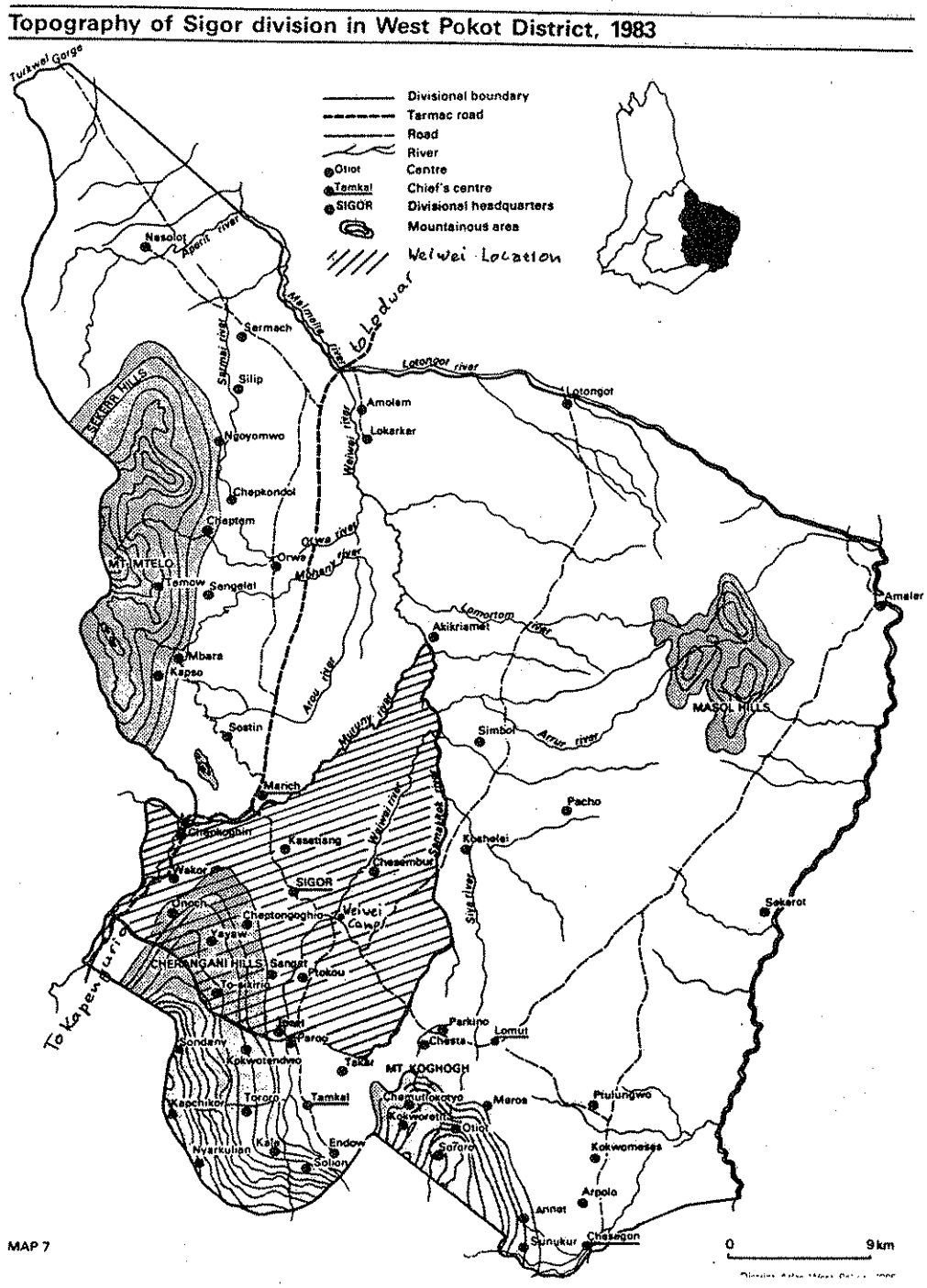
1.1 Situation

The foothills and plains of Weiwei Location are situated in the southeastern part of the district. Weiwei River runs through the location from south to northeast.
Weiwei Location is surrounded by Sook and Sekerr Locations to the North, Masol and Lomut Locations to the East and Mwino and Batei Locations to the Southwest.
To the South are the Sondang Range and the Koghogh Massif, both part of the Cherangani Hills from where Weiwei River runs through the Masol Plains joining the Turkwell River further North.
To the Northeast the Muruny River forms the boundary of the location crossing Marich Pass which separates the Sekerr Mountains to the North and the Cherangani Hills to the South.
The tarmac road between Kapenguria and Lodwar runs partly parallel along the Muruny River and also passes through Marich. From Marich to Sigor centre along a main earthen road is only a quarter of an hours drive. The building of the tarmac road reduced the driving time Sigor-Kapenguria from about three and a halve hour to one hour and fifteen minutes. Since then regular matatu services between Kapenguria and Sigor make the Kapenguria market and services available for people living in the surroundings of Sigor.
To the direction of Lomut and Chesegon runs the main earthen road through the Kerio Valley. Just South of Sigor where this road crosses the Weiwei River, many times the bridge has been swept away blocking the passage to the South.

Map 1 West Pokot District administrative division 1979 and the locations of Sigor Division in 1983



Map 2



Source: District Atlas West Pokot 1985, p.11.

1.2 Administrative History

The valley of the Muruny River formed an old route from the Kapenguria Highland via Marich Pass and Sigor to the Kerio Valley.
In this way Weiwei Location has always been a place through which travelling people passed. Around 1925 there were three roads in the location: one from Maerich[1] to Weiwei camp, Siya River and furtheron to Cheptulel , one from Maerich to Weiwei River (the Kolossia Road) and one from Weiwei to Kiptoyo (the road to Mwino). At that time Kapenguria-Sigor was a 4 days march.

In 1913 the government post "to administer the Suk and the Turkana" moved to Maerich the present day centre Wakorr, in Weiwei Location. Within two years Maerich lost this honourable position to Kacheliba from where the District Headquarters lateron - in 1929 - moved to its present location at Kapenguria. From 1917 onwards chiefs were located in Weiwei.

First data from the administration about the population of Weiwei counted:

	Huts	Polls*	men	women	children	cattle	shoats
1923	451	59	471	430	911	1151	7941
1924	425	37	487	424	619	1222	9131
1925	439	57	484	439	742	1304	8819
1926**						1609	14378
1927**						2362	17225

* Polls are: initiated boys not yet married
**livestock countings

It seemed that in the twenties quite a number of people attained cattle and moved into grazing areas returning from time to time. Irrigation was already practised in 1925 along two main furrows. On the irrigated fields sorghum was grown. On the rainfed fields fingermillet and tobacco were grown.
In 1924 270 Lb. maize seeds were issued and planted in a locational community shamba. In 1925 360 Lb. maize seeds were issued. About the results nothing is known. In 1931 Chaundy started a demonstration plot at Sigor Camp planting beans and potatoes, aided by schoolboys from the government school.

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1) nowadays Wakorr

Sigor Centre became more and more important. In the fiftees there was a trible police outpost with four constables, an African Court and a Political Police Force of sixteen people.
Besides three agricultural instructors and a grazing ward were working in the Division. In Wakorr was a prison camp with three warders.

In 1957 when the system of divisional administrative units comprising several locations started, Sigor became Divisional Headquarters of Lower(now Sigor)Division until 1970. Besides there was Boma or Kapenguria Division in West Suk District. Between 1970 and 1979 Sigor was Divisional Headquarters of Sigor Division.
After 1979 Sigor stayed Division Headquarters but the divisional boundaries changed. The chief of the location resides in Sigor. The assistant chiefs are posted in Sigor, Ptokou and Wakorr. The boundaries of both the location and sublocations changed considerably between 1969 and 1979 and between 1979 and1983 (see map 3).

Map 3 : Location and sublocation boundaries

1969 1979 1983

1 Korelach
2 Ptokou
3 Wakorr
4 Sangat

2 POPULATION

Weiwei Location has recently experienced many changes in boundaries. About the early boundaries we have no information at all. So we have to be very careful with conclusions about population development. We only give here the data for several years in which the population was counted. (See graph 1).

