1938 Kenya 1

No. 38184/3

SUBJECT. CO 533/496

Soil Erosion

(CDF Grant)

Previous

1937 File

Subsequent 1939 File

See 38398/38
38404/39
46596/41

1. Govt. Dep. Kenya ... 14.11.38
Ack. (13) ... file & express sincere appreciation of the assistance rendered.

... Circular No 23 dated 20.12.37
(... ... ...)

Dr. ... ...

...

Dr. ... ...

... ... CAC ...

... ...

... Kenya would be asked ... ...

to ... ... purpose.

... ...

... 24/1/38

No 1 — Put by
No 2 Draft herewith — Clothing ... 31/1

AB 9.2 — J.J. Paskin 1/2

Remind to ... to ... No 2.

7/3/3

F.O. Kenya 3 pm - Done - 7 FEB 1938

DESTROYED UNDER STATUTE

... ... No 2

DESTROYED UNDER STATUTE

... Kenya ... 30 ... 12.2.38

(S. Ans.) ... 20 additional copies of Secretariat Circular No. 23 of December 1937.

Taken – ...

A. J. Jarvis
22/2

C.O.C. 386 ——— 7.3.38

DESTROYED UNDER STATUTE ... Secretariat Circular 23 of 20.12.37 to members of the [illegible] Council.

? Put by
Clothy White 11/3

A.T. ...
A. J. Dawe
14/3

No reply received from Uganda to No. 14
on 38184/3/37 (Pt. 1)

... Jenkins
R. 297
... 4.38

(14) on –/37 has been followed by (19), dealing with the same subject.

Reminders to (18) & (19) might be sent as it will look churlish to delay reply to Dr Reisner's offer too long (see No. 21 on –/37).

Clothy White
5/4
at once

6 To Kenya } 13/8
7 To Uganda } Conf. A/2 13 APR 1938 3
Cond. by No. 9

8 Kenya 332 25.4.38
Sets out position regarding the ... visit to America & South Africa about which he is in communication with Uganda.

? Now write to Dr Reisner saying that Kenya & Uganda definitely accept the offer, with referring to (21) on –/37, & giving details as in No. 8. Draft submitted for concurrence.

Clothy White
5/5

9 Gov. Uganda 110 28.4.38
Accepts offer of the Agric. ... Foundation & states the officer selected is Mr. H.R. Hosking.

Draft to Dr Reisner amended in the light of No. 9, and a draft despatch to Uganda submitted covering the proposal that Mr Hosking should also visit the California Cotton Belt and Trinidad — a proposal which it would seem there need be no hesitation in approving.

Clothy White
7/5

Mr Dawe is away.
Perhaps I might have your views on 9 & these two drafts?

S. H. Campbell
9.5

These proposals may be agreed to. I have signed the drafts & when they are issued the file ...

be returned to me in order that the Empire Cotton Growing Corporation may be informed d/o of the projected visit of Mr Hosking to the Cotton Research Station in Trinidad

J. A. Stockdale

10 to Dr. Van Rensen 10/5 13 May 38

11 fr Uganda 131 9 [illegible] 16 MAY 1938

The d/o letter to Mr Kellby has been issued

J. A. Stockdale
2/6

to [?] Kellby (no) 21. 5. 38

13 Gov. 288 19.5.38
Sets out policy regarding reduction of numbers of cattle & incl. estimates of expenditure for 1938 & note of a visit by Messrs Gurney, Edwards & Barnes to the Union of S Africa & Basutoland.

orig desp on 38086/24/38.

Note: a progress report on soil conservation measures in Kenya is at (2) on 46596/38 EA. It is in the form of a memo circulated to the Governors Conference

No 13 The Kamba petition has been dealt with on 38086/24/38.

The despatch as a whole shows that the soil conservation service is getting into action very swiftly, & that the C.D.F. assistance in the Machakos reserve may soon bring in large results, particularly by way of showing the natives what can be done if proper measures are taken.

Sir F. Stockdale & the Governor to see

? Put by

C[illegible] 4/6

14 Gov. 314 6.6.38
Gives particulars of arrangements for visit to America of Messrs Barker & Hosking & asks that U.S. Govt be approached for grant of facilities. Possibility of a short visit to Italy will be discussed on arrival in London.

If we ask for facilities at all [illegible] put by [illegible]

We don't yet know when Mr Hosking will arrive in New York but he will report arrival in London (in June) after which it will be possible to let Dr Resner know, if necessary by cable, the dates at which the officers arrive in NY. I think this would be better than doing it all at a time.

Nor do we know if the Uganda Govt is going to ask us to ask for facilities for Mr Hosking. I should be inclined not to bother the F.O. with this anyway.

The question of Mr Mahon's visit to Italy does not require action now.

For the moment put by.

C[illegible] 15/6

Sir F. Stockdale.

No 13.

As regards the Kamba petition, a reply is being sent on 38086/24/38.

Do you think that anything shd be said (in a separate desp. on this file) as regards the report of the visit of Messrs Gurney, Edwards & Barnes to

No 14.

Having regard to previous corres. with Dr Brown [redacted], so your statement that it is necessary to ask the US to approach the U.S. Govt. officially [illegible] with the request that Mr Rogers & Mr Hocking should be "afforded all possible facilities" —

J J Paskin
30/6.

In view of the extract from a letter received from the writer for Mr Watson, D of A, Kenya now added to the file, this seems to be unnecessary. There will be no difficulty in the States.

I must, however, see Mr Hocking when he passes through London. He should call on me on arrival by arrangement & this office might ascertain when the [illegible] Castle arrives. He should call on Dr Rowland — and may thank you — for what the American mission has done. The E.C.G.C. also want to see him & are particularly anxious him to include a visit to Florida in his tour. We want to find out — in the interests of the West Indian Sea Island cotton industry the exact position in regard to Sea Island cotton in Florida. He should also see cotton cultivation in that State & the methods of cultivation adopted to check [illegible] deterioration & erosion.

H A Tempany
2/7

I am not sure whether you have seen Mr Paskin's query on No. 13

—

For the rest, I saw Mr Hocking at your request this afternoon for a few minutes. It is most annoying that we have no despatch from Uganda as to the financing of his tour and there is now no time to telegraph for one to be sent by air. I saw nothing for it but to ask Mr Hocking to set out his requirements (when he can estimate them) to us in a letter & promised that we wd. try to fix up for him with the C.A. He will write; & probably call again.

[further to (9)]

G McCampbell
6.7

No 13

I have read through this report on the visit to Basutoland & the Union of South Africa and it is pleasing to note that the officers who went on this tour learned much about Soil Erosion Control work. When this visit to Basutoland was suggested in my report on the visit to East Africa, it was held in Kenya to be undesirable. It is very pleasing to note that wiser counsels have prevailed. The report is an interesting & useful document & the officers responsible for it should be commended on its preparation & presentation. I do not think we need comment in detail. I am in full agreement with most of the points made in the report & it is made clear that progress

will only be made in that [illegible] in Kenya of [illegible] is so [illegible] by the [illegible] of all and the training of natives in measures designed to promote their conservation. [illegible] are not required.

It is [illegible] to [illegible] that the [illegible] has been [illegible] & we can only hope that the consideration [illegible] of the Dept. will not [illegible] their [illegible] and [illegible] measures are being [illegible].

J. A. [illegible]

[illegible]

The Kabaka of Uganda asked to-day about arrangements for [illegible] the details [illegible] [illegible] P.F. [illegible] [illegible] of [illegible]

[illegible]

[illegible]

[illegible]

[illegible]
[illegible]

17 [illegible] 367 — 3.8.38
[illegible] copy of a [illegible] [illegible] by Dept. of Agric. for use in [illegible] 6

There is no [illegible] [illegible] [illegible] [illegible]
[illegible]
[illegible]

[illegible] one copy to Mr Dane now and ask for 20 more when [illegible]

[illegible]
10/8/38
at once

18 [illegible] Foundation [illegible] — 10.8.38
[illegible] of [illegible] of [illegible] [illegible]

19 [illegible] — 5/8/38

20 Dr [illegible] — [illegible]
[illegible] 19

[illegible] 20
[illegible] (see note on 20)
[illegible]
[illegible]

[illegible]

[illegible] file for Questions Nos 1 & [illegible] asked by [illegible] Grenfell [illegible] [illegible] 31st July

W. Kenya — 3 pm — Conv — 31/8/38

[illegible]

22 Dr [illegible] — 19.8.38
Enquires how the grant should be paid

23 J. Dr [illegible] 22 acknd — 5.9.38

This amount of £100 promised for the Agricultural Missions Foundation should be paid to the Crown Agents for the credit of Kenya & Uganda funds in equal amounts & sent to the officers concerned. If this policy is approved, I need write Dr [illegible] accordingly & the Crown Agents could be advised, as also the Govts of Kenya & Uganda [illegible]

(9) on [illegible]/37

The Agricultural Missions Foundation offered two travelling fellowships each of £100. This has dwindled to a total of £100 in (22) & (23), & although there is probably no danger of a misunderstanding it is perhaps as well to emphasise the fact that there are two sums of £100 involved ~~concerned~~.

Drafts submitted

Clutterbuck
8/9

[illegible signature]
7/9

To Dr. J. H. Reisner (50) — 9 Sept 38
(22 amend)

~~To C.A.~~ — 13 Oct 1938

6/9

26. Dr. J. H. Reisner to — 16/9/38
Acks 24: Has remitted $300 to Hosking

~~27 To Reisner s/o~~ 26 Acks. — 23/9/38

Copy of (26) to C.A. with ref 25
(see clip above (27))

Clutterbuck 26/9
above

~~28 To C.A.~~ (w/c 26) B.C. — 3.10.38

29. J. D. Evans to — [illegible]/38
Suggests that the Language [illegible] officer in Kumasi should have an opportunity of seeing [illegible] work in Basutoland

Sir F. Stockdale

Your [illegible] of 22/[illegible] on [illegible] of [illegible] Mr Mahon is due to return to Kenya about [illegible] & [illegible]. Will it suffice to [illegible] fill for [illegible] on (29) on 15.11.38?

[illegible signature]
2.11

Mr Paskin.

I would propose to reply [illegible] in this draft

[illegible signature]
3/11

[illegible] [illegible] [illegible] at the [illegible] [illegible] [illegible] to deal with [illegible]. I have [illegible] [illegible] to draft. The [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible signature]

[illegible] 7/11.

[illegible]

~~30~~ To Dr. [illegible] Evans (50) — 29 [illegible] — 4th Nov. 38

31 Ak. Sec. Stat. 31/10/38
Refers to 20 copies of booklet on "Soil Erosion"

Copy to Mr Dawe (r min of 16/7)
Spares to Library.

? Send copies to Sir F Stockdale
Mr Pasain
Lord Temsfany, & [illegible]

Clotley White
12/11

Done
[illegible]
2/XI/38

A Thomas.

A.R. Thomas
12/11

32 J.A. Reisner S/o. 9/11/38
Encls receipts from Messrs Hosking and Maher for transmission to Cr Agts.

33 To Dr Reisner S/o 32 encl 18/11/38

34 To C.A. 2/12/38

Sir Frank Stockdale

The receipts enclosed in 32 have now been forwarded to the C.A. — see 34.

I am now minuting to you on 3 other points:-

(1) In case you wish to take any action on para 3 of 32.

(2) In para 4 of 14 it was suggested that Mr Maher should visit Italy on his return to Kenya. I understand that he is now back in England and I you have perhaps already discussed this with him.

(3) Nos. 29-30. You will no doubt also be discussing the question of a visit by Mr Langridge to the Union with Mr Maher.

A.R. Thomas
2/12

35 (1) I have written to Dr Reisner in regard to para 3 of 32.

