

1950's

Glover, PE 1950-51 *The root systems of some British Somaliland plants*. I-IV. E. Afr. Agric. J. 16: 98-113, 154-173, 205-217; 17: 38-50.

Includes some info on plant use by stock, e.g. *Aristida kelleri* grazed when young and green but wiry and unpalatable when old and dry, and other uses e.g. young thorns of *Vachellia* (*Acacia*) *bussei* eaten by Somalis.

Macfayden, WA 1950 *Vegetation patterns in the semi-desert plains of British Somaliland*. Geog. J. 116: 199-211.

Studied airphotos of 2 semi-desert areas, the Haud (S Brit Som and extending into Ogaden and Cent Som acc to his map) and the Sawl or Sorl Haud (E Brit Som and extending into N Somalia) plains. The Haud is c119,000 kmsq, at c7-9 30 N, 43-48 E. The N & W boundaries bounded by limestones, the S & W boundaries "are topographically indefinite." The terrain of the Haud is mainly plains which to the eye appear flat though in fact very gently rolling and sloping slightly to the SE. The surface is a thick cover of red sandy soil covering mostly sandstones, with limestones in the N and limestones and gypseous shales in the E. The veg is bush [bushland], also some stretches of grassy plain, *bans*.

The Sawl Haud covers c21,000 kmsq. The Sawl s.str. is red sandy soil over limestone, with bush, but a central area of anhydrite, the Haded, only has a sparse cover of coarse and rather short turfy grass with occasional open scrub and mostly treeless.

Two rainy seasons, the *Gu* in Apr-Jun and the *Karan* and *Dhair* in Sep-Nov. Temporary water in ballehs, ponds forming in natural or artificial depressions, and no permanent water over most of the plains and general absence of defined drainage channels. Due to lack of permanent water, Somali pastoralists pasture their camels and shoats only in the rainy seasons and for much of the year the Haud and Sawl Haud are practically uninhabited by man though having a fairly abundant fauna including lion, leopard, cheetah, hyena, jackal, many species of antelope, warthog, ostrich and other birds.

Some airphotos show remarkable rhythmic patterns, 'vegetation arcs' as he has called them, recalling a tiger skin or rhythmic ripples of sand. But they represent the rhythmical arrangement of concentrations of vegetation – trees, shrubs, herbs and thick grass. They indicate precisely the direction of the very low slopes, hence useful in watershed studies. These veg arcs are very clear in much of the Sawl s str., and in the N & E parts of the Haud but largely lacking elsewhere (i.e. southward). In areas of vegetation arcs, nearly all the vegetation is concentrated in bands of cover with the ground between practically destitute of vegetation. The vegetation is normally densest along the upslope edge, becoming sparser toward the downslope side. Extinct arcs are occasionally found, their position marked by a line of dead trees on bare ground, the accompanying vegetation having vanished. The arcs are invariably oriented at right angles to the direction of drainage, and are convex upslope. The ground level is not appreciably raised in the vegetation strips. The strip interval ranges from c70-276 m, averaging 158 m. The width of the vegetation strips is 20-36(-76) m, the intervening desert from (25)70-146 m, thus the vegetation

strips are c4 times narrower than the intervening bare sections. The average rhythm is c160 m of which vegetation accounts for 30-40 m; where strongly developed, the rhythm may rise to c250 m of which vegetation c50 m and bare c200 m. The length of arcs may be up to 2 km or more, but mostly from less than 0.5 to 1 km. He suggests that water flow is responsible for creating these arcs; wind as agency is out of the question. The arcs are long-established and stable, with no soil erosion.

Documented with some good oblique airphotos and a couple of ground photos.

332 *Schizachyrium kelleri* (*Andropogon cyrtocladus*) DUR Sometimes a thick growth is the main component of vegetation arcs in the Haud of N&Cent Somalia and Ogaden

Hunt, John A 1951 *A general survey of the Somaliland Protectorate* 1944-1950. Crown Agents, London, 203p.

A comprehensive and fascinating general account acc to Bowen & Bird 1988.

The following from photostat of ch.7 Flora, ch.8 Fauna, and a few later pp incl some tables. The flora chapter includes stuff that may also be published elsewhere (e.g. Glover 1947, Gilliland 1947).

Negative on fire. And can't agree that removal of trees will result in more grass growing. His observations show a variety of dynamics between tree and grass layer. Some places where woody cover was removed, e.g. old landing strips, have not been colonized by grass and some are severely eroded due to clearing.