Graph 1 : Population of Weiwei Location

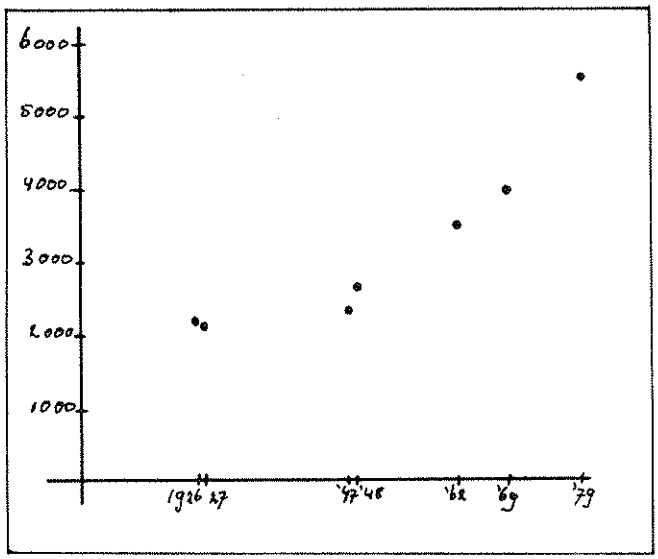
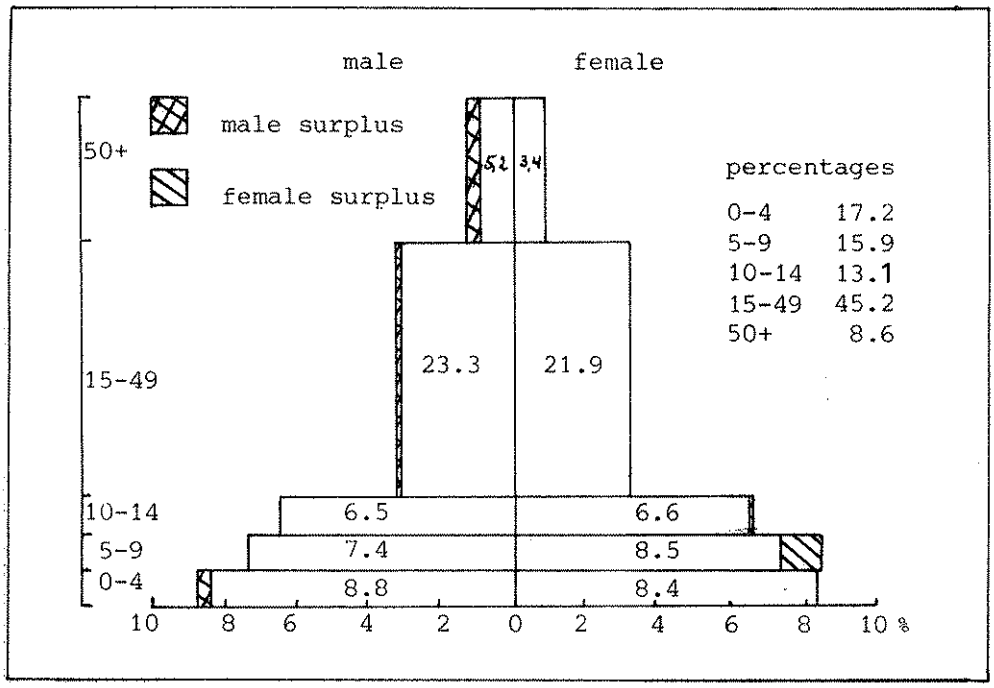


Table 1 Population density of Weiwei Location

year	number of people	km²	pers./km²
1926	2189		
1927	2134		
1947	2336		
1948	2679	389	7
1962	3507		
1969	3988	250	16
1979	5515	253	21
1983		231	

It seems that in the sixties part of the population of Mnagei must have come from Weiwei Location. A number of years later, in 1969 and afterwards inmigration took place. Pastoral people of Masol had to flee their overgrazed and raided area.
After 1979 this inmigration has strongly increased and now comprises several hundred families. They can only return to Masol again when they have acquired enough cattle to live from and when it is safe there. Nowadays they try to practise agriculture north of Sigor.

Graph 2 Population Pyramid of Weiwei Location 1979



For 1979 we drew a population pyramid. In comparison to West Pokot as a whole hardly any differences appear in the age groups.
The group of 0-5 years is somewhat underrepresented and the 15-49 group somewhat overrepresented. Three age groups (0-5, 15-49, and 50+) show a surplus of males. In the 5-9 group there are more females and the 10-14 group is neutral. In Wakorr was a road works camp at the time of the census which attracted male workers and might explain the male surplus in the age group 15-49 and also the overrepresentation of that age group compared to West Pokot as a whole. The major changes in sublocation boundaries make a comparison between the different years impossible on this level.

We here give the figures for the three sublocations Korelach, Wakorr and Ptokou.

Table 2 : Population census figures of 1979 for Weiwei Location

	Males	Females	Total	Number of Households	Km²	Density	Persons/ household
Korelach	1256	1207	2463	505	78	31	4.9
Wakorr	779	735	1514	336	98	15	4.5
Ptokou	786	752	1538	326	76	20	4.7
Weiwei total	2821	2694	5515	1167	253	21	4.7

In 1979 Korelach was the most densely populated sublocation,with a density of 31, Ptokou followed with 20 and Wakorr with 15. Weiwei as a whole had a density of 21 persons per km², only a bit higher than West Pokot as a whole with 17 persons per km². But within Wakorr (nowadays Korrelach) the area of Sangat has a much higher density. In 1979 at the time of the census there were 1167 households in Weiwei with on average 4.7 persons per household (West Pokot as a whole had 5.4).

3. NATURAL RESOURCES

3.1 Geology

The area is occupied by the oldest rocks found at the earth's surface all over the world: the Precambrium Basement System Rocks. The rocks are metamorphic: formed during a situation in which existing sedimentary rocks are changed, because of high temperatures, high pressures and chemically active fluids. This occurs during tectonical movements within the earth's crust. Metamorphic rocks have a relatively high resistance to erosion/denudation (more than their originating rocks) and are characterized by flowing layers.

In Weiwei, several types of these rocks are found. They differ in mineral composition, which may influence soil formation. The high Sondang level in the Southwest consists of hard granitoid gneisses. However, for a large part of the location no differentiation has been made on the geological maps.

After a long, uneventful stage, new tectonical activity (in this case faulting, related to the large Rift Valley Faulting System) occurred in the Mid-Tertiary. In this area, the North-South running Mwino Fault, in the centre of the location, is the most important and clear evidence.

Along the larger rivers (Marun, Weiwei) loose material has been (and still is being) deposited during repeated flooding (alluvial sediments). Especially along the Marun river (near Marich Pass) many people pan gold. These small gold grains they find, were originally minor constituents of the old Basement System Rocks. As time passed, part of these rocks have been weathered. The loose rock/soil material has been transported by water. Only a very small percentage of this material are small, relatively heavy gold grains. Because of their large weight they can not be transported over long distances. This is the reason why they accumulate in the alluvial material near their original source. The nearer to the source, the larger the gold grains will be.

Nothing else is mentioned in the geological reports about mineral deposits of significant economic interest.

3.2 Relief

Weiwei location can roughly be divided into two major landscapes. A steep, mountainous landscape in the Southwest, which is part of the Cherangani Hills and ranges from 1500 to over 3000 m. above sea level, and an undulating to flat landscape in the northeastern half: alluvial deposits along major rivers, bottomlands and a small part of an old peneplain. The latter is a landscape with very faint relief, which is the result of long lasting erosion and denudation. Scattered over such a plain, minor relict mountains are preserved. The landscape ranges in altitude from 900 to 1500 m.a.s.l..

Directly related to the variation in altitude, differences in climatic conditions occur (see 3.5).