(2) Mr Maher discussed with me the proposed visit to Italy. I told him that we might suggest that he could include it in his programme if he could afford the time and that he could do it on the way to catch a boat to South Africa. He will only see terracing & that terracing is almost invariably associated with the cultivation of the vine or the olive in the south. + One can learn all there is to learn from Italy from the railway carriage window, but a few days in the north of Italy might be useful to Mr Maher. He should be asked for his reactions to the proposal & if he says he would like to do it & if it does not mean an extension of his period for Kenya by all means let him do it. If he is not keen – well he will not miss very much.

(3) Mr Maher did not respond to the suggestion that Mr Langridge should go to Basutoland & the Union said that he thought he was too old, but

there is more behind it than that. The [illegible] is a Reconditioning officer in the employ of the local authority for the Reserves. Mr Maher is at heart a rehabilitation man & was apt to appreciate how one can work through local authorities and why in fact it is preferable to do so. I would suggest no action on the [illegible] at present. We will await the receipt of the Report of Dr Pole Evans on basis of which it is thought desirable raising the issue of the [illegible] in Basutoland & the Reserves. Mr Maher told me that Dr Pole Evans report was soon published to be [illegible] for the Reserves, the Engineer who is collaborating with Mr Maher, that there are some real snags in it for the Soil Conservation Service and for some other sections of the Dept. of Agriculture in Kenya. These facts did not surprise me & the Maher analyses [illegible] that this is the case.

F.A. Stockdale
8/12/38.

According to a letter on this file his passage to Kenya has been booked by the S.S. Dunluce Castle sailing from London on 22nd Dec. This looks as though he is not

contemplating a visit to Italy. Perhaps he mentioned this when he saw you?

In view however of × in Sir F. Stockdale's minute, it seems doubtful whether any expenditure on such a trip, badly needed each of any of Kenya's, wd. be justified.

? No need to raise this at all.

J.J. Paskin
8/12

As regards soil conservation, Mr Maher seemed surprised that we had not already received an application for a further large grant/loan from the C.D.F., especially for the purpose of clearing some of the "fly" area which alone (in his view) will enable land to be provided to ease the pressure in the Machakos district. In this connection he left with me the attached memo. to which is annexed a letter from Mr Swynnerton.

36

I saw Mr. Bal[illegible] today (D.C. Machakos) & he agreed that this was highly desirable. But he did not think that clearing of the fly area would be of much immediate assistance in connection with the destocking campaign as it takes much longer for such an area to become habitable for cattle than for human beings.

J. J. Paskin
5/XII

[illegible]

B.U. on duration in minute of Supt. of Tsetse has only today returned to Registry.

J. Jackson 29/?
12/12

No further action on 29 & 30 needed, in view of the last part of Sir F. Stockdale's minute of 3/12. Put by. [illegible] 12/12

37. Extract from Lord Hailey's African Survey

This appears to have got overlooked: but in view of the great activity going on at the moment in Kenya ? it may be put by.

C. Costley-White

I agree: there is no action that can usefully be taken on this.

[illegible]
17/3

J. J. Paskin
19/4

A N A F R I C A N S U R V E Y .

LORD HAILEY.

Extract from Page 1094, 1096-1097.

Chapter XVI. Section IV.

Kenya. Anti erosion measures on European Farms.

As a result of propaganda conducted both by the Agricultural De artment and by the Arbor Society anti-erosion measures such as broad-base terracing, green-manuring, composting, and the retiring of steep slopes from cultivation are being taken on the European farms, though not yet on a scale sufficient to control erosion altogether. The obstacle in this case is lack of money rather than indifference. The Land and Agricultural Bank now permits advances to be made for erosion works on the security of the crop, but no assistance is given by government, as it is in South Africa, to farmers for anti-erosion work. Probably the most serious erosion on European farms is being caused by the stock of native squatters, which has increased enormously in the last ten years. Farms which were closed down or abandoned during the world depression were often taken over by uncontrolled native stock, over grazed, and seriously damaged. An ordinance has recently been issued enabling squatter stock to be limited or prohibited in a district where a majority of the landowners vote in favour of such a course. The question has naturally been mooted, but not answered, of what is to become of the banned stock, should many

many of the districts take advantage of this provision; overstocking is already acute in most of the native reserves.[1]

A survey of the underground water resources of the colony noted evidence of progressive desiccation during the past twenty years, and observed a tendency for perennial streams to become seasonal. Lake Rudolph has been falling at the rate of one foot a year for the past twenty-five years.[2] No general steps have yet been taken to prohibit cultivation on river-banks, or destruction of trees outside the forest reserves, nor has the government incurred direct expenditure in controlling head-waters or catchment areas.

x x x

In recent years the government has become alive to the need for taking action in regard to the reserves, but it has not yet provided funds sufficient to deal with the problem on an effective scale. An Agricultural Officer has been seconded to make surveys of the badly eroded areas, and comprehensive reports of four of the regions have been prepared. In Kavirondo, nine small reclamation schemes have been approved by Local Native Councils, and a beginning has been made in checking the ploughing of steep slopes, building small dams, restricting cultivation on the edge of streams, and digging trenches or planting sisal and aloe

1. See Chap.XII,p.754.
2. A.W.Champion, op.cit.p.107.

aloe lines along the contour of gentle slopes.[4]
In the Kikuyu reserve the introduction of wattle [1] as a commercial crop has been a marked success, both as a cash crop and as a method of reafforesting the hill-sides and improving soil fertility. Mixed farming is gaining in popularity, the principal check to its spread being difficulties of land tenure. In one administrative district alone, however, there were recently estimated to be over 400 mixed farmers; almost every village is now provided with a compost-pit. The excessive and growing population of goats, which are extremely harmful to vegetation and (in rich areas such as the Kikuyu reserve) economically of negligible value, is still a problem which defies solution. The amended Native Authority Ordinance issued in 1937 authorizes headmen to give orders to control grass fires, and to prohibit grazing within areas closed to stock for reconditioning; headmen may also be empowered to call out able-bodied men for work on anti-erosion projects.

In pastoral areas the outlook is less hopeful. The live-stock population of the colony as a whole has more than doubled since 1920.[2] No large-scale attempts to limit stock or to institute systems of controlled grazing have been made.

4. Sir F.Stockdale, Report on his Visit, etc. op.cit. pp.89-90.

1. See Chap.XIII.p.890.

2. Report, op.cit. Cmd.4556,1934, pp.494-5.

SETTLEMENT OF THE FLY AREA. MACHAKOS

I set forth a number of points bearing on the clearing and re-settlement of the fly area in the Machakos Reserve in a memorandum which was forwarded to the Hon. Colonial Secretary in January or February 1938.

2. The Provincial Commissioner, Central Province expressed himself as generally in agreement with my views and concurred that it would be of value if He and I visited the fly-clearings and settlement schemes in Tanganyika at the end of 1938.

3. There has been no further discussion of this question as far as I am aware but it was brought to the fore again by a visit to Kenya during May of Mr. F.M.Swynnerton, the well known Director of Tsetse-fly research in Tanganyika, together with Mr. Hurst, the Botanist attached to the same organisation, shortly before their tragic deaths.

4. I visited the Mabuani area as far as Kampi ya Mawe with Mr. Swynnerton and he was very impressed with the possibilities of the area. He considered that a thorough survey would reveal that tsetse-fly might be cleared from the area at no great expense. At my request he wrote me a note on the subject, a copy of which is enclosed herewith.

5. Unless very large sums are made available for work in Machakos - an unlikely eventuality - the rate at which reconditioning and protective work can proceed is likely to be far too slow to keep pace with the rate of erosion and it is certain that large areas of the Reserve will deteriorate to a condition in which recovery to permit of human use is impossible.

6. It would be extremely helpful and valuable therefore, as Mr. Swynnerton suggested, if some of the worst areas could be allowed to protect themselves through

the

the return of a natural cover of vegetation until such time, many years hence, as we shall be able to tackle these areas and to protect them from further erosion by a properly planned and executed conservation scheme. The practicability of deferring work on these areas is dependent on providing alternative accommodation for people and stock in settlement schemes in the fly area.

7. I wish to recommend that a more detailed survey of the fly area should be made in order that an estimate might be prepared of the financial implications of such a settlement scheme. I had hoped that it would have been possible to secure the help of Mr. Burtt in obtaining a rough ecological survey of the vegetation of the area, since his botanical experience in fly bush was probably unique.

8. One of the most expensive parts of the fly-bush clearing is likely to be the provision of the clear-felled barrier between the settlement area and the main part of the bush; this barrier must be, at least in its final form, as wide as two miles Mr. Swynnerton told me.

The clearing in Makueni cost 7/- or 8/- an acre. It is just possible that this clearing could be done more cheaply, and certainly more expeditiously, by mechanical means in the way that large sisal estates have had bush land cleared.

Mr. Walker, East African representative of the Caterpillar Tractor Company, informed me that he would be willing to demonstrate an R.D.7 Caterpillar Diesel Tractor (60h.p.) and 'Bull-dozer' in clearing bush in the Machakos area. The trial would be over several days and would be free of charge.

I think it would be a good thing if Government took advantage of this offer, as the trial would give useful information on cost of bush clearing by mechanical means. It is understood that the figures obtained by large size companies who have often been rather lavish in their methods or haphazard in their organisation, are not such as give an idea of the lowest possible cost for bush clearing.

9. I understand that a cleared 'barrier' strip probably would have to be 20 or 30 miles long and two miles wide, that is 40 to 60 sq. miles or 25600 to 38400 acres.

(Sgd.) Colin Maher.

Officer i/c Soil Conservation Service

THE NORFOLK HOTEL

P.O.Box 64,
Government Road,
NAIROBI

29th May 1936.

Dear Maher,

I have given thought to the suggestion conveyed to me by my view of your fly-country on the Keiti and I have also had Lewis' report on it.

The country, as I told you, is very similar to country in Tanganyika which appears to be evacuated by G.pallidipes during dry seasons following defective rains. Leaf-fall, hence absence of good shade, is very general and starts early in seasons of this kind in the types of work and [illegible] I saw round Kampi ya Mawe and the flies tend to become entirely confined to the denser shade which follows (mainly the large rivers and tributaries. There can be little doubt that the destruction of this riverine shade - a destruction not necessarily involving the better trees - will, in the country I know, result in the expulsion of pallidipes. Davens' statement to me that when he was shooting game in the Keiti-Thwaki country for famine relief after a failure of the rains he saw flies almost solely in the larger rivers, whereas last year, after good rains, they were distributed everywhere, bears out, so far as it goes, my impression that this piece of country is well worth a detailed study from this point of view, as does Lewis' observation that he found five pupae mainly along the Keiti, whereas puparia (old pupa-shells) were much more extensively distributed. Lewis, I see, holds also the view that I formed. He says

on

COPY

THE NORFOLK HOTEL

P.O. Box 84,
Government Road,
NAIROBI.

9th May 1938.

Dear Maher,

I have given thought to the suggestion conveyed to me by my view of your fly-country on the Keiti and I have also had Lewis' report on it.

The country, as I told you, is very similar to country in Tanganyika which appears to be evacuated by G. pallidipes during dry seasons following defective rains. Leaf-fall, hence absence of good shade, is very general and starts early in seasons of this kind in the types of work and of tridents which I saw round Kampi ya Mawe and the flies tend to become closely confined to the denser shade which follows mainly) the large rivers and tributaries. There can be little doubt but that the destruction of this rivering shade - a destruction not necessarily involving the better trees - will, in the country I know, result in the expulsion of pallidipes. Jarvens' statement to me that when he was shooting game in the Keiti-Thwaki country for famine relief after a failure of the rains he saw flies almost solely in the larger rivers, whereas last year, after good rains, they were distributed everywhere, bears out, so far as it goes, my impression that this piece of country is well worth a detailed study from this point of view, as does Lewis' observation that he found live pupae mainly along the Keiti, whereas puparia (old pupa-shells) were much more extensively distributed. Lewis, I see, holds also the view that I formed. He says

on

on page 5 of his report that "it is probable..... that no inconsiderable stretches of this country are unsuitable to permanent infestation by tsetse and that there will be no necessity for destroying every tree".