Rainfed agr where rainfall >15 in (380 mm) or preferably >20 in (500 mm). Peck, Director of Agriculture & Veterinary Sciences, estimated the present agr areas at c800 misq of which 400-500 is on the watershed area of the Hargeisa and Borama districts (eastern extension of the Harar Plateau). Predominantly sorghums, some maize. Some dryland agr in the Acacia etbaica belt.

Floodwater agr produces mostly millet (i.e. sorghum?). Plowed by oxen with a wooden plow (erfi) and manured by stock especially cattle which eaten the stalks after harvest. Irrigated gardens: many small areas, growing fruit trees and vegetables.

Annotations on most of the wild animal species.

Camel (gel) is the most important animal in the internal economy. Transport, food. Hides mostly used as shoe leather.

The black-headed, fat-tailed 'Berbera' sheep (idoh) produce one of the world's most highly valued sheepskins. Grazed with goat though preponderant in highland plateau country while goat in broken country and lowlands. Sheepskins are the no1 export. Important in diet. Have thin coats and no wool is produced. Goat (riyoh) skin is a valuable export.

Humped cattle (lo') are much kept where they can reach water every few days. Kept primarily for milk or plowing, some hides. "Most Somalis do not like beef much, partly because the cattle are not usually slaughtered until useless for other purposes." (They must be awfully tough!)

Horse (faras) Less common than earlier in the century, but herds are still kept by the Warsengeli and Gadabursi. The Somali pony is well known as a polo pony. Motorization of troops has decreased interest in horse-breeding. Horses are now kept largely as a luxury by the richer Somalis. The horse needs water every 1-2 days.

Donkey (damer) Kept especially in the agr areas and in the hills, as well as in most towns. Used for transport.

Hens (digag) Somalis are beginning to eat more eggs and birds. Eggs cannot be bought at night.

Dogs (ei) may be useful watchdogs. They are 'unclean', Muslims will not touch the face or wet hair of a dog.

Divides the Somalis into 5 groups: nomadic stockherders, agriculturists, townsmen, gov servants, travelers. Among the townsmen are the powerful traders essential for the marketing of stock and agr products, as well as for the importation and distribution of essentials not locally produced. They are not necessarily sharply divided from the countrymen as they often have stock or plots and visit the country frequently. "There has been a marked drift to the towns during the recent war [WW2], and too many young people have left their stock and gardens [agr plots] to live in townships: but the towns are necessary market and cultural centres." The 'travelers' mostly start as seamen and roam the world, and there are colonies of Somalis in some British cities and the US. They provide a useful supply of money earned abroad and are an important contact between the outside world and the nomadic herder. They usually return, often to tend stock themselves.

A rich man may own as many as 1000 camels, though the normal rich owner has c100, and 10-20 is a comfortable number for the average well-to-do family. Camel meat is prized though a good deal of inferior meat is eaten. But special gelded camels (gawl) are fattened for slaughter. Camels on green grazing will do without water for 2-3 mo. When grazing is dry, camels are watered every 11-18 days though if grazing saltbush they must be watered daily. Camels are milked by men, and usually cows too. Men or women milk goats. Only women can milk a sheep or erect a (portable) house. Probably 250 shoats are optimal for the average family, being all that a woman with 3 small children can handle effectively. With green grazing, shoats (except those pregnant) can go 2-3 mo without watering, but 4-8 days in the dry season. Cattle and donkeys need water every 2-4 days.

In a year of good rain and grazing, exports tend to drop, and in a poor year to rise. That's because the Somali tends to sell his stock cheaply and willingly when there's a drought.

"The man's work in nomadic stock-herding is not always so obvious to the alien observer." He is seen driving camels and watering them occasionally. His feats of endurance and hunger and

thirst scouting for new grazing and searching for lost stock are not appreciated. Hence “when he is seen sitting down in a ‘coffee shop’ to drink a cup of tea and listen to the news in other people’s conversation, it must not be inferred that he spends his life in idle chatter, whilst his wife carries wood and water...” (And in fact, this isn’t even chatter, it is networking, getting information that may be useful to his production strategies.)

In N Somalia, the browsing of tree branches is an alternative feed for stock, and the acacias (e.g. *A. etbaica*, *A. bussei*, *A. tortilis*, *A. horrida*, others) are much used and often badly cut about when other foods fail. “Many graziers have so far failed to learn to cut off only the *lateral* branches of these trees for their stock to browse, with the result that the crowns of many trees are destroyed in each dry season, to the impoverishment of the country.”