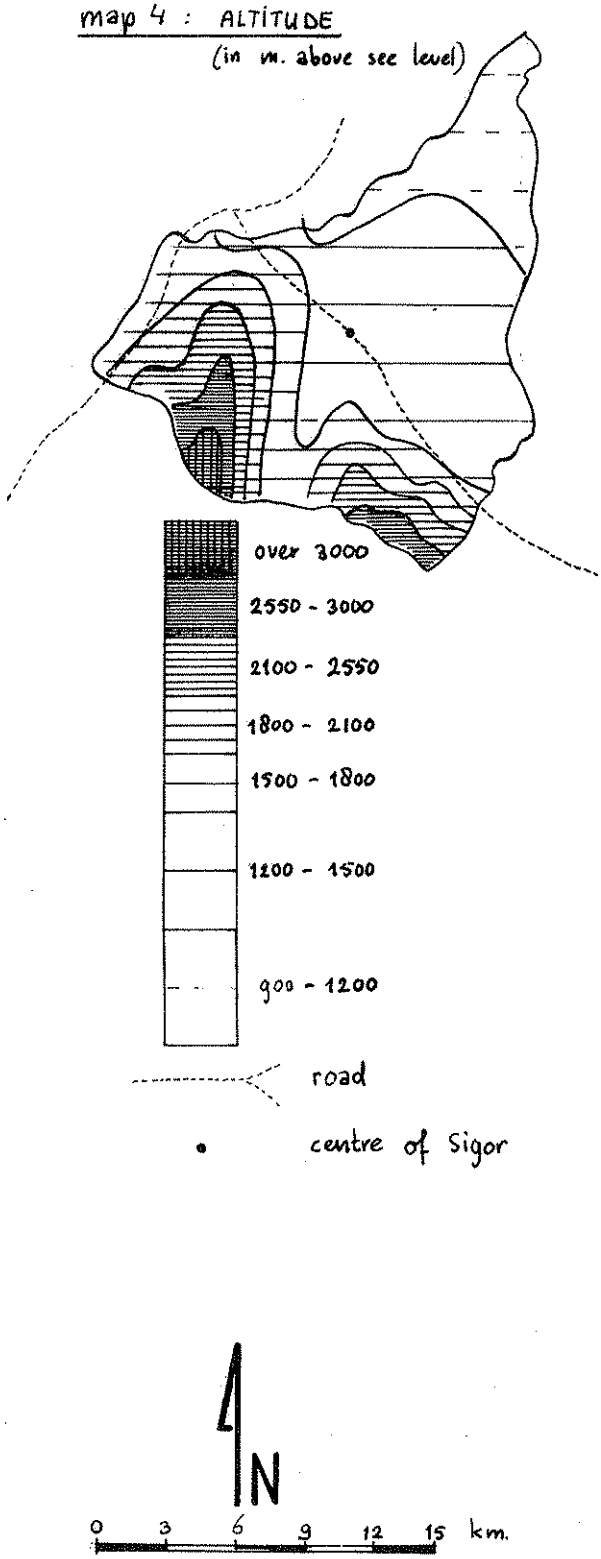
Map 4 gives a general impression of the altitude.

3.3 Vegetation and erosion

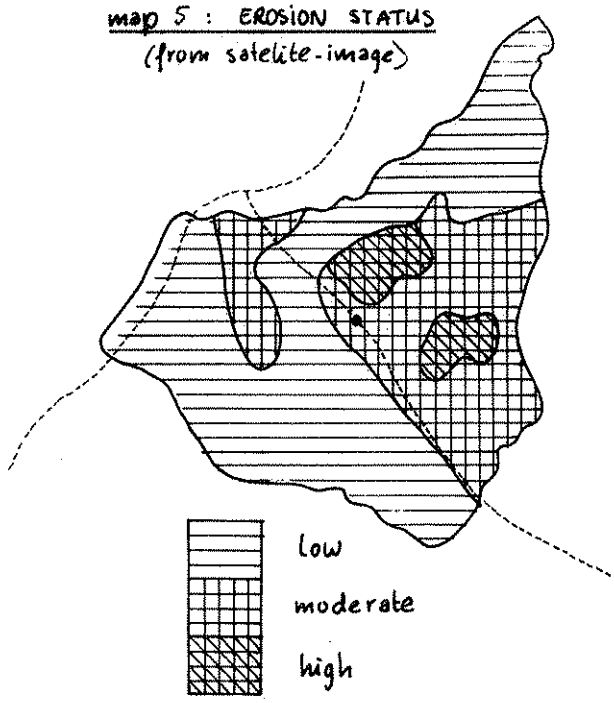
In the flat and undulating landscape low woodland is dominant with various Acacia species. The amount of undergrowth is variable, mainly depending on the amount of goats and sheep that use the area as grazing land. At several places overgrazing has caused moderate to severe erosion, as indicated on map 5 . On the plains near the escarpment, partly irrigated arable farming occurs as well.

On the steep escarpment and valley sides a combination of forest and rainfed arable farming is common. Deforestation in larger catchment areas like the Sondang Range, in order to enlarge the arable acreage, provide better and more grazing land and obtain more fuel wood, has greatly increased in recent years. This process results in severe erosion. Consequently the water retention capacity of the soils reduces dramatically. In this situation rainwater will mainly flow away superficially. The erosion process causes great danger to the water supply in a much bigger area than Weiwei location alone. Tighter regulations of forest cutting should be exerted through local chiefs and already caused damage should be restored, for, if no such actions are taken, the long term consequences will be disastrous. Without further study it is impossible to tell

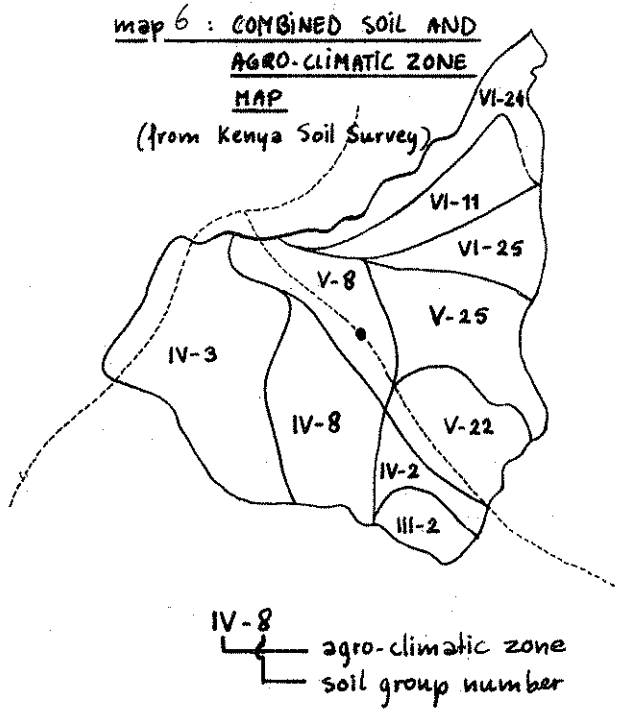
map 4 : ALTITUDE
(in m. above see level)



map 5 : EROSION STATUS
(from satelite-image)



map 6 : COMBINED SOIL AND AGRO-CLIMATIC ZONE MAP
(from Kenya Soil Survey)



how fast developments will take place, but that these changes will constitute a threat to for instance the irrigation schemes along the Weiwei and Turkwell rivers is certain, considering extensive surveys in other parts of the world.

Of course erosion does not only date from recent times. As an illustration we give a short outline of the erosion history in Weiwei location as described in Dubel and De Kwaasteniet (1983):

Patterson describes the situation of 1959 as follows: 'It had been clear almost from the inception of British rule that overgrazing and forest destruction were making large parts of the district into virtual desert, but almost nothing was done'. This was not wholly thrue though. G.H. Chaundy arrived in Kapengùria in 1931 to run the Government African School. He did not restrict his work to agricultural teaching at the school but started touring the district to improve the agricultural methods of the Pokot and to fight erosion. He reported about finger millet cultivation by the Pokot in the following way: 'As soon as the long rains started the seed was broadcast and owing to the steepness of the slopes the writer has seen not only soil washed away, but the seed also.' On the demonstration plots he founded throughout the district (one of them in Sigor, nowadays belonging to the Village Polytechnic), contour ridges were made and the people were told that if the soil was washed away this would affect their crops. This was not enough to induce people to follow his example and finally he introduced ordinances which required farmers to place contour-ditches in the fields and to stop further slope planting. Despite these ordinances people continued planting on steep slopes and the African Agricultural Instructors who were assigned to enforce the ordinances were often accepting bribes to overlook illegal practices. During the entire colonial period the Pokot resisted forest reservation strongly because they were afraid that land would be grabbed from them by the Europeans.

Finally Uhuru came and with the disappearance of the Europeans all the restrictive rules they had imposed upon the Pokot were thrown overboard. This period was still remembered by some of the older people in 1982. They told how, in the general euphoria

about the departing of the Europeans, people went their own way and started clearing finger millet plots high in the mountains and along the small streams which arose there. Resistance to any restrictive measure was even increasing. In the middle of the 1970's restrictions on burning in the catchment areas and cultivation within a distance of 7 to 10 m. along the rivers were reimposed. From the Forest Station in Tamkal a start was made to replant the catchment areas of the Weiwei and its tributaries and to keep the people from cultivating the higher parts of the mountains.
However, it is questionable whether this will have any effect. As the area is not a Forest Reserve, people can not be fined. In general the situation is the same as in colonial times: there is much talking about soil conservation at barazas, but none of the measures is really effectuated.
By 1974 the Forest Department established a tree nursery in Sigor that is still working reasonably well. Until 1981 the number of seedlings varied between 20,000 and 70,000 yearly. In 1982 131,000 seedlings were produced. The Sigor project had a staff of 25 people. Financing was uncertain in 1983, but in the Annexes to the District Development Plan 1984-88 we find an ASAL allocation of 50,000 Shs. for 1985-86 and a proposed allocation of 62,500 Shs. for 1986-87 for afforestation in Weiwei Location.