If further examination bears out this view that chiefly the main rivers need be dealt with a very much larger area might be attacked at relatively small expense than that which the present barrier cuts off, but a difficulty to be faced will be the nature of the ultimate barrier by which the flies would be prevented from re-invading in suitable seasons at least part of the country which you will have rendered unsuitable. It is possible that a complete clearing of say two miles of the course of each river that flows out of the area, at the periphery of the area, may serve to prevent invasion beyond a very few miles. It is possible on the other hand that a more complete barrier, like your present one but wider, may be necessary. It is here that our knowledge still falls short but I hope to obtain light on this point during this year's operation in Tanganyika.

As regards the attack inside the area merely trapping the flies out, as Lewis is now doing on the Lambwe, might replace the clearing of this riverine thicket, though it is doubtful if the last flies would go.

A survey, as I said to you and as Lewis says in his report, will be necessary to elucidate the position but meantime a preliminary idea of the possibilities might be obtained from a flight over the area.

G.brevipalpis, mentioned by Lewis as present, would go also with the clearing of the rivers. I am not quite sure to what extent G. longipennis, also present, can survive in scattered deciduous thicket. The observations

would

would however throw light on this point as well.

It certainly seems to myself, as an outside observer, that to be able to move a large section of your population into a new area altogether (under regulation) is the one thing that will give you the space and the jumping-off point which you need to get on with the cure of the eroded areas, which, if a large proportion of the population should move (which is doubtless difficult owing to its size) nature could be left to cure much of the erosion and large sums be saved. Whether the cash could be provided could be ascertained from the survey combined with the conclusion of work on pallidipes now taking place, or about to, here and in Tanganyika.

Whether the people could be made, or as in Shinyanga, be tempted to move in once the country had been provided, can be known only to yourselves! I am sure Lewis won't mind me having written you my impressions as they coincide with his own.

Wishing you and your wife a really grand trip in America,

Yours sincerely,

(Sgnd. C. E. M. Swynnerton.

3rd December, 1938.

My dear Meisner,

I have to thank you for your letter of November 9th. Hosking and Maher have both been seen during the time they had in England. There is no doubt that both of them have profited greatly by their time in America and they were both appreciative of all that was done for them.

You will find your trip to India interesting and if you visit Delhi, the Punjab, or Coimbatore in Madras I would suggest that you make contact with the following:-

Sir Bryce Burt,
Vice-Chairman,
Imperial Agricultural Research Council,
Delhi.

Dr.M.Burns, formerly Principal, Agricultural College, Poona, and Director of Agriculture Bombay, now Agricultural Expert to the Imperial Agricultural Research Council, Delhi.

DR. JOHN H. MEISNER.

The Rahadur T.S.Venkataraman,
Sugar Cane Expert,
Imperial Sugar Cane Station,
Coimbatore, Madras.

T.F.Littlewood,
Deputy Director of Agriculture,
Lahore, Punjab.

C.S.Stewart,
Director of Agriculture,
Lahore, Punjab.

If you mention that I suggested that you should ... then I am sure that they will do all they can for you.

With best wishes for a pleasant trip.

I am,

Yours sincerely,

(Signed) KOALE.

AGRICULTURAL MISSIONS FOUNDATION, INC.

156 FIFTH AVENUE
NEW YORK, N. Y.
TELEPHONE: CHELSEA 3-1897

JOHN H. REISNER
EXECUTIVE SECRETARY

November 9, 1938

Sir FRank A. Stockdale, K.C.M.G., C.B.E.
Caxton House (East Block)
Tothill Street, S.W. 1, London, England

Dear Sir Frank:

In view of the fact that the correspondence with reference to the grants which we recently made to the governments of Kenya and Uganda has all been carried on with you, I think that I shall send you the enclosed receipts from Messrs. Hosking and Maher to be forwarded to the Crown Agents for the Colonies. Both men needed the funds which we voted and they were paid to them here in the U.S.A. according to the receipts enclosed.

I am expecting Mr. Maher here in New York this weekend and we shall be sailing together from New York on November 18. From letters received from him, I feel that our investment in Maher has been exceedingly worth while. I sometimes wonder, however, whether the Uganda authorities fully understood the conditions under which our offer was made.

I am leaving November 18 for about three months' travel in India to study rural missions work there, and naturally I shall be greatly interested in everything the government is doing to improve agricultural conditions. I am wondering whether there are certain members of the agricultural staff in India whom you feel I should try especially to see, and if so, would you be good enough to give me a note of introduction to them.

As background reading I shall have with me on the trip the report of the Royal Commission made I believe in 1928, of which the present Viceroy was chairman; also the recent report by Sir John Russell on the work of the Imperial Council of Agricultural Research, and the report on the development of the cattle and dairy industries in India, by Dr. Norman C. Wright.

My address in India will be: c/o National Christian Council, Nelson Square, Nagpur, C.P.

Yours very sincerely

John H. Reisner

John H. Reisner

JHR:M
Encl.

2nd December, 1938.

38184/3/38.

Gentlemen,

I am directed by Mr.Secretary MacDonald to refer to the letter from this Office of the 3rd October concerning the remission of funds from the Agricultural Missions Foundation of New York to the Governments of Kenya and Uganda in respect of the visit to the United States of Mr.C. Maher of Kenya and Mr.H.R. Hosking of Uganda.

2. I am now to inform you that a letter has been received from the Agricultural Missions Foundation stating that the agreed amounts of £100 were in each case paid over to the officers concerned while they were in the United States. The relevant receipts are enclosed herewith.

I am,

Gentlemen,

Your most obedient servant,

(Sgd) A.R. Thomas

THE CROWN AGENTS

FOR THE COLONIES.

Draft
A.R.T. 2/12/38

14

2nd December, 1938.

38184/3/38.

Gentlemen,

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I am,

Gentlemen,

Your most obedient servant

THE CROWN AGENTS

FOR THE COLONIES.

B 297

Please register
on 38784/2/38 (Long
& take action as a
(4) in letter of 18/11

SCHelf
19/11

18th November, 1938.

Dear Reimer,

Thank you very much for your letter of November 9th sending me the receipts from Messrs. Hosking and Maher for the funds which the American Missions Foundation placed at their disposal during their visit to the United States. These will be forwarded to the Crown Agents in due course.

I have already seen Hosking and he has given me an account of his trips in the States and his impressions of the work which he visited. I expect that Maher will be calling on me when he passes through London.

We greatly appreciate the assistance which your Foundation has given in this matter and I can assure you that Mr.Hosking has collected together a considerable amount of soil conservation data which will be of great use to Uganda.

I am,

Yours sincerely,

(Signed) F A STOCKDALE

DR. JOHN H. REISNER.

18th November, 1936.

Dear Reisner,

Thank you very much for your letter of November 9th sending me the receipts from Messrs. Hosking and Maher for the funds which the American Missions Foundation placed at their disposal during their visit to the United States. These will be forwarded to the Crown Agents in due course.

I have already seen Hosking and he has given me an account of his trips in the States and his impressions of the work which he visited. I expect that Maher will be calling on me when he passes through London.

We greatly appreciate the assistance which your Foundation has given in this matter and I can assure you that Mr.Hosking has collected together a considerable amount of soil conservation data which will be of great use to Uganda.

I am,

Yours sincerely,

(Signed) F A STOCKDALE

DR. JOHN H. REISNER.

IRENE
Transvaal.
13. Oct. 1938

My dear Stockdale.

I note in your report on your visit to East Africa in 1937 on page 93 you mention a suggestion that Langridge the Reconditioning Officer in Kamasia, might perhaps be given an opportunity of seeing the anti-erosion work which is being done in Basutoland.

I want to say that I was very much impressed with the good work which Langridge has done single handed and with very little backing from some of the agricultural "experts"

As much of the Kamasia country

is almost identical with a large portion of our Transvaal bushveld, where we have carried out some very successful reconditioning work in somewhat different lines I think it would help Langridge greatly in his future work to see this and I am suggesting it in my report which I am now busy writing.

If you agree, perhaps you could oil the wheels a bit. Langridge certainly deserves more encouragement for what he has done, than I think is likely to be given him. A move from you would be of enormous encouragement to him

With kindest regards

Yours sincerely

J. B. Pole Evans

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A move from you would be of enormous encouragement to him.

With kindest regards.

Yours sincerely

J. B. De Beer

AGRICULTURAL MISSIONS FOUNDATION Inc.
156 FIFTH AVENUE
NEW YORK, N. Y.

September 18, 1950

Sir Frank Stockdale, K.C.M.G., O.B.E.
Colonial Office
Church House (West Block)
Tothill Street, S.W.1
London, England

Dear Sir Frank:

Thanks for your letter of September 8 and for directions for the transmission of the fellowships made available for Maher and Hoeking.

About two weeks ago I had a telegram from Hoeking out in New Mexico asking that we remit $500 to him as expected funds had not arrived. This we did immediately. I am expecting him here in New York possibly within the next ten days. If he needs the balance of the $500 I take it that it is perfectly in order to give it to him. He can make the necessary adjustments with the Uganda government in due course.

I shall also await Maher's return before making the remittance to the Crown Agents.

With kind regards and best wishes, I am

Yours very sincerely

John H. Reisner

JHR:M

C. O.

Mr. Costley-White. 8/9/38.
Mr. Paskin. 8/9
Mr. Sir F.Stockdale. 9/9 Ss.
Mr. A. J. Dawe.
Sir H. Moore.
Sir G. Tomlinson.
Sir J. Shuckburgh.
Permt. U.S. of S.
Parly. U.S. of S.
Secretary of State.

For Sir F.Stockdale's signature.

DOWNING STREET.

September, 1938.

DRAFT.

DR. JOHN H. RIESLER.

Dear Rosner,

I have now consulted the Colonial Office about the payment of the two Travelling Fellowships which your Foundation has made available in connection with the visit of Messrs. Maher and Hosking.

The most convenient procedure would be if the money could be paid over to the Crown Agents for the Colonies, 4, Millbank, Westminster. They have been warned to expect the receipt of £200 from the Foundation and to credit £100

FURTHER ACTION.

each to the Governments of Kenya and Uganda. The Crown Agents will send you a formal receipt.

Both Mr.Maher and Mr.Hosking have no doubt been supplied with funds by their Governments and I do not expect that they will ask for any advances to be made from the money made available by the Foundation while they are in America.

Yours sincerely

See (76) on 3127 EA (Pf of Hosking)

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Yours sincerely

See (76) on 31277 EA (PF of Hosking)

Dec 19/9/28 S

But see 72 on Hosking's PF

SNC

AGRICULTURAL MISSIONS FOUNDATION INC.

156 FIFTH AVENUE

NEW YORK, N. Y.

August 19, 1948

Sir Frank A. Stockdale, K.C.M.G., C.B.E.
Church House (East Block)
Tothill Street
London S.W. 1, England

Dear Sir Frank:

Messrs. Baker and Hastings have both arrived according to schedule, spent about a week here in New York getting automobiles with which to do their travelling in the States - a very wise provision - and then went on to Washington where, from reports which I have received from both of them, they had a very helpful time and were able to work out satisfactory schedules. I have word from both of them since they have been on the road.