Schizachyrium kelleri [likely this species is the one called *dur*, [*Andropogon*] In N Somalia grows below c4000 ft on calcareous soil. Usually associated with termite mounds and flourishes on any calcareous surface, even a few metres in extent. Not on gypseous soil. A useful wind and water break, stopping grass seed from being blown or floated right away. Not a very valuable grazing grass but the young shoots are eaten, and the 6-ft-high tussocks and belts of the grass form a useful fodder reserve, if not too dry and hard, when smaller grasses fail.

Chrysopogon aucheri is the favorite grass of graziers in N Somalia. Grows in the *Acacia bussei* zone and somewhat lower on any non-rocky soil.

Details on other range plants particularly the acacias.

Gilliland, HB 1952 *The vegetation of eastern British Somaliland*. J. Ecol. 40: 91-124.

(Note there’s also an earlier work, 1946, The grazing areas of eastern British Somaliland, as vol.4 of the 4-vol study of N Som by Glover 1946-47. It is 140 pp & most of it is a detailed study of the veg, per 6 formations and many subtypes & associations. I don’t know if it’s worth bothering with this rept.)

A simple and inadequately documented paper on the veg of part of N Somalia, but very important simply because it is one of the very few concrete pieces of research we have. A total of only 21 relevés, each serving as an example of a veg type. They have quite a few undet species, but it’s all we got! I’ve pulled out some info, e.g. relative f of certain groups.

These relevés, based on belt transects 2000×6 ft, list the species, give a f. dist’n of size-classes by stem diam, & a relative % cover (which is annoying & frustrating because I can’t translate it into absolute cover). For grasslands, very brief species lists comprise the relevés, based on estimates in 25 in.sq. quadrats.

A rough map of veg types. A few photos.

Some ref to overuse, erosion; and the veg treatment is informed (in overall scheme) by the Clementsian paradigm of climax.

The appendix is very useful, listing the Somali plant names. This has been put into my master file. It's based on the collection made by P.E. Glover & the author, work done 1944-45.

The Somali usually has "a rather wider conception of species than a botanists, especially in difficult groups, though in such genera as Commiphora his degree of specific exactness was often amazing." This is a confused way of explaining the Somali's floristic knowledge. It initially suggests that he can't differentiate some species, "especially in difficult groups," which is immediately contradicted by acknowledging that in Commiphora, the biggest and most difficult genus in the Horn of Africa, he is an expert. This seems to surprise Gilliland.

What he misunderstands is that the Somali's keenness of observation and differentiation is the full equal of ours, but unlike our sometimes academic knowledge-for-its-own-sake approach, his knowledge of plants is calibrated vs. their utility. Where it helps to know, he knows, but in many genera of smaller forbs, for example, plants that are totally insignificant or 'useless' as he would put it, there's no point in differentiating. So he apparently lacks fine discriminatory ability for some groups, but this is because he has no need to discriminate. Where he needs to be, he is a true expert.

So let's amend Gilliland's statement. The Somali's conception of species is dynamic, and relates to a plant's usefulness. His ultimate taxonomic units may even extend to the subspecies or varietal level.

The veg classification is a mixed bag, too many subtypes without enough documentation, and a whole section on post-climax veg. Mixed deciduous woodland and thicket, of the deciduous semi-desert formation, is basically Ac-Com bushland.

UN 1952 *Information from non-self-governing territories, British Somaliland.* General A/2134, p.3-12.

The economy is based on nomadic pastoralism and development is mainly directed towards the extension and improvement of pastures, of livestock breeding and its products. Methods to increase the productivity of the land by means of irrigation and the development of the system known as Yemeni farming by using spate [flood] water are also being pursued.

The territory has 800sqmi for cultivation, 16,800 is forest and acacia scrub, 8400 is arid and coastal plain, 42,000 is steppe grazing.

The camel is the Somalis' most prized possession. Shoaat have cash value and provide meat, milk and ghi. High-value sheepskins are exported to Europe and US.

Lawrie, John J 1954 *Acacias and the Somali.* Emp. For. Rev. 33: 234-238.