In the Sangat/Weiwei scheme land degradation makes itself felt by a change in the level of the Weiwei river and the developing gullies. Some of the older men told that since the beginning of the 1960's the level of the river is lowering more rapidly after the rainy season, but they could not tell whether this was accompanied by a considerable rise in the wet season discharge. Anyway it seems justified to assume that changes are taking place in the regime of the river and both floods and watershortage can be the consequence of it.

Although their irrigation system was washed away several times, people only nowadays become aware of the effect of soil erosion. One of the reasons for this is that some natural drainages which have been existing in the area for a long time, now have become wide gullies which destroy irrigation

furrows time after time, while also newly formed gullies cause a lot of damage. It was tried to check the gully development by filling them with stones and trees. An example is the largest gully in Korrelach sublocation. 15 Casuals were employed to construct checkdams in it. However, a heavy storm in March 1981 destroyed all the soil conservation 'structures' and widened the gully to 20 m., half a kilometer before it reaches the main river. In 1982 8 gabions were placed in this gully. On the other side of the Weiwei river gullies are still filled with stones and branches, and the furrows are still filled with local materials. If no real progress is made in soil conservation programmes, the people who are dependent on furrow irrigation will soon be faced with the same problems.

3.4. Soils

According to the Exploratory Soil Map of Kenya, 1980, of the Kenya Soil Survey (scale 1:1 million), seven soil groups occur in the area (map 6). The first symbol in the code stands for a certain agro-climatic zone (see 3.5), the second symbol gives the soil group number (description below). The mapping units are not always homogenous, which means that different soil groups may occur in a particular unit as well, while it is not mentioned in the description.
For the general description of the soils we used the Kenya Soil Survey Reports, but also general literature, applicable to Kenya as a whole and to other arid and semi-arid areas.
The official soil classification according to the Soil Map of the World (FAO/UNESCO, 1974), also used by the KSS, is added.
The given soil depth refers to the effective soil depth for plant roots.

Soils occurring in Weiwei location are: 2, 3, 8, 11, 22, 24 and 25. The other numbers are found elsewhere in West Pokot and Elgeyo Marakwet.

2. Soil development in the mountains and escarpments.

These soils are well drained, which means that water is removed from the soil easily but not rapidly. These soils commonly retain optimum amounts of soil water for plant growth after rains or addition of irrigation water. This unit is a complex of shallow, rocky and stony soils and deep, non rocky and non stony soils. Shallow means less than 50 cm. deep, which causes problems for plant roots. Natural fertility is moderate. Erosion susceptibility is high, mainly due to the sloping character of this unit.

Classification: MFbc, chromic cambisols-partly with lithic phase; with eutric regosols and rock outcrops.

3. Soil development in mountainous areas.

The soils are somewhat excessively drained, which means that water is removed from the soil rapidly. The amount of water available for plant growth can become a problem. The soils are shallow, rocky and stony: apart from problems for plant roots, this can cause difficulties while working on them with simple tools. The soils are young, little developed. Natural fertility is moderate. The soils as such are not very susceptible to erosion, but due to the sloping topography, the erosion hazard is high when the natural vegetation is scarse or when cultivation practices do not coincide with conservation measures.

Classification: MUbe, eutric cambisols-partly with lithic phase; with lithosols, eutric regosols and rock outcrops.

8. Soil development on the footslopes.

These soils are well drained, very deep, that is deeper than 120 cm., and the structure is rather loose.

Natural fertility is moderate. Due to the good infiltration capacity and the almost flat topography, the erosion susceptibility under a good natural vegetation cover is rather low. However, cultivation and for instance overgrazing have increased the erosion hazard. In fact erosion is a big problem at several places.

Classification: FUlc, chromic luvisols; with rhodic ferralsols and luvic/ferralic arenosols.

11. Soil development on almost flat areas.

The soils are moderately well drained, which means that water is removed from the soil somewhat slowly, so that the soil is wet for a small but significant part of the year. For certain

plants these soils may be too wet because too little oxygen is available while oxygen is of vital importance for plant growth. The soils are very deep, slightly to moderately calcareous and slightly sodic. The latter means that the soil material, in this case clays, contains relatively much sodium. After rainfall or addition of irrigation water, the sodium is displaced from the clay minerals and reacts with the soil water, so leading to a very basic soil solution. The clays disperse and this results in a severe loss of soil stability so that the surface horizons become structureless (extremely hard and massive when dry). In this situation these soils cannot be used for cultivation.
Only when the complete removal of the sodium ions is achieved, the soil becomes more acid, the structure stabilizes and cultivation is again possible.However, to achieve this, a lot of non-saline irrigation water is necessary and the soil must be artificially drained in order to wash out all the sodium. These measures are very expensive and in this area not realistic.
Erosion can occur especially after overgrazing.
Classification: YUxh, haplic xerosols-with sodic phase; with calcaro-cambic arenosols.

22. Soil development on gently sloping, undulating areas. The soils are well drained, shallow, strongly calcareous, moderately to strongly sodic and saline. Sodic properties have been discussed above. Saline means that the soil solution contains many soluble salts. When the salt concentration of the plant moisture becomes lower than the concentration of the soil moisture the roots can no longer absorb water and the plant will dry out and die. Only special adapted salt loving plants can survive under these extreme conditions.

The salt may originate from the parent rock or (as is often the case) from secondary accumulation. Salting may for instance occur on the lower slopes and valley bottoms as a result of the removal of the original vegetation in the hinterland. This will result in an increased rate of removal of minor quantities of salts from the soils on the upper slopes. Consequently, the salts accumulate in the valley bottom lands, where rainfall and drainage often are not sufficient to wash the salts out.

The soils are unsuitable for arable farming. Again, only expensive intervention (non saline irrigation, drainage) can solve this problem.
The soils in this unit have a gravel mantle. The excessive amount of gravel at the surface makes arable use and extensive grazing very difficult.
Classification: UxUrc, calcaric regosols-with gravel mantle and sodic-saline phase; with gleyic solonetz.

24. Soil development on flat areas along rivers.

The soils are well drained to imperfectly drained and very deep. They show stratification due to sedimentation processes (finer and coarser material deposited on top of each other by the flooding rivers). The soils are calcareous and have a good natural fertility. In the arid zone VI however, salinity may be a problem. Erosion hardly occurs on these flat surfaces; flooding can cause problems ((young) plants will be damaged and waterlogging may occur).
Classification: AAjc, calcaric fluvisols (locally with saline phase?).

25. Soil development on the bottom lands.

These soils are imperfectly to poorly drained, very deep, dark brown, slightly calcareous and strongly sodic. As discussed earlier, sodic soils are not suitable for cultivation, unless expensive major improvements are applied.
Classification: BUso, orthic solonetz.

3.5 Climate

The ecological potential of an area depends, apart from soil and relief characteristics, hydrology and erosion status, largely on the prevailing climatic conditions; particularly the annual and seasonal balance between rainfall and evaporation (the latter is mainly determined by temperature and turbulence).
The climatic conditions in the location vary considerably, due to the altitude differences. Unfortunately there is only one climatological station in Weiwei location: Sigor-station, situated in the transition zone from the mountainous to the flat/undulating landscape. For this station only rainfall data are available. In this paper we add figures of Tamkal-station (about 11 km. South of Sigor, in the Mwino Valley, Mwino location) and Lomut-station (some 14 km. southeast of Sigor, at the foot of the escarpment in Lomut location). Also for these stations rainfall figures are the only available data.
The given figures are not representative for the whole location. The amount of rainfall for instance, will be higher in the mountains in the South (some 1500 mm./yr. like in a comparable area around Kabichbich, Lelan location) and lower in the plains in the north-eastern part of the location (less than some 800 mm./yr.).
Apart from the spatial variation, there is also a high variability in rainfall at one particular place. From the monthly rainfall dispersion graphs and the long-term-mean graphs (see below) one can read that the deviation from the mean figures is large (often more than 100%), both considering rainfall in one particular month and the yearly rainfall. It appears that even during the long rains between April and August a period of relatively low rainfall exists in June. November is the month of the short rains. Yet, on average, all months receive at least some rain, even during the dry season between September and March.

For temperature data the only source is the Exploratory Soil and Agro-climatic Zone Map of Kenya, 1980 (scale 1:1 million) of the Kenya Soil Survey. Mean annual temperature ranges from 14 to 20°C in zone III (southeast of the location) to 22 to 30°C in zone VI (the northern part of the location). In table 3 some more agro-climatic zone characteristics are given.
For each zone the ratio between average annual rainfall (r) and average annual potential evaporation (E_0) is listed.