I supposed that I would pay these men the $100 which we offered in connection with their visit here. They neither of them seemed to know anything about it, however, and evidently were well supplied with funds. I told them that if they needed any money at any time to please let me know, that I would make available whatever was necessary, up to the limits of our grant. What was your understanding as to how our fellowship grant should be paid? We are ready to act on your advice in this matter.

Yours very sincerely,

John H. Reisner

John H. Reisner,
Executive Secretary

AGRICULTURAL MISSIONS FOUNDATION, INC.
156 FIFTH AVENUE
NEW YORK, N. Y.

JOHN H. REISNER
EXECUTIVE SECRETARY

RECEIVED
21 JUL 1938
C.O. REGY

July 12, 1938

Sir Frank A. Stockdale, K.C.M.G., C.B.E.
Caxton House (East Block)
Tothill Street
London S.W. 1, England

Dear Sir Frank:-

19 We are delighted to have your letter of July 5 saying that Messrs. Maher from Kenya and Hosking from Uganda are on their way to the States and will be arriving about July 20. I shall have a letter waiting for Mr. Maher at the boat as you suggested, recommending that he stop at the Prince George Hotel on East 28 Street. I take it that we shall have word indicating the boat on which Mr. Hosking will be arriving. I am rather at a loss to know what correspondence has taken place between these gentlemen and the Soil Conservation Service but I shall write to Bennett giving him such details as you have written. Unfortunately Lowdermilk is leaving in July sometime for several months in Europe and the Near East.

Very sincerely yours,

John H. Reisner

JHR:D

John H. Reisner
Executive Secretary

APPENDIX "F"

SLOPES AND LAND USE

	Actual measurements.	Remarks.
1.	15.0% slope	Old shamba, half-way up a ridge in Mapuli, eroded down to subsoil and stones, completely bare.
2.	22.0% "	Grazing land on side of ridge or edge of ravine in Mapuli. Completely bare. Eroded to subsoil and rock. Gullying.
3.	30.2% "	Eroding pastureland on bottom slopes of Iveti Hills. Over-grazed. 20% to 30% cover of grass.
4.	37.0% " X	Cultivated shamba on slopes of Iveti Hills. Cultivated ready for planting. Stalks of pigeon peas left in ground.
5.	42.0% "	Ditto. Broughted maize about three ft. high.
6.	50.4% "	Ditto. Wheat and maize. Maize-rows leading down-hill, wheat - a poor stand - interplanted.
7.	45.0% "	Ditto. Planted with millet and maize.

X Slopes steeper than this are under cultivation.

GENERAL RECOMMENDATIONS FOR CONTROL OF EROSION IN UKAMBA RESERVE.

Slope.	Use and method of control.
1% to 1½% :	Cultivation: broad-base or narrow-base terraced ridges. Contour planting.
1½% to 2½% :	Pasture, woodland, or Napier grass; or true bench terraces if cultivated.
2½% upwards :	Cattle or forest trees. Sides of ravines, bush or Napier grass. This is too steep for pasture owing to liability to erosion, especially through criss-cross cattle tracks and to the waste of energy caused to milk- or beef cattle in climbing the slopes.

NOTE: A 1% slope is a slope in which there is a vertical drop of one foot in a length of one hundred feet measured on the surface of the ground.

JM/DH.

YOUR REF.

EMPIRE COTTON GROWING CORPORATION.

INCORPORATED BY ROYAL CHARTER.

TELEPHONE:
VICTORIA 2811.
TELEGRAPHIC ADDRESS:
"EMCOTTON, SOWEST, LONDON."
CABLES:
"EMCOTTON, LONDON."

Kings Buildings,
Dean Stanley Street,
Millbank,
London S.W.1.

In any further letters on this subject, please quote

29th March 1940.

Dear Seel,

I am most grateful to you for having lent me a copy of Soil Erosion and Land Utilization in the Ukamba Reserve, by Colin Maher. It was very good of you to have sent it round so speedily. I return it with very many thanks.

Yours sincerely,

Assistant Secretary.

G. F. Seel Esq.,
Colonial Office,
Downing Street,
S.W.1.

SOIL EROSION

AND

LAND UTILISATION

IN THE

UKAMBA RESERVE

(MACHAKOS)

BY

COLIN MAHER, M.A., Dip: Agric: (Cantab.) A.I.C.T.A.

AGRICULTURAL OFFICER.

C O N T E N T S.

PAGES.

SOIL EROSION & LAND UTILISATION IN THE UKAMBA RESERVE (MACHAKOS)..... 1.- 3.

FOREWORD..... 1.
INTRODUCTION..... 2.

PART I.

THE UKAMBA RESERVE (MACHAKOS) AS IT IS..... 4.- 18.

TOPOGRAPHY, SOILS & CLIMATE..... 4.
AGRICULTURE..... 5.
LAND TENURE..... 6.
SOIL EROSION..... 8.- 12.
Introduction..... 8.
(a) The Hills..... 8.
(b) The Ridges..... 10.
THE FORESTS..... 12.
WATER SUPPLIES..... 14.
THE YATTA..... 14.
THE FLY AREA..... 15.
RECONDITIONING..... 16.- 19.
Rate of progress of Reconditioning..... 16.
Stagger Trenching..... 17.
Closing of Areas to Stock 17.
Communal Labour..... 17.
MEASURES BEING TAKEN TO CONTROL SOIL EROSION..... 17.- 18.
Terracing..... 17.
Composting..... 18.
Cultural Measures..... 18.

PART II.

A SCHEME FOR RECONDITIONING AND PROTECTING THE UKAMBA RESERVE..... 19.- 34.

INTRODUCTION..... 19.
THE HILLS AND FORESTS..... 20.
THE AGRICULTURAL LANDS..... 22.
LAND TENURE AND THE HOLDING SYSTEM..... 24.
THE BADLY ERODED AREAS AND THE FLY AREA 25.- 28.
Introduction..... 25.
Reconditioning of the Eroded Areas..... 25.
Settlement in Kikumbuliu Location..... 26.
The Yatta..... 28.
THE LIMITATION OF STOCK..... 28.- 30.
(a) Liebigs Factory..... 28.
(b) Limitation of Cattle. 29.
EXTERMINATION OF GOATS..... 30.
PROPAGANDA..... 32.
CONCLUSION..... 33.

PART III./

C O N T E N T S.

PAGES.

SOIL EROSION & LAND UTILISATION IN THE UKAMBA RESERVE (MACHAKOS)..... 1.- 3.

FOREWORD..... 1.
INTRODUCTION..... 2.

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AGRICULTURE..... 5.
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Introduction..... 8.
(a) The Hills..... 8.
(b) The Ridges..... 10.
THE FORESTS..... 12.
WATER SUPPLIES..... 14.
THE YATTA..... 14.
THE FLY AREA..... 15.
RECONDITIONING..... 16.- 17.
Rate of progress of Reconditioning..... 16.
Stagger Trenching..... 17.
Closing of Areas to Stock 17.
Communal Labour..... 17.
MEASURES BEING TAKEN TO CONTROL SOIL EROSION..... 17.- 18.
Terracing..... 17.
Composting..... 18.
Cultural Meagures..... 18.

PART II.

A SCHEME FOR RECONDITIONING AND PROTECTING THE UKAMBA RESERVE..... 19.- 34.

INTRODUCTION..... 19.
THE HILLS AND FORESTS..... 20.
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Introduction..... 25.
Reconditioning of the Eroded Areas..... 25.
Settlement in Kikumbuliu Location..... 26.
The Yatta..... 28.
THE LIMITATION OF STOCK..... 28.- 30.
(a) Liebigs Factory..... 28.
(b) Limitation of Cattle. 29.
EXTERMINATION OF GOATS..... 30.
PROPAGANDA..... 32.
CONCLUSION..... 33.

PART III./

PART III. PAGES.

ESTIMATES OF THE EXPENDITURE REQUIRED TO REHABILITATE THE UKAMBA RESERVE..... 35.- 38.

TERRACING.....35.
RECONDITIONING..... 35.
GULLY CLOSING GANGS..... 35.
RE-AFFORESTATION..... 36.
BUSH CLEARING IN KIKUMBULIU..... 36.
TRANSPORT AND TRAVELLING..... 37.
CLERICAL STAFF..... 37.
LIMITATION OF STOCK..... 37.
Staff, etc. ..... 37.
TOTAL EXPENDITURE..... 38.

APPENDICES.

A. - STATISTICS RELATING TO POPULATION, STOCK AND AMOUNT OF BADLY ERODED LAND IN THE UKAMBA RESERVE.

B. - SUGGESTED 'IDEAL' SMALL HOLDINGS WITH THEORETICAL CASH INCOMES.
Locations:-
(1) Matungu or Kangundo.
(2) Mwala.
(3) Nzaui.

C. - REVENUE AND TAXATION.

D. - EXPENDITURE BUDGETED BY THE LOCAL NATIVE COUNCIL MACHAKOS, FOR RECONDITIONING DURING 1937.

E. - A DEMONSTRATION SMALL HOLDING.

F. - SLOPES AND LAND USE.

GENERAL RECOMMENDATIONS FOR CONTROL OF EROSION IN THE UKAMBA RESERVE.

FOREWORD

It may be thought that in this memorandum I have strayed far from my "terms of reference". It must be considered impossible and useless, however, to attempt to suggest treatment for the symptoms of the disease without searching for the causes and endeavouring to remove them. The causes are wrong use of land; - wrong methods of farming, wrong densities of population and stock, settlement in wrong situations. The outward and visible signs of soil erosion are merely the tokens of man in a state of unbalance with his environment. In order to redress the accumulated evils which have accrued during forty years of British rule, with tribal peace and territorial confinement, and to prevent virtual loss of the Reserve eventually, for purposes of human occupation, it will be necessary to spend money on a scale which has not been hitherto contemplated. Attempts to accomplish any noticeable improvement with the meagre funds which have been available up to the present must be as disheartening to the officers in the Reserve as attempting to bale out the ocean with a tea cup.

During my brief stay in the Reserve, during which I have tried to see as much of the area as possible, I have had most valuable discussions with the following officers for whose opinions and advice and entirely helpful attitude, I wish to express my sincere thanks :-

Mr. La Fontaine, Provincial Commissioner, Central Prov.
" Bailward, District Commissioner, Machakos.
" Rammell, Senior Asst. Conservator of Forests, Nairobi.
" Scott Little, Veterinary Officer, Machakos.
" Hobbs, Agricultural Officer, Machakos.
" Javens, Reconditioning Officer, Machakos.

and Capt. F.O'B. Wilson, an unofficial member of the Machakos Reconditioning Committee.

(Sgnd) COLIN MAHER.

AGRICULTURAL OFFICER.

SOIL EROSION AND LAND-UTILISATION IN THE UKAMBA RESERVE (MACHAKOS)

INTRODUCTION:

It is widely appreciated to-day that man only exists, by favour of Nature, as long as he takes care to preserve something near an equilibrium between loss and gain of soil and soil fertility. Losses are caused especially by the erosive action of water under the influence of gravity and by wind. Gains are made through the building up of soil by decomposition of the parent rocks, and by the addition of organic matter deposited by vegetable and animal organisms. As soon as man, in the attempt to wrest greater wealth out of the soil, allows the forces of wind and water to play unchecked on land deprived of its natural vegetative cover, he starts a progressive deterioration which may become beyond his power to control and which may lead to his eventual ruin.