This refers to Somaliland i.e. N Som. Evidently at least partly based on personal observations. Though dependent on the vegetation for both cultural materials and food, and though appreciative of the value of both trees and grass, Somalis feel neither tribal nor individual responsibility and "merely exploit for the present with no care for the future." (i.e. no

conservation ethic) It is a moot point whether Somaliland is grossly overstocked, or herds are merely badly distributed. He feels that an effective system of pasture management and use of water would benefit the situation. Indicators of improper or careless use of resources are lopping for fodder and cutting branches and small trees for thorn enclosure material. The use of live branches for enclosure of farmland has been prohibited since 1930 by the Cultivation and Use of Land Ordinance, but the practice is rife. There's also an ordinance from 1947 prohibiting use of live wood for charcoal manufacture, yet this practice too is widespread.

“*Acacias* of many species play an important, almost vital, part of the lives of the Somali nomads. It might even be said that without these trees nomadic life would be impossible; at least it would be very different. *Acacias* provide browse for the stock, much of the material for the *aqal* or portable huts, protective fencing round camps and kraals, charcoal, fibre, and numerous other wants.” Almost all acacias may be used for the thorn fence surrounding nomadic encampment. All species are used for firewood. The bark of many species used for making rope. Most acacias (in N Somalia) are used for fodder: browsed by camel and goat and lopped in drought time or dry season. The outstanding, multipurpose acacias are *A. bussei*, *A. tortilis* and *A. etbaica*.

Lawrie, John J 1954 *Acacias and the Somali*. Emp. For. Rev. 33: 234-238.

I've done this backwards: I should have read this paper 30 yrs ago, before we went to Somalia!

332i In the Haud (southern part of N Somalia and southward) there is a grass cover thick enough to carry a fire, and it is often burned in order to produce a crop of young grass and to destroy ticks

147 *Acacia* “*Acacias* of many species play an important, almost vital, part of the lives of the Somali nomads. It might even be said that without these trees nomadic life would be impossible; at least it would be very different. *Acacias* provide browse for the stock, much of the material for the *aqal* or portable huts, protective fencing round camps and kraals, charcoal, fibre, and numerous other wants.” Almost all acacias may be used for the thorn fence surrounding nomadic encampment. All species are used for firewood. The bark of many species used for making rope. Most acacias (in N Somalia) are used for fodder: browsed by camel and goat, and lopped in drought time or dry season.

147 *Acacia bussei* The soft, succulent young thorn eaten by Somalis and their stock. The old bark from the main stems of this acacia is eaten, and “bark stripping for this purpose probably does more damage than does the making of rope.” The innerside of the outer bark is beaten lightly and then an infusion made, producing a drink like tea. The bark is also used in tanning, e.g. skins for use as water or milk carriers. In N Somalia often used for the revetting of wells because of its resistance to rot and termites. Also one of the species most used for building village huts. A preferred source for centre pole of nomadic hut in N Somalia. Wood for axe handle. A stick is cut from this tree, for use in handling thorny branches when making a thorn enclosure. Bark made into rope, and the rootbark of this acacia also yields a fibre for rope-making. Roots are the favorite material for the hut framework (several semi-circular hoops over which mats are secured); the long roots of this acacia spread for up to 20 m or more just below the surface, and are simply pulled up. Inner bark chewed until soft, then made into string for

stitching mats used for covering the Somali nomadic hut. Roots make the reinforcing mesh for big grass-woven vessels. One of the acacias especially liked for firewood in N Somalia. In N Somalia almost the only wood used for charcoal manufacture. Browsed by camel and goat. Fruit eaten by stock. Lopped for fodder and is much more sensitive to lopping than e.g. *A. etbaica*.

147 *Acacia mellifera* A preferred source for centre pole of nomadic hut in N Somalia. Browsed by camel and goat.

147 *Acacia senegal* Gum is collected and sold (N Somalia), there is no tapping as in Sudan. A non-preferred source for centre pole of Somali nomadic hut. Wood for axe handle, and often for club in N Somalia. One of the acacias especially liked for firewood in N Somalia. Browsed by camel and goat. Fruit eaten by stock.

147 *Acacia circummarginata* Gum mixed with milk and taken for back pains. Gum edible, eaten locally but not marketed. One of the acacias especially liked for firewood in N Somalia. Browsed by camel and goat.

147 *Acacia reficiens* (misera) Bark made into rope. Roots used for framework of Somali nomadic hut. Browsed by camel and goat.