The probability that the rainfall in the rainy season (P_r) will be less than 2/3 of the E_{0r} (a relatively dry year) becomes higher when the agro-climatic zone becomes dryer. Consequently, the chance of a partial or total crop failure increases the more arid the zone is. In zone III the chance is 2 to 20%; in other words one out of fifty to one out of five years. In zone IV the chance is one out of five to about three out of five years. In zone V and VI the situation is even worse: three out of five to nine out of ten years for zone V and at least nine out of ten years for zone VI.

Since 40% of the location is situated in zone IV, 32% in zone V and 25% in zone VI, it will be obvious that the potential of rainfed arable farming is very low. This can also be concluded from the fact that since several generations irrigation practices have been applied in Weiwei location (when the first furrow was dug no one knows, the Pokot merely say it was a long time ago). Especially zone IV and the part of zone V at the foot of the mountains/escarpment is important for irrigated agriculture.

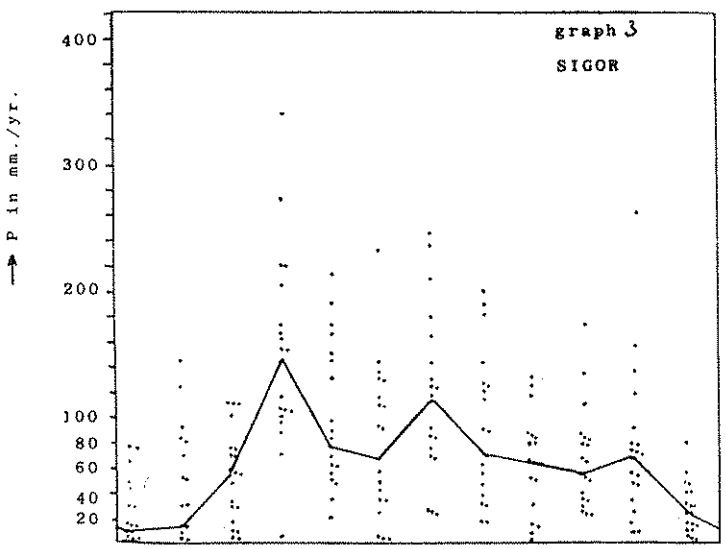
Table 3 : Characteristics of the Agro-climatic Zones

zone	III	IV	V	VI
climatic designation	semi-humid	semi-humid to semi-arid	semi-arid	arid
mean annual temp. in °C	16 - 20	18 - 23	21 - 25	23 - 30
mean annual max. t in °C	22 - 26	24 - 28	26 - 30	28 - 36
mean annual min. t in °C	10 - 14	12 - 16	14 - 18	16 - 24
climatic designation	fairly cool to warm temperate	warm temperate to fairly warm	fairly warm to warm	warm to very hot
average number of growing days	235 - 290	180 - 235	110 - 180	75 - 110
r*/E_0** -ratio in %	50 - 65	40 - 50	25 - 40	15 - 25
Pr***/2/3E_{0r} in %	2 - 20	20 - 65	65 - 90	90 - 97
risk of crop failure (adapted maize)	fairly low (5-10%)	low to moderate (10-25%)	high (25-75%)	very high (75-95%)
area in % of total area of the location	3	40	32	25

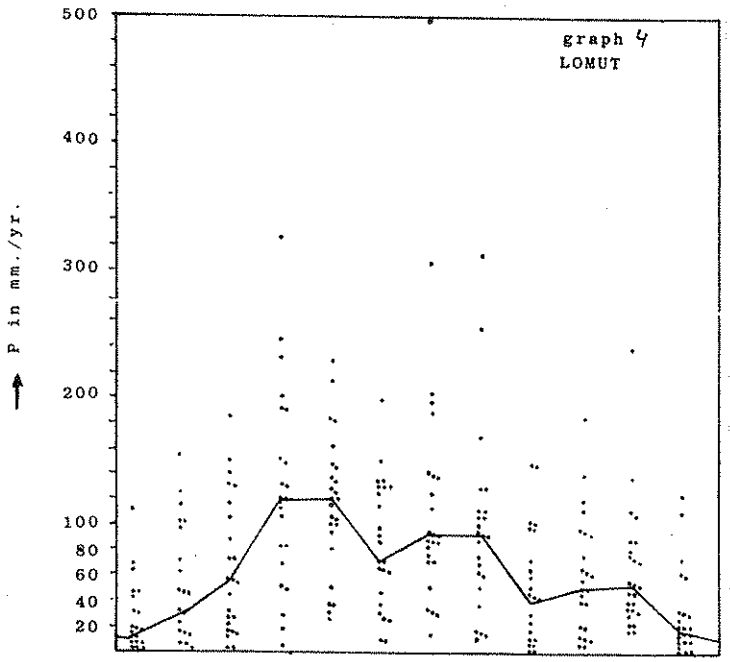
* r = rainfall ** E_0 = potential evaporation

***Pr = rainfall in rainy season

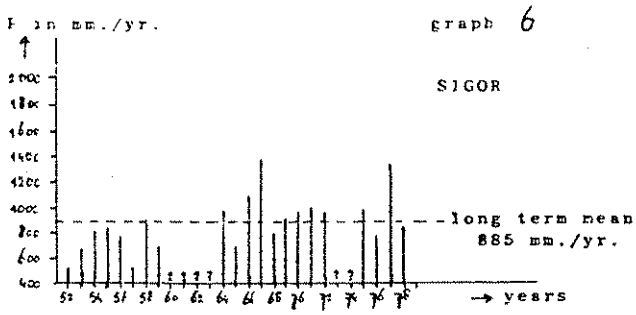
Graphs 3 till 8 : Rainfall and Climate

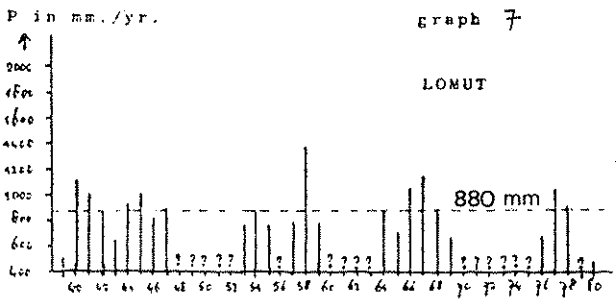


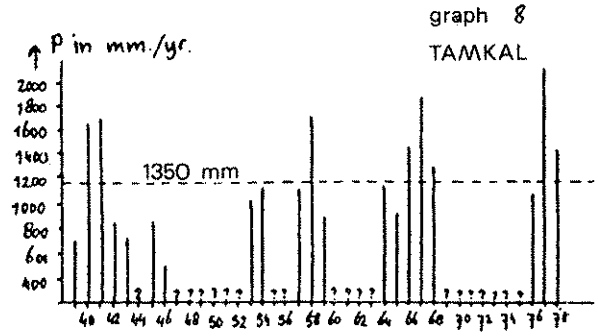
	J	F	M	A	M	J	J	A	S	O	N	D
mean	23	40	54	151	122	70	107	91	58	67	76	28
median	9	14	53	144	82	65	114	71	68	56	69	28

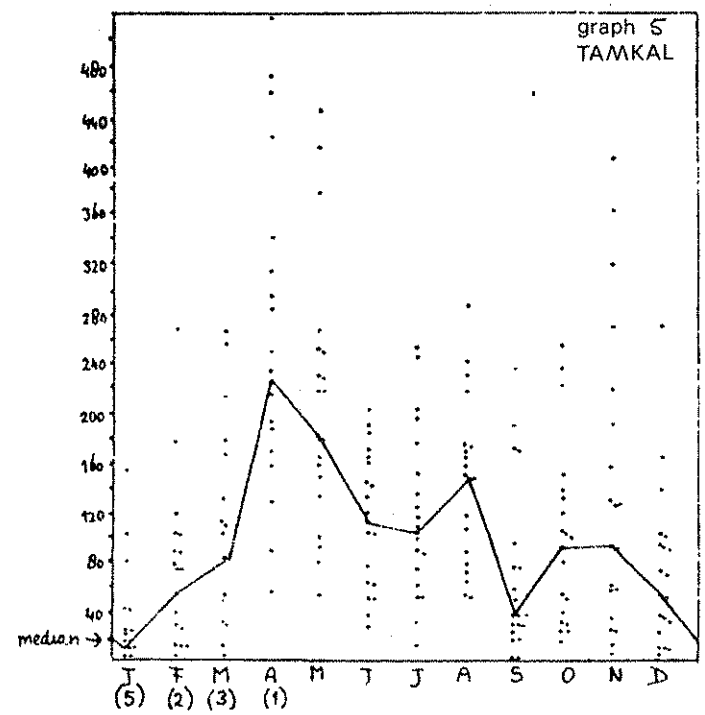


	J	F	M	A	M	J	J	A	S	O	N	D
mean	22	44	63	122	116	82	116	93	46	60	66	30
median	11	27	56	119	120	72	93	92	42	51	55	20









mean	27.9	67.0	95.1	257.2	208.3	109.5	116.6	141.2	69.3	98.2	136.6	72.3
median	13	48	82	226	179	112	100	147	37	90	91	49