Every type of land may be considered to have an optimum use to which it should be put for the benefit of the community. This 'optimum use' may be taken as that which will enable the greatest number of people to be maintained at a reasonable standard of living while the fertility of the land is maintained unimpaired. Conversely there is an optimum number of people and stock which may be settled on any type of land. Any increase in this number may be made without soil deterioration and hence of future human and animal carrying capacity - but only at the expense of a progressively greater amount of human labour and probably a lowering of the standard of life of the general population. Thus the Chinese are crowded together around some of the great rivers at a density of about 1,500 to the square mile. Such a density of population is only made possible by guarding most meticulously the fertility of the soil: waste means death. Nor can the standard of living be regarded as much above the subsistence line while droughts, and devastating floods - caused by failure to conserve the vegetation and soil in the enormous area by which the rivers are fed before they run into the densely populated alluvial plains - periodically bring starvation and destruction to the teeming millions of peasants. The chief factors which control land use are soil, type climate, topography and position relative to roads and railroads which permit inter-communication and the export and import of agricultural produce and manufactured goods.

If a certain minimum standard of living is to be preserved for an agricultural population the people must be settled at a density which is not above a certain maximum; the farming community must live in areas in which the 'climatic risks' of drought etc. are not too great to prevent success in their undertakings; on soil which, given reasonably good treatment, will maintain a good yield indefinitely; and on land which is at no greater slope than will permit, with the use of appropriate anti-erosion measures, of settlement for such a length of time that it may be taken as 'permanent' for all practical purposes. Last of all there must be an

adequate and accessible supply of water for stock, for domestic purposes, and, in the drier districts where land is suitable for this use, for irrigation.

A heavier agricultural population may be maintained as has been mentioned, by the use of more arduous methods of adding to and conserving soil fertility and of preventing loss of soil by erosion.

However the extent to which production can be intensified is limited; for example the improvement in yields brought about in a dry area by the application of bona manure or compost is limited by the moisture available; again the crop plant itself, given no limits as far as the other factors are concerned, cannot give an indefinitely increased yield.

If the population of people and stock are increased without intensifying the efforts made to conserve the soil and soil fertility, then the carrying capacity of the land will diminish at a rate corresponding to the increase in population till it may become absolutely nil. Perhaps it should be observed that a higher population of people can be carried on the land without a general decline in the standard of living if the surplus number, above the agricultural or pastoral optimum, engage in industrial pursuits, and spend some of their gains in buying food from the local agriculturists and pastoralists or in importing foodstuffs.

The Machakos Reserve is an appalling example of a large area of land (2,166 square miles) which has been subjected to un-co-ordinated and practically uncontrolled development by natives whose multiplication and the increase of whose stock has been permitted, free from the checks of war and largely from those of disease, under the benevolent British rule.

Every phase of misuse of land is vividly and poignantly displayed in this Reserve, the inhabitants of which are rapidly drifting to a state of hopeless and miserable poverty and their land to a parching desert of rock, stones and sand.

This memorandum, which deals with the problem of rehabilitating the Ukamba(Ulu) Reserve, has been divided into three parts. In the first section is given a description of the Reserve as it is; in the second various proposals are made for re-adjusting those matters which are leading to the permanent destruction of the Reserve; and in the third part are given estimates of the expenditure which would be necessary if those proposals were approved by Government.

PART I. - THE UKAMBA RESERVE (MACHAKOS) AS IT IS. TOPOGRAPHY, SOILS AND CLIMATE.

The Ukamba Reserve is bounded on the west by the settled areas and to the north, north-east and east by the Athi River. It consists of a number of hills composed of gneiss rocks of the Basement Complex, varying from soft micaceous gneisses to hard granitoid gneisses, between which are plains which have been cut by numerous water courses into a series of ridges; these ridges are steep near the hills but farther away from the higher masses they often become broader, more rounded and more suited for agricultural purposes.

The hills vary in height approximately from 5,500 feet to 7,000 feet. The dissected plains vary between 4,500 and 5,000 feet though towards the south-east, in the Kibauni and Mbuni locations, the altitude is often only 3,500 to 4,000 feet.

Farther to the south-east there is flatter country, well covered with bush and grass owing to the presence of testse fly, which leads down to the Athi River. Here the altitude over four or five hundred square miles of the Reserve in the Kikumbuliu and Kibauni locations is only 3,000 to 4,000 feet.

The soils are chiefly red or yellow earths or sandy loams which are very subject to erosion; the extent of erosion will be dealt with in more detail later. Certain districts, for example, in the Masii location, contain areas of a grey earth or sandy loam with a yellowish sub-soil the origin of which is uncertain, but which is probably the result of soil formation under conditions of interrupted drainage owing to the nature of the faulting of the parent rocks beneath. These soils appear to be more resistant to overgrazing and erosion than the red soils when under bush and pasture. The type of bush on the grey soils is the Combretum complex which seems to grow rapidly after lopping so that complete destruction of the bush or tree-cover has not yet been accomplished.

There are occasional patches of heavy black soils such as are to be expected in this type of country.

The rain-fall on the tops of hills like the Iveti Hills is probably 45" to 50"; this falls away rapidly, however, as one passes away from the heights and drops to 30" to 35" over the bulk of the agricultural locations though Matungulu, which is near the hills, probably received 40". Towards the south-east the rainfall may be only 25" to 30"; but the dessicated nature of the eroded and deforested country, on which the efficiency of the rainfall perhaps is as low as 10%, owing to the rapid run-off, and the effect produced by hot and parching blasts of wind which blow across these devastated lands, doubtless gives an impression of a much lower rainfall than actually occurs.

The fly/

The fly country itself, at an even lower elevation, is cooler and owing to the vegetative cover, has a more humid atmosphere. The type of grasses and the trees which grow here suggest that the rainfall is in the neighbourhood of 35".

The long rains start in February or March. These rains are apt to fall in heavy downpours and to cease abruptly in the middle of May or at the end of June. The short rains, which are used for planting the main crops of the Reserve, begin in October and fall in gentle showers.

AGRICULTURE.

The Wakamba are a Bantu tribe which is partly pastoral and partly agricultural. Before cattle were acquired, probably from the Masai, the tribe is thought to have been almost exclusively agricultural.

A stock count is being carried out at present by Mr. Scott Little, Veterinary Officer, and figures should be available in about four months time; meanwhile it may be assumed that the Wakamba own about 250,000 cattle which are maintained on about 1,000,000 acres, which includes land under cultivation, under forest, etc.

Thus there are only three to four acres available for each beast although a great part of the Reserve would not maintain one animal on a hundred acres. In addition there are said to be 229,000 goats and 50,000 sheep; so that each three or four acres theoretically has to carry a sheep or goat as well as a cow or ox.

Actually the surplus stock is said to be chiefly dispersed at present on European farms, on the Yatta, near Simba, and in the Embu district whence the cattle are, I understand, periodically driven out by the Administration but whither they gravitate back again, the Embu natives apparently having no objection to the presence of numbers of Wakamba and their cattle.

Numbers of these cattle may be expected to return to their locations in the rains when they will bite off any scanty volunteer herbage and thereby assist the progress towards permanent destruction of the land by yet a further stage.

The cattle which remain in the Reserve are very undersized and probably give little or no milk. There is practically no sale of ghee but 27,160 hides with an average weight of 9 lb. worth about 57 cents a lb. and 24,690 skins worth about 80 cents each were sold by the Wakamba during 1936. As the Carter Land Commission pointed out, a family of five only owns approximately five head of cattle and six and a half head of sheep and goats; but it is in the latter possessions that the seeds of destruction and poverty are doubtless to be found.

In their/

In their untutored state the natives probably grew only small patches of crops for food purposes: under the impulse of Government direction and propaganda a certain amount of agriculture is now carried out for cash sale as well as for food. Maize, millets, sorghums, pigeon peas, cowpeas, cassava, beans and pumpkins are grown in various parts of the Reserve. 18,229 bags of maize and 4,328 bags of pulse crops were passed through the inspection centres at Machakos and Tala during 1936. Cotton planting is being encouraged at the lower elevations in the Kibauni and Nzaui locations while wattle is being grown to a certain extent at the higher elevations. 106,296 lb. of first quality cotton were sold in 1936 at 12 cents per lb. and 88,634 lb. at 6½ cents. 137 tons of wattle bark were sold at 22/- to 23/- per ton.

Some of the richer alluvial soils of the valleys in the hills, both low down and high up in the hills, are devoted to the culture of sugar cane. This is partly used as a food but to an increasing extent it is used in preparing a fermented liquor, the juice being expressed by crude wooden rollers. It might be assumed that, wafted away on an alcoholic cloud, the Wakamba can sometimes forget the appearance of their Reserve, but in fact they are perhaps not very sensitive about the latter.

Drunkenness is, I understand, on the increase amongst the Wakamba although the decrease in the number of suitable moist places must make the amount of cultivation of sugar cane rather less. The old men, I was told, spent day after day in a state of intoxication, starting to imbibe at 9 or 10 o'clock in the morning. There are also an increasing number of addicts amongst the young men. Formerly the young men were unable to buy "Tembo" since only the old men owned goats with which the alcohol was purchased: it was also against custom for young men to drink liquor. Nowadays the young men who return to their locations with shillings in their pockets are able to purchase liquor and the old men probably are too glad to assist in consuming it to raise objections on questions of principle. I have dealt with this matter at some length as I have been struck with the importance that the sale of sugar cane and the preparation of "Tembo" has in the Reserve. It is open to question whether a people amongst whom the men are confirmed drinkers can readily be roused to appreciate the ideals of sound land utilisation.

LAND TENURE.

Originally each native customarily cultivated on a patch of land, upon which he had a cultivation right, called an Ngundu. He grazed his cattle on a demarcated area called a Kisese, which consisted of the uncultivated part of his Ngundu. Usually the members of an Utui, or collection of ten to a hundred villages, placed portions of their Isese together to form an area

on which/

on which communal grazing was allowed by mutual agreement.

Formerly there was also the Neu or true communal grazing land but, by enclosure, this type of grazing has practically disappeared.

Encouraged by the local Administration, the native right holders are enclosing their Isoso, at a very rapid rate for their private use. Demarcation is usually done by planting suckers of sisal, or a local species of Euphorbia, or by laying down small hedges of dead thorn bush. These boundaries are respected by neighbouring herdsmen and the enclosed areas usually, but not invariably, are much better covered with grass. Often stock appears to have been excluded altogether from these enclosures in order that the grass may improve.

There seems to be no arrangement by which the size of holding which is being demarcated shall be of a reasonable economic size nor any machinery to prevent future excessive sub-division and fragmentation. No local legislation exists as far as I know whereby good husbandry methods shall be assured on these demarcated areas and deforestation, over-stocking and soil erosion prevented.

Presumably the more enterprising natives may indulge in a little profitable land grabbing at the present time of transition, and a parasitic landlord class later may emerge.

Finally the consolidation of rights to the land may eventually lead to the land developing a value which will enable it to change hands by purchase and to the possibility of a state of peasant indebtedness coming into being such as is envisaged by Livers.ge.

SOIL EROSION.

Introduction.

The greater part of the Ukamba Reserve has lost the top soil through erosion. A considerable portion has also lost most of the sub-soil. If present tendencies remain unchecked there will soon remain nothing but rocky and stony hills and steep ridges, cut by deep ravines.

Mr. Hobbs, Agricultural Officer, Machakos, estimates that 391,000 acres of the 1,058,000 land in the Ukamba locations, exclusive of the sparsely inhabited Kikumbuliu location in the "Fly area", must be deemed to be badly eroded. (See Appendix A).