147 *Acacia tortilis* Excellent shade tree. In N Somalia women knock down the fruit with long sticks and it is eaten green or dry. Wood for axe handle, and often for club in N Somalia. A stick is cut from this tree, for use in handling thorny branches when making a thorn enclosure. Bark made into rope. Roots used for framework of Somali nomadic hut. Inner bark chewed until soft, then made into string for stitching mats used for covering the Somali nomadic hut. A favorite browse of all stock and gives a green flush of browse when there is nothing else to be had. Fruit eaten by stock. In contrast to *A. bussei* which has only shallow roots, *A. tortilis* is more resistant to overbrowsing and trampling because it has both shallow and deep roots. But the extensive cutting of its branches seems to make it very susceptible to borer attack.

147 *Acacia etbaica* Bark made into rope. Inner bark chewed until soft, then made into string for stitching mats used for covering the Somali nomadic hut. Bark used for tanning skins for use as water or milk carriers. A stick is cut from this tree, for use in handling thorny branches when making a thorn enclosure. Not liked for firewood because the bark does not readily fall off, so it makes a smoky fire. Browsed by camel and goat. Troops of baboons have been seen in the trees feeding on immature fruit. Lopped for fodder, and much less sensitive to this treatment than *A. bussei*.

147 *Acacia nilotica* Excellent shade tree. In N Somalia women knock down the fruit with long sticks and it is eaten green or dry. Roots make the reinforcing mesh for big grass-woven vessels. Fruit eaten by stock.

147 *Acacia edgeworthii* The almost ripe seed eaten raw or cooked

147 *Acacia oliveri* (unispinosa) Gum eaten

Greenwood, JEGW. 1957. *The development of vegetation patterns in Somaliland Protectorate*. Geog. J. 123: 465-473.

First refers to Macfadyen 1950a,b on veg arcs in Somaliland Protectorate. Visited in 1955-56 and saw veg arc terrain from the ground. "The existence of arcs would probably have gone unnoticed without prior location on aerial photographs." (This suggests the subtlety of the phenomenon from the ground. I found the presence of arcs not at all obvious and if not aware that they may be present, they can easily be overlooked.) Veg arcs are on terrain with a significant percentage of clay, and have not been seen on sands. Veg arcs have been noted on airphotos from Kenya & Tanganyika, restricted to areas of rainfall not much exceeding 500 mm.

'Vegetation arc' is partly misleading since these series of bands are only arcuate in some places notably in low hilly country, and on plains they may approximate to straight lines.

Tries to explain the development of arcs in relation to runoff and percolation of water. Suggests that arcs migrate upslope. Not much of a paper, I don't see any systematic data, not even on soils which are said to be a key.

Some good airphotos of arc areas.

Pichi-Sermolli, Rodolfo EG 1957 *Una carta geobotanica dell'Africa Orientale (Eritrea, Etiopia, Somalia)*. Webbia 13: 15-132.

Important only because it was an early attempt to classify the major vegetation types of Ethiopia (along with Eritrea and Somalia). Though many faults of data foundation and the odd configurations of types, has had undue influence, repeatedly popping up, sometimes uncritically copied, in later (general) studies. Yet a labor of love, it seems, assembling the lit & drawing the lines.

Formerly an important map of the vegetation of NE Tropical Africa, but very generalized and some units clearly unsatisfactory. Its continued citation demonstrates the lack of further progress in broad-scale vegetation studies.

24 veg types (some only applicable to Ethiopia). To a large extent, a compilation (uncritical or unsynthetic) of the lit, and not a resynthesis of the veg units(?). No new data. Essentially no good attempt at envir. quantification or correlation with veg. Some of the lines look awful fishy including (especially) C Somalia.

I'd go further, and state that without some systematic survey work, i.e. beyond driving along a main track and jotting down a few names, a map such as this is scarcely worth the paper it's printed on and in some cases (this one is a good candidate!) downright misleading. A fiendishly difficult thing to refute outright, because the units are so flaccidly defined. There's a lot of leeway, and a lot of stands would be excusable in quite a number of the types.

The following are the veg types that occur in Somalia:

2. grass, perennial herb & subshrub steppe. Big region bounded by approx. Gardo-Garoe coastward, extending N to Cape, & S taking in the N half of Mudug Region; also a wedge S between coastal G and interior B, ending at approx El Dhere. The 'subdesert' of Gillett 41. In Mudug dominated by *Chrysopogon*. There or elsewhere also *Sporobolus* spp, *Tripogon*, other grasses. Also, *Suaeda*, *Atriplex*, *Limonium*, *Sporobolus*, other grasses. Or *Lagenantha nogalensis*, *Sporobolus* spp. Note only grasses, dwarf shrubs (esp. halophytes) & forbs are mentioned, no tall shrubs or trees.