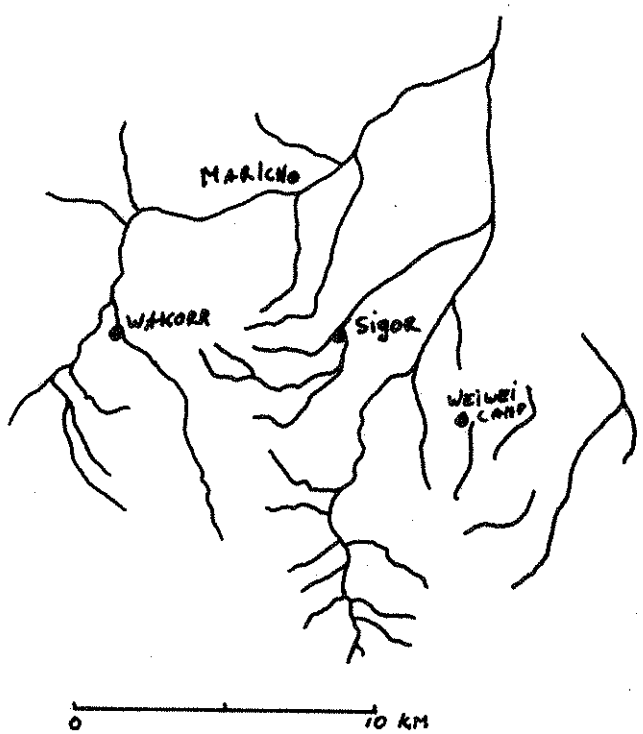
Graphs 3, 4 and 5 show dispersion figures for the monthly rainfall. Every dot corresponds with the rainfall figure for that month in a particular year. The figures in brackets indicate the number of years in which no rain fell in that month.

Graphs 6, 7 and 8 show the variation from the long term mean, using the available annual figures. For Sigor 20 years, for Lomut 25 years and for Tamkal 20 years.

3.6 Hydrology

The entire location is part of the Weiwei catchment area which finally drains into Lake Turkana. The major part of the area drains into Weiwei river itself; only a narrow zone in the East drains into its tributary Muruny river. The Muruny joins the Weiwei some 10 km. northeast of Sigor while Weiwei river flows into Turkwell river about 120 km. north of Sigor.
The Weiwei and Muruny are perennial rivers, which means they carry water all through the year. Discharge figures are not available. In the dry season though, discharge is obviously much less than in the wet season. A recent survey (1) carried out in this area concludes that nowadays there is more water available for irrigation than is actually being used.
Apparently the amount of water was no restricting factor for , possibly partly adapted, traditional irrigation at that time.
However already in the dry year 1984 and also in the years thereafter problems arose . The increasing need of water by the KVDA will undoubtably cause problems between KVDA and the local population. They can only increase with the major plans KVDA has in mind (see paragraph 4.5).

Map 7: Rivers in Weiwei Location



Source: Map 1:250,000, Survey of Kenya.

1) Richard Hogg, 1984.

4 AGRICULTURAL USE

4.1 Agricultural Production from 1930 onwards.

We will cite extensively G.H.Chaundy, education officer with an agricultural degree, who was stationed in Kapenguria in Jan. 1931. During that year but also lateron he made extensive tours through the district and described the systems of agriculture at that time. He also visited Weiwei Location and wrote the following about the sorghum production.

"In the locations of Mwina, Weiwei, Lomut, Cheptulel and Marich there was a definite system of land tenure, in contrast to the pastoral locations, where all grazing was communal. Two crops of sorghum were grown per year, one planted in April or May, and harvested in September, and the other planted in October and harvested in February or early March. For the growth of the first crop the people relied on the rains and irrigation was only resorted to when there was a dry period, but the second crop, though planted before the rains stopped, was irrigated during its later growth. It was a crude form of irrigation. Main furrows were dug from the streams just before they came to the flat plains. These main furrows were taken out roughly at right angles to the streams, and from them smaller furrows were constructed. As the land was flat there was little soil erosion.

After harvesting the crop the land was allowed to rest for two seasons and reverted to bush, so only one-third of the available cultivable land was under a crop at one time. In this way the land was not worked out; these light sandy soils easily loose their fertility if continuously cropped without rotation or manuring.

When plots were prepared the following procedure was followed: the trees were merely lopped and not destroyed, the branches being used as fences. All undergrowth was cut, put into heaps and burned. The land was then dug with primitive hoes, a type of hard wood being sharpened and used for the blades. Very few people had metal hoes. While the women were digging, the men were opening up the water furrows. Each family's plot was marked by stones and often an irrigation furrow. As soon as the rains came, usually towards the end of April or early May, the seed was broadcast. When about six inches high, the crop was thinned and weeded. It was the custom of

the people to leave too many plants, with the result that the crop was often badly "laid" during high winds or storms. When the crop was ripened platforms were built on which children sat, scaring away birds. It was harvested towards the end of September by cutting off the ears. The women undertook the threshing. It was stored in the huts where the people lived, a platform being built about the height of the eaves.
Five distinct varieties of sorghum were grown by the people, at altitudes varying from 3,000 to 4,000 feet."

In the higher areas from 5,000 to 8,000 feet fingermillet was grown on steep slopes.
"Steep hillsides were chosen as the local people say that when grown on the flat the millet is attacked by a disease called 'Cheptaita' (rotting of the developing "fingers", which, as a result, do not set seed). It was harvested four to five months after planting. After harvesting, the patch was left and the next year another piece of the forested hillside was destroyed and prepared for planting. On most hillsides in West Suk bare places could be seen - the sites of former shambas. It was realized at once that this primitive method of agriculture was gradually reducing the forested slopes to bare rocky wastes. After the seed had been planted and before the crop had time to take root, extensive erosion took place. The people were also destroying the forests along the streams running down the hillsides. At this stage it was useless to prohibit the cultivation of hillsides owing to the lack of staff to enforce the application of any rules made. Fingermillet had been the staple food of the people for generations; it is nutritious and will stand storing for a considerable time."

To prevent extensive erosion on the steep slopes and to improve and augment the food situation, Chaundy outlined a scheme in August 1931. "This was that each location should have its own agricultural demonstration plot and seed farm. It was explained that the benefits would be threefold :
- To introduce new crops to the district;
- To teach the people better methods of agriculture, special attention being paid to soil conservation;
- To be a seed distributing centre."

After a lot of initial difficulties the demonstration plots, among which one was in Sigor, seemed to show results.
According to Chaundy by the end of the thirties erosion decreased considerably and future food shortages were not very likely, owing to the fact that people planted a variety of crops.
"Banana suckers have been planted extensively in the plains zone and practically every family has its own plantation. Other crops doing well are sweet potatoes, yellow maize, cassava, pawpaw, groundnuts, onions and simsim. These are in addition to the sorghum and fingermillet which the people have always planted.
In the Weiwei Location a community centre has sprung up around the demonstration plot, with the village school, dispensary in burnt brick, and two shops."

Chaundy remained active in the area till around the middle fourties. The demonstration plot now belongs to the Village Polytechnic.

Patterson, citing the West Suk Intelligence Report, Nov. 1950, is much more sceptic about the results Chaundy made. Maize and probably bananas did have some success, but besides, all sorts of - "elaborate excuses were put forward as reasons for not accepting seed. Some said they had sufficient already, others that a number of deaths had been caused by eating maize, others that the women became so fat from eating maize that they could not bear children, while the existance of every beast, bird or insect that walks, flies or crawls was cited as a reason for not planting some particular crop."
According to the Pokot the problem with the new crops was that, although they liked some of them, they complained that too much labour was required to grow them. "Chaundy's soil conservation measures were generally thwarted by bribing the African inspectors to overlook violations." (Patterson, 1969, p.24).

Certainly on the long run the introduction of new crops was not without problems. Even by 1963 a witchdoctor convinced people in Sigor to abandon maize planting. Sorghum and millet were still the main crops in Weiwei. Beans were increasing and maize was not yet very popular. Also erosion continued to be considerable; enforcing rules against erosion is difficult in remote areas.