The condition of the various land types of the Reserve will be described in some detail in succeeding paragraphs. The chief causes of erosion in the Reserve may be summarised as follows, roughly in descending order of importance:-

(a) deforestation of the mountain tops and sides and of the sides of the ravines and river valleys;

(b) over-stocking and over-grazing by both cattle and goats, leading to destruction of vegetative cover and increase of surface run-off and also to formation of cattle tracks which leads to gullying;

(c) cultivation of steep slopes without any measures being taken to control soil erosion;

(d) loss of humus in the soil and failure to replace it by any form of organic manure;

(e) use of ploughs, allowing larger shambas to be tilled, especially on steep slopes;

(f) increased cultivation through (a) desire to obtain money to pay taxes and to buy present day requirements (b) the falling off of yields on eroded shambas;

(g) run-off from road drains, combined with (a) and (b).

(h) periodical concentration of cattle near rivers and water holes.

(a) The Hills.

There is a strong temptation for cultivators to engage in agriculture on hills, especially in the tropics. The rainfall is always higher and the accretions of humus provided by centuries or perhaps thousands of years of forest growth leave a rich black soil which will give heavy crops for several years. For ten, twenty or thirty years the husbandmen may rejoice in their bountiful crops, and then retribution

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begins to hover over the land.

Not all forest soils are intrinsically rich in minerals: only the chocolate loams derived from volcanic tuffs and soft lavas are inherently high in mineral fertility. Forests develope in high rainfall areas and make their own rich top soil upon which they feed. When this is removed it may be found that the underlying soil is relatively poor and deficient in minerals: such is the case in regard to the poor, light, sandy micaceous loams which are generally formed from the ancient rocks of the Basement Complex such as compose the Machakos hills.

The true functions of hilly land situated like the hills of Ukamba is to guard the agricultural and pastoral areas below. Covered by a dense canopy of forest the hills will preserve a humid atmosphere congenial to crops and grasslands below; there will be some little increase in local rainfall through the presence of these forested slopes and rain will tend to fall in gentle showers rather than in violent bursts; like a sponge the forest humus will soak up the rain and gently and continually feed the streams which flow from the mountain sides so that they run gently and continually, not in sudden violent rushes of turbid water passing on in a destructive flurry, leaving behind a gorge of dry sand and great bare boulders. Only when the streams run slowly, clearly, and permanently can they be of the utmost value in keeping a healthy and contented population, in allowing full use to be made of the grazing lands, and in permitting irrigation of the drier, flatter lands further down stream.

Again the vegetative cover on the hillsides prevents the rain from running suddenly off the slopes, tearing soil off the fields below, gouging out great gullies which lower the water table and so dry out the land, and leaving here and there wide beds of sterile sand.

The hills of Ukamba were once, perhaps less than forty years ago, covered with dense forest. The streams then ran throughout the year and might have contained fish to supplement the food of the natives. Since then the forests and bush have been almost entirely destroyed by felling to allow cultivation, by fire, by over-grazing and browsing by the sleek but ruin-bringing goat.

Great rocky faces are starting to appear in the sides of the hills, bare red sides and gashes where large portions of the soil and sub-soil have slipped away, long bare slopes where the unwary walker may slip on the carpet of angular quartz fragments.

In places on the lower slopes of the hills cattle tracks have collected the run-off from the bare hillside. In one such place the water, starting in a furrow six inches deep, in the course of a hundred yards has torn out a chasm thirty feet deep and twenty or thirty feet wide.

On the hill tops, such as on Iveti, Mbooni, Kilungui and Mutungulu, some of the occupiers have ploughed shambas several acres in size and have planted them up with maize. The forest soil is rich initially and good yields are being obtained, especially where the fields are sheltered from the winds by forest plantations established by the Forest Department.

But the slopes are steep and as the soil binding humus becomes destroyed, year by year, the soil starts to wash and gully; black soils change to grey, grey change to yellow, then the yellow soils start filling to cover the bones of the mountain and sharp quartz stones become seeded over the surface of the fields. The maize at the top of the ridges is tall and healthy, lower down it is rather stunted, still farther down the slope it becomes more stunted and wilts in the sun, since the soil is more shallow and little of the rain which fell earlier on was able to soak into the land on the severe slope of 30 to 60 per cent or more. At the bottom of the ridges, near the little water courses, the maize once more flourishes, growing in the patches of silt deposited by the run-off water coming from the land above. Many of these native maize growers have built houses such as would be considered by the Director of Medical Services an indication of a social step forward; but they have literally builded on sand. An hillside of rock and stones burning in the sun is no place for the preservation of a "minimum standard of living". These men must return to their squalid grass huts, their skins and their goats; such things will be more suited to these hills which, if no strong protective measures are taken, will later be described by someone as "barren goat country".

(b) The Ridges.

I have painted a somewhat gloomy picture of the course which is being taken on the hills which vary individually as to the degree to which they have suffered or as to the extent to which the desirability of cultivation, even by native standards, has been dissipated.

This is often connected with the nearness of the hills to salt-licks suitable for the ubiquitous goat. The situation on the lower land where stocking has probably been still more intense, and where goats are in their sub-scorched element, is liable to produce even a greater depression in the beholder.

The water tearing off the denuded mountain sides has carved out the water courses, often to bed-rock, in ravines which are sometimes several hundred feet deep. The sides of the ravines, which vary from 30 to 40 per cent in slope, are completely bare except for a little scrub thorn bush or a few Aloes and are often covered with sharp quartz stones, some of which are the size of pebbles and some are as large as a man's head. There are bands of quartz fragments, sometimes six inches thick and sometimes three or four feet, beneath the surface of the soil. These bands may be near the

surface/

surface of the soil or they may be several feet below in either case continued erosion exposes these quartz layers or, to use a mining term, the "outcrippers" of quartz, and the sharp arêtes, which can never weather, make a sterile surface to the land.

This barren appearance of the land is due to overstocking by cattle, to continued browsing by goats, and to shifting cultivation whereby poor, unproductive, eroded shambas are eventually abandoned completely and left to the mercies of the weather and the goats.

Every phase of soil erosion for which there is a name in the terminology of soil conservation is to be found in this district: sheet erosion, shoestring gullies, small gullies and "spectacular" gullies twenty or thirty feet deep, all are present. The ridges are being cut back and back by subsidiary gullies. The main water courses cannot usually deepen very readily since their beds are of rock but they are meandering in great curves, depositing loads of barren sand at each bend. At the same time the soil on the slopes of the water courses, which are devoid of binding vegetation and of riverine forest, continues to wash into the river beds.

Small flocks and herds move along in clouds of dust in the river bottoms, seeking out the occasional rock pool of filthy water which remains, at distances of several hundred yards apart, or the grazing on patches of rush or sedge. Here and there a patch of Cynodon sp. has established itself on a sand bed and has been grazed down eagerly till it is like a lawn. The nature of the facilities of the people for obtaining water for domestic needs may be imagined; needless to say, little if any water is wasted by the natives on hygienic measures.

The cultivation which remains is chiefly on the tops of the ridges, where there is still some soil or sub-soil and the slope is not so great, and at the bottoms of the slope near the beds of the streams, where soil has been deposited either recently or in a previous geologic era. In the former situations the use of a plough is possible, shambas tend to be large and sheet erosion is correspondingly facilitated; in the latter places the slopes are often so steep that it is possible to walk up or down them only with difficulty and gullying soon takes place, down to the underlying stones or rock, splitting the slope into several miniature ridges and so drying out the soil.

On some shambas the women have collected the quartz fragments into large heaps at intervals over the ground. This is a task which is likely to tax their strength in the coming years.

A magnificent panoramic view of the red eroded plains may be obtained from Kilima Kimwe (6,300 feet) which rears its precipitous height, just outside Machakos, 1,500 feet above the level of the plains. Incidentally

this hilly

this hill illustrates, within a relatively small compass, the misuse to which the hills are being put. Except for two or three enormous fig trees, relics of the forest of long ago, there are no trees on the summit except for a few clumps of wattle. It was seen that a patch of wattle, the trunks of which were fifteen inches thick, had been cut down recently on the very crest, where the hill is only about fifty yards wide, and maize planted instead. At the top of the hill there is a deep basin-shaped depression - a natural catchment area - which at present, in the dry season, merely contains a dry swamp. This obvious stream source is divided from a steep sided valley, the natural outlet of the stream, by a barrier of earth and rock some sixty feet wide and the same height. The sides of this valley or earth gorge into which the underground waters of the stream must later emerge are at least 40 per cent in slope but are cultivated for maize which, however, was nearly dead from drought. It is possible that afforestation of the top and upper slopes of Kilima Kimwe and of this steep valley would enable this stream to flow perennially.

The soil of the sheer slopes upon which maize is being grown on this hill is a very light gritty loam which will rapidly erode away when the forest humus is finally destroyed.

THE FORESTS.

During the last twelve years the Forest Department has established just over 1,000 acres of forest, chiefly on the hill-tops. The trees planted have chiefly been gums but there is a splendid and exemplary plantation of young cedars on the Iveti hills. The patch of old gums on the top of these same hills has a dense undergrowth beneath the trees which would efficiently prevent run-off and erosion; this is because, it may be presumed, the soil was still fertile when the trees were planted and the rainfall is ample. On the other hand some of the small plantations of gum trees which may be seen by the roadside at various points in the reserve are poor. These were originally planted by the Forest Department and handed over later to the Local Native Council. The trees in these plantations have not made vigorous growth nor is there any ground cover. This is doubtless due in large part to the fact that grazing and trampling of the soil underneath the trees has taken place through the agency of the local cattle and goats.

The Forest Department has a total area of 2,378 acres reserved on the hills of Iveti, Mbooni and Kilungu. This acreage will soon all be planted up and then difficulty will arise as to the future planting programme, unless special arrangements are made for the setting aside of land for afforestation.

An examination of the gum plantations on the Mbooni Hills showed that gums are far from satisfactory for planting on the mountain tops. The shade which is cast on the soil is very scanty and so, therefore, is

the amount/

the amount of protection of the soil from beating rain. The amount of litter which falls is not sufficient to prevent erosion and the humus formed is poor in quantity and quality nor does it incorporate itself readily with the top soil. Where the gums had been thinned several years ago in a plantation on a steep slope on Mbooni and laid along the contour it was observed that the poles had collected about six inches of silt where there was a run of only eight or ten yards down the hill. The more recent policy of the Forest Department of planting mixed stands of Cypress and Grevillea robusta is very satisfactory since these trees drop a good deal of litter. Cedar and Olive and other indigenous woods have also been planted.

Wattle has been established from seed at the higher altitudes on several of the hills and there are some excellent plantations on Mbooni. The accumulated mat of leafage, twigs, seed pods, and fibrous roots, makes an ideal sponge for soaking up the rain and preventing run-off and erosion, although no ground cover grows beneath the shade of wattle. Results were not nearly so good where cattle and goats had been permitted to walk underneath the trees. Natural regeneration was occuring beneath the parent trees which tend, incidentally, to fall or be blown over when about sixteen years old.

Throughout the Reserve there are occasional sacred groves whither the natives repair to pray for rain. One could not help thinking that if there were enough sacred groves to cover all the hill tops and sides there would be less urgency for prayer.

There is a notable grove on one of the lower slopes of Mbooni, near the Nzaui road, containing a number of indigenous Podocarpus trees including one magnificent old tree which is a veritable inspiration for afforestation.

The Local Native Council had planted up 700 acres in small plantations, chiefly of gum trees, up to 1928. Since that year large issues of tree seedlings have been made to individual natives but there is little sign that anything but a negligible number of these trees have been planted and tended and have survived.

The nursery work carried out by the Local Native Council officer is very praiseworthy. It seems a great pity that the further care of the seedling trees by the natives is not as efficient. There is no alternative but to accept the view that there is no hope of adequate and efficient afforestation being carried out by the natives or that they will keep their cattle and goats out of the plantations or closed areas without protective rules being enforced most stringently.