3. shrub steppe [*Steppa arbustata*] (Couldn't this be tree or Woody steppe, as it includes *Ac-Com*.) Lots in N, & an area W of Las Anod. Ref to Gillett 1941.

4. subdesert scrub (a) The *Indigofera spinosa*-*Duosperma* zone of E-N Kenya from L. Turkana down to Garissa. (Note this is not even mentioned! Good example of greatly misleading nature of this map. Overlay it with Herlocker's Marsabit map. Any connection at all?); (b) Another large area centrally in CR, W from W of Hoddur & N borders, through all of Beledweyne Dist., & a NE section taking in parts of Xarardheere & Hobyo Districts. *Commiphora* dominant, *Acacia*, capparids, *Euphorbia*, *Jatropha*, maybe *Sansevieria*. (Is Subdesert scrub a good name for this type? Is it not thicker vegetation than would be connoted by 'subdesert'? Looks like a dry variant of *Commiphora*-*Acacia* type.

5. subdesert trees succulent scrub. Islands in Horn region viz. the tip area, in N Som; incl *Boswellia* spp.

6. broken xerophilous open woodland. The largest type, $\pm$ contiguous; a lot of the Ogaden, also S of Mandera to Bardera, much of Mudug & N Somalia.

Acacia the top dominant - e.g. *A. tortilis*, *A. mellifera*. Also capparids, *Commiphora*, other trees & tall shrubs.

A large subzone in CR is the *Cordeauxia* type; includes lots *C. horrida*, *C. africana*, *C. flabellulifera* (schimperi), *Boscia minimifolia*, *Acacia tortilis*.

7. xerophilous open woodland (1) A broad zone between #6 and montane evergreen scrub of Ethiopia. (2) Much of S Somalia from almost Beledweyne SW through Baidoa to almost mouth of Jubba R, & apparently much of E Kenya bushlands.

Acacia predominant, especially *A. seyal*, *A. senegal*, *A. mellifera*, others. *Adansonia*, *Dobera glabra*, *Combretum*, *Terminalia*, *Sterculia*, capparids. Many other 'moderate-dry' genera and species. *Commiphora* not predominant, and semi-mesic types such as *C. boiviniana*.

9. lowland evergreen thicket. Coastal band into extreme SW Som. Mentions Dale 1939 only.

11. savanna (various types). In Somalia, note a fairly small area approx. between Bur Acaba & Jalalaqsi, the wedge ending approx at W side of Buulo Burte; & an area in extreme SW interior. Also in S Eth.

Lots of 'mainline' grass genera, e.g. *Aristida*, *Cenchrus*, *Chloris*, *Digitaria*, *Eragrostis*, *Panicum*, *Harpachne*, *Sporobolus*, *Tetrapogon*. Woody: *Thespesia*, *Combretum*, *Terminalia*, *Diospyros*, *Balanites*, *Adansonia*.

15. montane dry evergreen forest. Bits in N Som, & patches thru Highland Eth.

16. lowland moist evergreen forest. Boni (or near, in SW corner of Som.

21. coastal formations. Seems to approximate the coastal grassland zone. Unbroken from N down to Kismaayu.

Mentions various kinds of halophytic & littoral associations, & even *Thalassia hemprichii* (a seagrass) along coast. But clearly has missed the clearcut coastal plains. Various species are mentioned but not e.g. *Indigofera sparteola* ('intricata') or *Aristida kelleri*. Hard to imagine how these broad, unmistakable, and relative homogenous plains could be missed out in his description. For his ref. to e.g. Hobyo he mentions Stefanini & Puccioni explorations along coast, and account in Chiov. 1929.

22. mangroves patchy in S & N Som.

24. swamp formations (at Dolo) Mainly lower Shabelle.

Boaler, SB 1959 *Conocarpus lancifolius Engler in Somaliland Protectorate*. Emp. For. Rev. 38: 371-379.

The coastal plain of N Som "is one of the most unpleasant places on earth during the summer." From Jun-Sep, mean monthly max is >100 F, air is dry and full of sand blown by the SW gale, topsoil is dry as dust.

Characteristic plants of W part of coastal plain (W of Berbera) include *Balanites orbicularis*, *Cadaba rotundifolia*, *Maerua somalensis*, *Indigofera sparteola*, *Eragrostis hararensis*, *Panicum*.