During the end of the fifties and the beginning of the sixties the government proposed to extent the area under irrigation "to make Sigor again a granary for a much larger population than the approximate 30,000 inhabitants of the Division."
In 1964 according to the 7-year Agricultural Development Plan "Sigor can boost of being one of the most highly underdeveloped areas of Kenya despite their good agricultural potential.

Barter trade with pastoral people had in former times been possible. But in the fifties and sixties famine relief was regularly necessary for the people who before could buy grains from Sigor Division." Moreover within the division famine relief was and is regularly necessary in dry years and also after flooding of the rivers which carry too much eroded material and subsequently destroy the crops.

So Weiwei irrigation scheme was proposed. Both this Weiwei (—/Sangat) irrigation scheme and the irrigated KVDA (Kerio Valley Development Authority) farm will be discussed separately furtheron.

During the seventies and eighties maize is becoming more and more important and is now the major crop.

We continue with a detailed description of the present farming system in Weiwei Location based on a survey done by Elisabeth Meyerhoff.

4.2 Subsistence economy of a Pokot agricultural Community in Weiwei (Survey by Elisabeth Meyerhoff)

During the middle of the seventies Elisabeth Meyerhoff did an in-depth anthropological research in Katuw, an area just north of Ptalam Sublocation, in Weiwei Location. We used her typescript "The position of women in the subsistence economy of the Pokot agricultural community ", written in 1978, to give a description of the agricultural economy in Weiwei Location. The typescript describes the situation around 1977. At that time the changes in the Pokot economy only started and most households were only marginally integrated in the money economy.

Crop cultivation and irrigation.

Each family has tenure rights, 2.5 acres on average in different ecozones, from the valley floor of the Weiwei River to the high hillslopes. Every year 0.75 - 1 acre are used for maize (by all house holds), 0.25 - 0.5 acre are used for fingermillet (by 70% of the households) and in dry years sorghum is cultivated as a short rain crop (less than one acre; for one quarter a variety that takes only two to three months to harvest and for three quarters varieties that take five months to harvest). The actual use of land is not always on the fields which are owned by the household: half of the fields are "begged"; between relatives this happens without compensation, between non-relatives a token gift is a necessity. In very rare cases land can be bought (1/4 - 1/2 acre for one young female goat which was, in 1977, the equivalent of about 600 Shs. per ha.).

Maize is mainly cultivated on the valley floor. Each family cultivates two to three fields of maize per year, each field between 0.25-0.5 acres big. The same piece of land can be used three to four years and is left fallow one or two years afterwards. In the recent past the maize acreage in Katuw increased gradually and also the amount of labour and capital spent on maize. The labour calendar and the average labour time involved are given below.

A small field (0.25 acre) can give a yield of 300-400 kgs. of maize[1]. An average family eats 20 kgs. per week so 1040 kgs. per year. The problem is that maize can only be stored for eight months and before green maize from the next crop can be harvested mostly there are about seven weeks without maize from the own fields. Most people try to have a foothold in various eco-zones to avoid this problem. Maize in the valley is mature in September; on the high plateaus of Kokwotendwo in December or January. When a family is nevertheless confronted with a maize shortage they sell a he-goat (for 40-60 kgs. of maize; we must remark that there must have been a considerable inflation at the expence of the cultivators : in 1982 a goat sold for 100 or even 125 Shs. and maize was still about one Shilling per kg.).

Fingermillet plots are used for two years and left fallow for six to eight years. They are situated at the often very steep hill slopes not far from the homesteads. In the slack period before planting time after the second fingermillet harvest, an extended family clears a plot of three to four acres and each household gets 0.25 to 0.5 acres. This usually gives 200 kgs. of grain[1] and it is used for food and beer. In this area it is not an exclusive women's crop, although mostly women do the majority of the lighter tasks. For the labour calendar the information can be found below.

Sorghum is only cultivated when the April-June rains were not good and when people fear that the harvest of maize and millet are far from sufficient. They use more than one variety to ensure a long harvesting period.

Irrigation

The irrigation system in Katuw is at least four generations old. Canals are made and the river Weiwei is dammed just below small

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1) Meyerhoff gives very high yield figures compared to figures from other sources.

rapids. The Katuw canal is 0.7 km. long, 90 cm. wide and 30-60 cm. deep. Building and repair is exclusively a man's job. Normally they repair and rebuild the canal in May but in years with a lot of damage they start much earlier. In a normal year it takes a group of 15-20 men about 12 days of hard work (170-220 working days). To build a new canal even costs 500 working days per km. If a man is not around to do the job it costs him a payment of one goat. The irrigated plots are especially used for the cultivation of maize, sorghum, cassava and bananas.

The Korok community of men still plays a dominant role in deciding when irrigation starts (as they also decide when sowing/broadcasting can start) and whose fields are irrigated in which sequence. They also fine people who misuse the system, and they manage the maintenance system. Both men and wives use irrigation water and women do have a separate right to request for water.

Table 4 Labour calendar for Katuw area (about 1500 to 1800 m.)

Month	Maize	Fingermillet	Sorghum	Irrigation	Other
January (dry)		Fencing (each second year, all the time by m. (total 8 weeks)		if large damage: start repair (m)	building huts (m/w) water (w)
February (dry)	digging (m/w, one week)				water (w) animals (m/w)
March (dry)	fencing (m, 4 weeks for large area)	clearing used land			idem
April (rain)	planting (m/w, 1 day)	fencing used land			gathering insects
May (rain)	1st weeding (m/w/ch, 3 weeks)	broadcasting		rebuilding/ repair canal (m)	vegetables (w)
June (rain)	building shelters (m/w, 4d.) 2d weeding, (3w) guarding (m/w)	take care			vegetables gathering
July (dry)	not always 3d weeding, guarding	some weeding	planting	irrigation	veg. try to find additional maize
August (dry)	guarding, build maize stores (m/w) green maize ready	birdscaring building store near the hut	take care	irrigation	
September (dry)	guarding maize harvest and drying	harvest and storage	take care		
October (rain)	storage		harvest of early types		
November (rain)			take care		
December (dry)		clearing new land (each 2d year) and fencing.	harvest of late types		

Some tasks are in fact done the whole year: collection of vegetables (by women, but especially in the months before the harvest); collection of firewood (by women), of water (a heavy job, especially when the streams are dried up, by women and children), fishing (by men), beekeeping (by men), and animal husbandry (milking especially in the rainy season ; looking for pasture, especially in the dry season, mostly by men and boys).
The labour calendar shows that especially the years in which new fingermillet plots are cleared are very busy ones. In those years only October and November can be regarded as slack months.
The Katuw labour calendar is valid for the communities on the middle slopes of the valleywhere the harvest starts in july. Higher up in the valley(e.g. from Tamkal upstream) the harvest period is much later.

Livestock

In the Katuw community households with cattle were rare (and regarded as wealthy). More often households had an average of 25-30 goats and 10 sheep, that is: households which could be regarded as established, after 11 years of marriage or more and with 2 or 3 children alive. Goats were very important in the reproductive system of the population here. A female goat has an average offspring of 7 or 8 during her lifetime. If no calamities happen an accumulated offspring of 30 in ten years can be regarded as normal (which is a very high rate of interest....). Most of the male goats were sold or eaten.
In times of food shortage they were sold or bartered for maize.
Also labour payment, fines and ceremony gifts were paid in goats.
In bridewealth arrangements goats were important too. In this area bridewealth was two cows and six goats, to be paid in a spread form: 30-40% straight away, 10-20% after the birth of the first child and the rest lateron.
Compared with the other agricultural Pokot the bridewealth was rather low, mostly it is 3 or 4 cows and 30 goats and compared with pastoral Pokot it was extremely low (there it might have been 20 head of cattle or more and 60 goats).