It will be seen that there are only some 2,000 acres of forest in the Reserve or under 0.2 per cent of the Reserve; for climatic and agricultural reasons there should be at least 5 to 10 per cent or 53,000 to 106,000 acres of forest in the Reserve.

WATER SUPPLIES.

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It has already been explained that the minor streams in the Ukamba Reserve are now but seasonal. They come down in spate, carrying tons of the soil of the Reserve towards the Indian Ocean, after a very small shower of rain has fallen, but the rivers are dry again in a few hours. There is no riverine forest or bush to prevent the banks from eroding.

Water is usually obtainable, as in the arid Turkana Province, by digging several feet down in the sandy river beds. At the time of my visit to the Yatta, on February 5th, the large Mwita Siano river, which divides the Yatta from the Kitui portion of the Ukamba Reserve, was also dry and water was only obtainable by digging in the sand. The Athi River, the banks of which are equally denuded was little more than ankle deep at the Cable camp on February 9th.

Since 1928 the Local Native Council have built 35 dams which have been of great benefit in securing the distribution of the stock so that severe wearing of cattle tracks has been partially avoided.

Nevertheless, on land which is well provided with water courses which ran continuously not so many years ago, it must be admitted that the construction of dams in a way is a defeatist policy. Dam building is essential on hard lava soils where percolation is poor and streams are few; the same cannot be said for a country with a permeable sandy loam soil and gneissic rocks which are often of a soft nature.

Efforts in such a country should be directed to protecting the sources of the streams and in preventing run-off from the land. However, these dams will doubtless also be of value in sealing up gullies and in holding up silt although this was hardly the original intention in making them.

It may be considered that, except in special areas, the problem of water supplies will be automatically solved if the protection of the hills is given attention. This in turn will assist in preventing the formation of severe gullies on the slopes through the continual passage of animals to the limited number of spots at which they may assuage their thirst at present.

THE YATTA.

The Yatta is a large area, the portion in the Machakos Reserve being 200,000 acres in size, and has been reported upon by many observers during the last few years. My own observations were limited to the section seen from the Kitui road between the Athi River and the Mwita Siano, supplemented by occasional excursions into the bush a few hundred yards on either side.

The country on the Machakos side of the Athi River is very badly eroded, consisting of bare red sub-soil and scrub. Even the private holdings demarcated with sisal hedges are often in very bad condition though other protected areas are well covered with dry grass.

The worst part of the Yatta is near the lava ridges towards the Athi River. The slopes are steep here, 15 to 25 per cent perhaps, and erosion is taking place rapidly. Not a blade of grass is to be seen on vast stretches. Sheet erosion is being followed by gullying while sharp quartz stones are sprinkling the surface in many places. The only cover is provided by thorn scrub.

There was a little grass on the hills which are strewn with lava boulders and which are presumably too inaccessible and too far from water to be grazed by cattle.

Conditions are better at the north end where the soil is a poor sandy loam derived from the Basement Complex and, above all, the slopes are only four or five per cent so that erosion is less. There may be a twenty or twenty-five per cent cover of grass in this part of the Yatta.

THE FLY AREA.

The area in Kikumbuliu location which is subject to tsetse fly and so cannot at present be grazed by cattle amounts to about 400 square miles; there are also about 100 square miles in the adjoining Kibauni location.

This gives a total of 320,000 acres but, omitting a few stony hills and ridges which are unsuited for grazing or cultivation, it may be perhaps more safely estimated at 250,000 acres of relatively flat land, that is to say gently rolling country on which the slopes are not more than five per cent.

The area is at present under bush, mainly deciduous and with comparatively few thorn trees, and tall grass. The appearance of the vegetation suggests that the rainfall is at least 35 inches although there is said to be a drier belt some twelve miles from the border of the Mzaui location. The grasses include Panicum maximum, Panicum coloratum, Hyparrhenia spp., Sporobolus sp. Cynodon spp., Cymbopogon spp., Themeda triandra, Digitaria spp., etc.

There are very few natives and no stock in the area at present but there is some game including elephant, rhinoceros, giraffe, impala, etc.

There are very few spots where permanent water can be obtained but the presence of lines of trees along the frequent temporary water courses suggests that boring would be successful.

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The Kaiti and Thwaki rivers run in the northern half of the area and the Athi River borders the area on its eastern side. The soil is a very light sandy loam similar to that in Nzaui location.

RECONDITIONING.

Rate of Progress of Reconditioning.

I have already said that Mr. Hobbs, Agricultural Officer, Machakos, estimates that there are 391,000 acres or 37.0 per cent of the 1,056,000 acres of the Machakos Reserve which are badly eroded.

200 acres were stagger trenched for experimental purposes by the Department of Agriculture at Lower Mbooni in March 1932, and a further area of about 34 acres at Kitota in 1933-34, about 17 acres being closed to stock but not trenched.

An officer was engaged by the Local Native Council for reconditioning work in the Reserve in 1928 but this officer, Mr. Javens, was engaged in road-building, bridge-building, dam-building and afforestation till May 1936 when he was instructed to occupy himself in the restoring of the eroded grazing lands by supervising labour digging stagger trenches and by closing land to grazing by all stock.

Mr. Javens has covered 170 acres up to the present time and closed 24,500 acres to stock.

A second reconditioning officer was engaged by the Local Native Council in January 1936. This officer had views of his own as to methods of reconditioning and his methods do not seem to have been very successful; further, his work was carried out on land with only a 4 or 5 per cent slope on which closing to grazing alone will soon restore a vegetative cover.

From the filed reports of the second officer, Mr. Leakey, I have ascertained that he supervised the digging of stagger trenches on 22 acres in 1935 and 60 acres in 1936.

His reports show also that 150 acres were treated with "zig-zag trenches" which I presume to be trenches two feet deep dug across the slope at intervals of about twenty yards, and with Croton trees planted on the banks, which I saw in Kitota location. He also ploughed a further 200 acres and planted Napier grass and cuttings of trees in the land, but the cover on this area is now not as good as on adjoining pieces of land which was merely closed and allowed to regenerate a cover naturally. In addition, I understand, about 470 acres were merely closed to stock. The total area closed or treated by Mr. Leakey was 900 acres.

It will be seen that a total of 476 acres or 1.2 per cent of the badly eroded areas have been stagger trenched, and another 350 acres or 0.09 per cent of the eroded areas have been treated with more or less inefficient other methods during the past two years.

Eight boys, working in pairs, were pegging out the lines for narrow-base contour banks on the Iveti Hills and Mr. Hobbs informed me that 200 acres have been marked out. It is not believed that any banks have yet been constructed by the natives and Mr. Hobbs considered that the pegs have probably since been lost and no banks made.

Composting.

Mr. Hobbs states that there are 7,500 compost pits in the Matungulu and Kagundo locations and that 500 owners have removed compost from the pits. The natives in these locations are the most advanced in the Reserve, however, and are farming the most remunerative land. It is not thought that any of the natives in the poorer more eroded locations are making compost or using boma manure on their cultivated land.

Cultural Measures.

I saw no evidence of any cultural methods being used to control wash, such as the placing of trash across the slope. Row planting of cultivated crops like maize and cotton though necessary, is increasing the amount of erosion. The more go-ahead natives with large shambas have check-rowed their maize and this custom increases wash since, when cultivating between the hills in two directions, in one direction the furrows of the cultivators lead down-hill.

The mixed planting practised by primitive natives undoubtedly helps to control wash to some small extent.

Unfortunately, owing to the uncertain and medium rainfall and the generally poor soil, the Wakamba natives, from dire necessity, keep their crops very clean and the absence of weed cover helps towards the removal of the soil by run-off water.

Pigeon pea stalks, instead of being buried in the soil or laid in bundles across the slope, are burnt as firewood.

On some steep slopes at Upper Mbooni I noticed that natives had dug trenches across the tops of their shambas in order to prevent the water flowing off the hill above from running across the shamba. The ditches were then led down the middle of their shambas by the quickest route so that the water was hollowing out deep gullies.

I saw no method being employed of strip cropping with sweet potatoes or other suitable wash-stop crop.

PART II. A SCHEME FOR RECONDITIONING AND PROTECTING THE UKAMBA RESERVE.

Introduction.

It must be observed that many counsels of perfection, or rather pieces of advice which would have gone far to prevent and repair damage by erosion, are to be found in official correspondence dealing with the Machakos Reserve during the last few years and in formal recommendations of the Machakos Reconditioning Committee: on paper all is not rotten in the state of Denmark.

It must be realised, however, that these counsels are actually dead letters in the Reserve owing to lack of adequate European and native staff to ensure that they are carried out. For example, no attempt can be or is made to prevent cultivation of steep slopes or the cutting out of riverine bush and forest, etc. Orders which cannot be carried out merely bring authority into disrepute while inadequate propaganda is useless; and so in the circumstances it is inevitable that no efforts, destined to be hopeless, are made to enforce these desirable restrictions on land use. The administrative officers are fully occupied with tax-collecting, trying cases and the hundred and one duties to which district officers must attend; the agricultural officer is fully engaged in developing new areas, encouraging methods of more intensive crop production, watching the machinery of the Native Marketing Ordinance, issuing seeds for issue and trying out new crops and new methods of cultivation; the Reconditioning officer has his hands full with his numerous forest nurseries, his dam building, his road making and his reconditioning work - he does what he can but he has no legal authority nor has he sufficient subordinate staff to enforce restrictions which the natives are likely to resent and to endeavour to evade.

The end result of forty years of British administration is that the Reserve stands as a cruelly evidence indictment of the Kenya policy of modified indirect rule. A prominent farmer of the Machakos district aptly compared the present mental and social state of the natives in the Reserve to that of a minor who must be gently but firmly guided. It is obvious that indirect rule can only obtain the observance of true principles of land utilisation - permitting permanent and prosperous settlement - if there is a great expenditure on education both juvenile and adult. This point has been stressed sufficiently by Dr. Patterson during the past few years. As it is we now have a problem of tremendous size to solve because we have removed those grim old natural limitations to the destruction of the land by herdsman and husbandman - famine, war, and disease - without either giving the natives the learning to live aright on their land or the compulsion to do so. The futility and tragedy of this policy is exemplified by the land of a native member of the Local Native Council who was once sent home to England on some ceremonial occasion and who is a member of the Machakos Reconditioning Committee. Great raw red gullies, thirty feet deep, gape on his land and there is no sign of any intelligent effort to stop this criminal wastage of the land of the Wakamba. If this is how the leaders lead how shall the people follow ?

THE HILLS AND FORESTS.

If the present and future welfare of the Wakamba tribe is to be regarded, the tops and steep sides of the hills must be returned to forest. Failure to do this will bring evil consequences in the destruction of the hill land, loss of the water supplies of the lower lands and an aggravated rate of erosion throughout the Reserve with a corresponding impoverishment of the people.

The sceptic of the wisdom and absolute necessity of a policy of afforestation should visit Kilungu. On this mountain, as a result of cultivation and over-grazing, huge gullies hundreds of feet deep are eating into the hills, while elsewhere the surface of the steep hillside pastures is sliding away, leaving great red scars or bare rock. The life in years of the innumerable maize shambas made on slopes so steep that a man can scarcely walk up to them can be numbered on the fingers of one hand.

This question has been exhaustively discussed with Mr. Bailward the District Commissioner, Machakos and Mr. Rammell, the Senior Assistant Conservator of Forests and we are all agreed that the following policy should be adopted :-

(a) every hill must be examined individually and an arbitrary boundary line drawn on some contour which will include above it the tops and the steepest sides of the hills; the area above this boundary shall be declared to be a Forest Reserve;

(b) all goats shall be immediately prohibited in this area and the cattle limited to three per family which shall be kept for supplying milk, compensation being paid for any cattle which are destroyed;

(c) the existing inhabitants shall be subject to the jurisdiction of the Forest Department and shall be used, where required, by the Forest Department as forest squatters;

(d) cultivation on new land shall only be undertaken by permission of the Forest Department who will ensure that it is carried out on systematic lines permitting of economical and gradual re-afforestation of the hill sides and prevention of severe erosion in the meantime;

(e) excessively steep slopes now under cultivation shall be planted to wattle immediately by the cultivator or they shall be planted with permanent trees by the Forest Department;

(f) temporary rights of natives in plantations of wattle or other trees which they have planted already shall be respected and also their rights in wattle planted under (e), though after a crop of wattle has been taken the land shall revert to the use of the Forest Department;

(g) the Forest Department shall draw up working plans for a gradual restoration of these hills to forest to cover a period of, say, twenty years: for this purpose a detailed survey of the present situation is necessary and aerial photographs of the area concerned would be of the greatest value.

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It will be seen that, by this scheme, while the essential idea of re-covering these hills is carried out the present inhabitants will suffer the minimum possible disturbance in their social and economic life. Some disturbance is bound to occur but against this must be weighed the overwhelming desirability of safeguarding the general community, the agriculturists on the flatter lands and the pastoralists in the drier parts, against the misuse of land by the individual hill-dwellers.

It is not merely that it is necessary to remove the hill side cultivator from a position analagous to that of a man who is sitting on a big limb of a tree and cutting it through between himself and the trunk: we must protect from the weight of the heavy bough of desiccation and erosion the rest of the community below, upon which it will fall as the result of the efforts of the economic suicide above.

During a period of twenty years it may be expected that the dwellers on the hills will tend to migrate down to the agricultural lands or be absorbed into various industries other than agriculture, particularly as educational facilities improve. Further, during twenty years it is hoped that a sufficient volume of education and propaganda will have been poured into the Wakamba for them to appreciate that these measures have been adopted for their ultimate health and wealth as a tribe.

Optimistic references are sometimes made to the feasibility of cultivating on terraces on steep hill sides where the slope is greater than 25 per cent. The following points should be borne in mind :-

(i) the terrace walls must be permanent and therefore of stone and the labour of cutting, transporting and building the walls would be prodigious;

(ii) the stone terracing of the Machakos hills, even if the labour difficulty was overcome, would not have the beneficial effect of forests on climate and water supplies. It is particularly desirable to obtain this effect from these hills which should be the bulwarks of the plains against desiccating winds from the dry areas to the south and east;

(iii) agriculture would be very difficult on dry, sun-baked terraces; in some parts of the world as in Northern India, there are water supplies for irrigation of terraced land from heavily forested or glacier-capped heights behind; in other parts the rainfall, as in Malay or Java, is about 80 inches. The Machakos hills are themselves the local watersheds;

(iv) terrace farmers usually live in regions where a very high density of population produces a strong pressure on the land, a struggle for very existence, and a very low standard of living;

(v) terrace farming, as in the Mediterranean regions, is often rendered essential by previous denudation caused through the activities of the goat on the rocky hillsides;

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(vi) it is not only moisture which is a difficulty in terrace farming; where life is arduous and existence precarious the peasants often carry baskets of soil or manure several miles up the hill to their terraces. This is a labour which it is difficult to imagine the Wakamba undertaking.

The natives might establish small patches of gum trees for firewood and building poles on their own holdings on the lower land. They are doing this already, to a limited extent, in certain districts.

The lower slopes of the hills, if not afforested, should properly be used for pasturage, the stocking on which must be restricted. This zone will include slopes of 15 to 25 per cent. Cultivation on slopes of this severity should only be permitted on the lower parts of the hills if the owner lays out his fields in bench or step terraces which preferably should be made permanent by the use of stone walls.

Adequate wind-breaks should be planted at intervals of 250 or 300 yards.

If the tops and sides of the hills are not protected in the way suggested it will not be possible to prevent destruction of the lower lands by erosion such as is beginning on the valuable agricultural lands at Matungulu.

THE AGRICULTURAL LANDS.

The lands which should properly be considered as agricultural and suitable for permanent intensive cultivation are the flat lower lands and broader ridges with slopes up to 15 per cent. There should be ample agricultural lands of this description in the Reserve to meet the needs of the tribe. Land with slops of 15 to 25 per cent should be used, under control, for pasturage and steeper slopes than this, such as border many of the ravines, should be left under bush or planted to trees or Napier Grass. No grazing or cultivation should be permitted on the slopes over 25 per cent unless contour stone walling has been carried out to prevent the sandy slopes from washing away. These steep slopes might be planted to Elephant Grass (Napier Grass, Pennisetum purpureum) but this should be cut for fodder, not grazed off. I do not consider that contour strips of Napier Grass will be sufficient to enable those steep slopes to terrace themselves, but a typical slope should be planted in this manner by the Reconditioning Officer as an experiment to see whether this means of protection is successful.

It should be noted that these latter recommendations apply to the steep slopes on the lower lands, not to the hill sides which have been dealt with already.

No time must be lost in terracing all the agricultural lands. Soil which is lost now cannot be restored several years hence. Where there are wide expanses of agricultural land on a gentle slope, as in Matungulu location, parts of Kalama and Lower Mbooni, etc. the land should be protected by Mangum broad base terraces.

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In order that this work shall be done as rapidly and effectively as possible I suggest that caterpillar tractors and terrace graders should be used.

In the first place one unit of a tractor and grader should be purchased in order to obtain experience as to methods and costs. It is likely that the cost of protecting these lands will be from Sh 5/- to Sh 10/- per acre.

However as the land should produce 10 bags of maize together with two or three bags of beans, or 500 or 600 lb. of seed cotton in the lower areas, the cost per acre, spread over several years, cannot be considered excessive relative to the benefits received in conserving soil and moisture.

It is not proposed to employ terracing units with oxen since there would be difficulty in keeping the oxen in sufficient condition to do this heavy work throughout the year, especially where grazing is scanty, and losses from disease would be heavy.

Where the nature of the land does not allow of large scale terracing projects the shambas must be protected by narrow-base terraces and a large staff of trained natives would be required for pegging out narrow-base or bench terraces by the means of line levels or other simple devices.

It may be remarked here that there is a very grave danger of wide-spread destruction of land with the increase of cotton growing at altitudes of 4000 feet and below, as in Nzaui, where the soil is a hungry, light, sandy loam which erodes and is eroding very rapidly with the cultivation of row planted crops. It was noticed on one cotton field that the discharge of a ditch on to the land had carried scores of tons of silt and sand off the field for over a hundred yards below the field, through tall grass.

The cotton which has been planted in general looks extremely healthy and has resisted the drought in a remarkable manner. A large extension of cotton growing is to be encouraged but this will be fatal unless, concurrently, the lands are protected by terrace banks and the use of compost is developed. Particularly dangerous are some existing block plantations of some 50 acres of cotton where the catchment area being large, severe erosion may be expected.

Forest or bush should be maintained within fifteen yards of any water course. Exceptions may be made in the case of crops such as bananas and Napier Grass which will prevent any silt from being washed into the river bed.

The possibility of discouraging the cultivation of sugar cane on alluvium in the valleys should be considered by the Administration. In its place I suggest that vegetables and fruits, such as tomatoes, etc. might be cultivated in order to supply the vitamins which are so much required in the native diet. The vegetable plots, which irrigation might sometimes be possible, especially if the rivers were more under control, should be laid out in flat terraced beds and protected against loss of soil by hedges of 'Babu's Delight' or other suitable plants.

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Continued and increased propaganda in the use of compost should be carried out and the laying across the slope of trash such as pigeon pea stalks should be encouraged. This latter point is bound up with the provision of local 'wood lots' for the supply of firewood. Where 'Stalk borer' is a pest maize stalks must be composted or fed to the cattle rather than laid across the slope. Contour planting and strip cropping should be recommended and maize should be planted in rows, not in hills, which should be roughly at right angles to the direction of maximum slope. Interplanting of row planted crops like maize and cotton with a suitable legume is very desirable while the demarcation of shambas by small hedges will also assist to prevent wash.

LAND TENURE AND THE HOLDING SYSTEM.

In the first part of this memorandum certain evils which may be expected to arise from the present haphazard consolidation of land rights were touched upon. It is an administrative matter to decide how far these objectionable aspects can be prevented and land tenure regularised. Some decision as to the ultimate ownership of and responsibility for the land and as to methods of inheritance seems desirable if the land is to be preserved. It is not the function of this memorandum to discuss the type of social system which should be encouraged in a primitive community the customs of which are in a state of flux under the relatively sudden infringement of western civilisation.

Nevertheless it must again be stressed that under any social system there is an optimum density of agricultural population for any standard of living. If large holdings eventuate and a class of landless wage earners appear, the wages of the latter will to some extent be regulated by the wages offered on the external labour market or by the remuneration offered by industries other than agriculture. Excessive sub-division and fragmentation of the land on the other hand, might lead to a state of economic depression and misery rivalling that in parts of India.

It seems that the agricultural lands of Ukamba, such as those of Matungulu, might support two families of 5 on 25 acres of which one of the families would be a paid labourers' family.

The pastoral or semi-pastoral areas might support one family on 50 acres or on 25 to 50 acres when there is a large proportion of agricultural land.

In the cotton areas such as in Nzaui, 50 acres should be sufficient for two families, the head of one family being the land owner. In the agricultural or largely agricultural areas it is desirable not to make the unit too small or insufficient cattle would be kept for working the holding.

These are considered to be minimum sized holdings if a standard of living involving a cash income of not less than £12 a year - a modest requirement - is to be obtained. It is assumed throughout that methods of good husbandry are employed, including the use of compost

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and rotational grazing. There is a danger that owners of much larger holdings might not employ methods of farming which are sufficiently intensive to support the maximum population on the land. In Appendix "B" of this memorandum will be found details, necessary theoretical, of 'ideal' holdings in agricultural and pastoral areas. These details are the result of discussion with Mr. Hobbs, Agricultural Officer, Machakos.

THE BADLY ERODED AREAS AND THE FLY AREA.

INTRODUCTION.

It is agreed, I think, by all officers who are well acquainted with the Ulu Reserve that the badly eroded areas require at least five years rest in order to restore the vegetative cover. In order to give the land this period of rest all people and stock must be removed from the area.

Further, since other parts of the Reserve will doubtless need reconditioning and the worst parts are rapidly deteriorating beyond redemption, an effort must be made to close the whole of the badly eroded areas within a period of four years: that is to say, 100,000 acres a year must be closed.

There are about 250,000 acres of land in Kikumbuliu location which are not occupied owing to the presence of tsetse fly. If the fly bush is cleared at the rate of 100,000 acres a year this area will be available for settlement by the people removed from the eroded areas. If 50 acres is allotted to each family the area will hold about 25,000 people or 5,000 families.

Although the eroded areas really require five years rest it may be necessary, if no other land can be found for settlement, to begin restoring the people to these locations in the fourth year in order that people from other eroded locations may be accommodated in Kikumbuliu. The rate of stocking and general methods of land use must be very carefully controlled on the regenerated lands.

It may be desirable to give the various families the choice of remaining on their holdings in the fly area or of returning to their old holdings after four or five years.

RECONDITIONING THE ERODED AREAS.

Stagger trenching at Sh 8/- or Sh 10/- an acre, although very effective, is far too expensive an operation to contemplate over the 391,000 acres, nor is it a permanent prevention of run-off. At the same time some method by which run-off can be prevented and the growth of a vegetative cover accelerated is much needed.

I suggest that Sh 1/- to Sh2/- an acre should be spent on these lands by making contour banks three feet wide and two feet high at intervals of fifty yards.

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