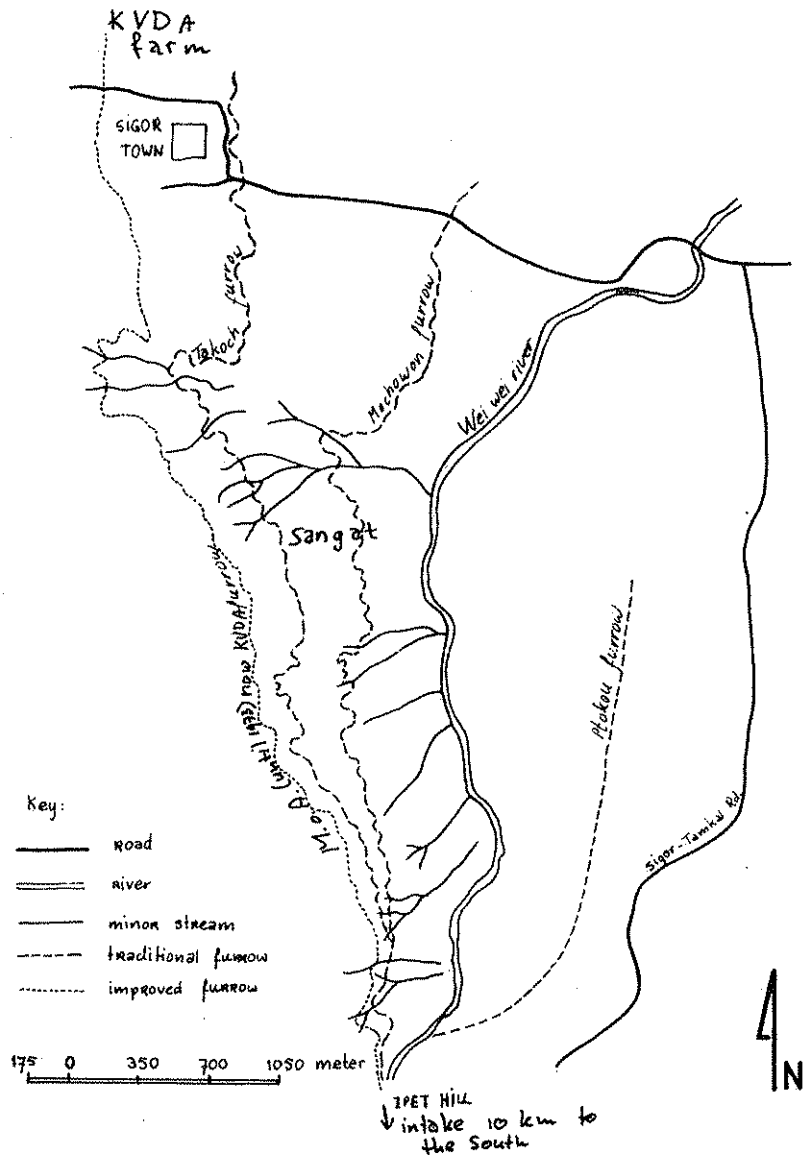
Money

Households in the Katuw area did spend money in 1977. They were supposed to pay an area rate of 25 Shs, to pay fines in money and more and more people organizing work parties had to spend some money to pay the workers in beer. Also seeds and tools were bought.

Those who sent their children to school (a small minority in 1977) had to spend 50 Shs. on a school uniform and 40 Shs. on school fees. Those who had cattle did spend a small amount on treatment and salt. A number of household items were bought too: cooking pots, some clothes, blankets, beads, household tools, salt and fat. A 'monetarized' household could spend about 450 Shs. according to Meyerhoff, the equivalent of nine male goats or 800 kgs. of maize (in 1977).

4.3 Irrigation

As mentioned before irrigation has been part of the Pokot arable farming methods for at least several generations.In this location the Sangat/Weiwei 'scheme' and, since 1981, the Kerio Valley Development Authority (KVDA) farm are the major irrigation activities. The first comprises three operational furrows on either side of the Weiwei river: Takoch in Korrelach sublocation, Mochowon in Sangat and Ptokou.



The furrows have consistently been identified, both in colonial times and thereafter, as in need of improvements and rehabilitation. The potential of the 'scheme'area, if irrigated, for increased food production is relatively high.

For this reason irrigation has been a development priority for several decades. This potential also encouraged the KVDA to establish the farm near Sigor in 1979. From an irrigation survey (1) carried out in 1984 we learn that ....
' Yet the local farmers do not make maximum use of what resources they already have. Nearly everyone I met told me that the acreage under cultivation had declined in the last ten years...' and ' ...Since 1978-79 large areas, especially on the northern side of the Lomut-Sigor road, have been left uncultivated. Why this is so has more to do with social and economic reasons -the general move away from sorghum to maize, the growth of wage labour and gold panning, schooling- than any particular lack of irrigation water ....'.
We add another possible explanation for the decline in acreage under cultivation Northeast of the Lomut-Sigor road: according to the Exploratory Soil Map of the Kenya Soil Survey, most of the soils in this area are sodic and/or saline (see section 3.4), which decreases yields dramatically. However, the scale of this soil map is 1:1 million and therefore is not accurate enough. A more detailed soil survey is a necessity here in order to evaluate the further irrigation possibilities. Especially because at least part of the KVDA farm may be situated in this area, that is, when all the planned 2000 ha. are under cultivation.
Continuing with Richard Hogg's findings: he states that .....
' ... Whatever reasons for the decline in acreage, the consequences are clear under production of basic traditional food crops. There is therefore good reason to encourage farmers to make more intensive use of the land, especially by encouraging the use of irrigation to grow maize and sorghum in the dry season, during the slack period of the agricultural cycle. At present for instance, no farmers grow a second crop of maize....'. However, '.... I do not suggest a general government sponsored rehabilitation of all existing furrows. Rather in the first instance, certain important or potentially important furrows should be selected for rehabilitation. The use farmers make of the 'rehabilitated' furrows should be closely monitored. Local agricultural extension staff should encourage not only the planting of cash crops, but, above all,

1) Richard Hogg, 1984.

cereal crops like maize and sorghum. The existing traditional set of rules regarding the use and maintenance of the irrigation furrows, nowadays partly lapsed, should and can be re-invigorated with the backing of the local administration. In particular each major furrow should have its appointed committee of elders, who would be responsible for its upkeep....'.
In the other sections of this chapter the partly irrigated arable farming is discussed in detail.

4.4 Sangat/Weiwei Scheme

Hogg, who did research on irrigation in the area, gives a summary of government or other interventions in this scheme.
"This 'scheme' (in fact it is not a scheme anymore) is situated south of Sigor township, in a narrow valley of the Weiwei River, on the footslopes of the Cherangani Hills.
It has a long and complicated history, but it will suffice to give only a brief summary thereof:
Traditional forms of irrigation have been practised in this area since times immemorial but Government intervention was for the first time considered around the year 1956. The first proposal, which was submitted in 1962, envisaged to irrigate an area of 250 acres, for which the costs were estimated to K.£ 10,500/- (Chief Hydraulic Engineer, Ministry of Works). By April 1963 the construction of a gabion type weir and intake, as well as a main canal (furrow) had been completed. The head works and main canal were for the second time completely destroyed by floods in March 1969. The local people then tried to make a temporary intake and to rebuild the main canal only to be destroyed again in 1970.

After this disaster, the Provincial Administration launched the idea to "re-build" the scheme, i.e. to construct new head works, and a main canal on a self help basis (cost estimate Shs. 60,000/-).

The Water Department was subsequently approached to assess the situation and to prepare a plan and cost estimate. Their brief plan, submitted in 1971, proposed to construct the headworks and a left and right bank canal for which the costs were estimated at Shs. 80,000/-. (the construction of a distribution network was proposed as Phase II).

The Freedom from Hunger Council agreed to contribute Shs. 20,000/- to the project, whereas the Water Department allocated Shs. 80,000/-. The proposed canal alignments had been surveyed by the Water Department and construction started early 1972.

By the end of 1972, about Shs. 50,000/- were spent on the construction of a canal and it was feared that the funds would be insufficient to complete the project, unless the work could be continued on a self help basis.

A survey was carried out by the F.M.U. in December 1972 (119 ha, at a scale of 1:2,500). Since the self help contribution appeared to be extremely poor, it was suggested to turn the Project into a Government run Pilot Scheme. Moreover, suggestions for a 1,000 to 2,000 acre scheme (K.£200,000) were also made at that time and in this context a bigger area was surveyed in 1973/74 by the F.M.U. (2,146 acres, 1:5,000, left hand side only).

For unknown reasons the construction, started in 1972, came to a nearly standstill in 1974 and Government attention was then diverted from Weiwei to a newly proposed scheme near Kainuk (Amolem), for which the Norwegian Government had pledged financial aid. From that moment onwards, the people of Sangat continued to irrigate as they were used to before 1962.

According to Hogg in 1982 there were two canals (furrows) in operation, the one on the left bank canal serving 282 families (roughly 100 acres) and the right bank canal serving 277 families (roughly 100 acres as well). There is no weir or permanent intake structure and the remains of the destroyed structures can still be seen.

Dubel and de Kwaasteniet, who did a research in the area in 1982, estimate roughly the same area under irrigation for the right bank 100-150 acres (without fallow land) but much more for the left bank: 500 acres (instead of the 100 acres mentioned by Hogg).
In a monthly report of Sigor Division it was estimated that the potential of land which can be irrigated in Sangat/Weiwei scheme is 1500 ha! of which less than 1/4 was utilized. This seems to be a high estimate. They estimate the number of families depending on irrigated maize in the Sangat/Weiwei area at about 450 to 500. By chance roughly the same number as Hogg thinks live there?