Lasiurus hirsutus is the dominant of tall grassland on Zeila Plain in NW Somalia.

On the coastal plain, characteristic trees of watercourses include *Acacia tortilis*, *Combretum molle*, *Turraea parviflora*, *Ziziphus mauritiana*. *Tamarix nilotica* common along watercourses with permanent water.

Conocarpus lancifolius Evergreen tree to 60x2+ ft. In N Som, grows naturally in alluvium of watercourses to 3000 ft (to c4000 ft near Borama though stunted), but only E of 45°30' (which is E of longitude of Berbera). It does not seem to be associated with *Acacia tortilis*, a common tree of watercourses on the coastal plain. Stands, rarely more than a few acres in area, are owned by the Somali group living near them. Has been planted in all the coastal towns of Som and in Aden, Djibuti and Port Sudan. An excellent, rapid-growing shade tree, provided the roots can reach ground water or is well watered. Formerly the chief use was in building the Arab dhow, for which timber cut in Somalia was worked in Arabia. Wood as building poles for local houses in N

Som. Makes excellent charcoal. The greatest source of loss to young stands of seedlings and saplings is browsing by goat, and very few plants survive. Mature trees may be lopped and eventually killed, especially in years of drought. *Conocarpus* is disappearing from many watercourses due to the browsing and lopping. Locusts eat the leaves.



Open to dense *Acacia-commiphora* bushland covers much of E. Bulo Berte District above the escarpment. Dom/subdom genera: *Boswellia*, *Caesalpinia*, *Commiphora*, *Cordeauxia*, *Vachellia*. 312 woody and subwoody species. Lots of palatable browse species

Photo: Peter Kuchar

1960's

Sacco, Tommaso 1960 *L'azienda zootecnica di Uar-Mahan in Somalia*. Considerazioni floristiche. Riv. Agr. Subtrop. Trop. 54: 425-453.

Veg of the Experimental Zootechnical Farm at Uar-Mahan, which is halfway (27 km) between Afgoi and Uanle Uen to the NW. Includes a very simple veg map, and some info on some species, and a species list. Most of veg characterized as bush-herb and tree-bush-herb. Has some Som names but I can't be sure if they're not from the biblio e.g. Chiovenda refs.

Boaler, SB & CAH Hodge 1962 *Vegetation stripes in Somaliland*. J. Ecol. 50: 465-474.

Using Gillett 1941 veg classif, stripes occur mainly in *Acacia bussei*/*Chrysopogon aucheri* CT and *A. tortilis*/*Andropogon cyrtocladus* CT – as written by Bowen & Bird 88. Don't I have enough on stripes, e.g. their 1964 pap.

Note that stripes can be both in bushland and grassland. In bushland the spacing is c90-180 m and in grassland c45 m (*though I'm a bit confused by their description*). Note Photo 2 in which scattered trees, mostly aligned along stripes but they are far from complete tree stripes. They're just dotted along the veg-stripe portion rather than between- stripe portion.

They note that these patterns are “Nearly unrecognizable on the ground” but “show clearly on air photographs.” Yes, that was my experience; it was often hard to recognize that I was standing in a patterned landscape. (cf. CR veg)

147 *Acacia bussei* A study in N Som found vegetation-stripe landscapes most numerous and most striking (from the air) in *Acacia bussei*/*Chrysopogon plumulosus* open woodland. The vegetated stripes are up to 180 m across with a sparsely vegetated interstripe lane c45 m wide. The trees may be up to 9 m high with surface root systems extending up to 45 m from the trees. *A. bussei* is also present in *Acacia tortilis*/*Schizachyrium kelleri* stripes.

332 *Chrysopogon plumulosus* ('aucheri') A study in N Som found vegetation-stripe landscapes most numerous and most striking (from the air) in *Acacia bussei*/*Chrysopogon plumulosus* open woodland. This grass forms the greater part of the ground layer in the bands, though it is more frequent in the open than within the shade of tree crowns. This grass may also form dense untreed arcs, and here the vegetated stripes and bare lanes are of about equal width. Occasional stunted acacias may also be found in the stripes. The soil of vegetated stripes has higher clay content than that of the bare lanes.

Boaler, SB & CAH Hodge 1964 *Observations on vegetation arcs in the Northern Region, Somali Republic*. J. Ecol. 52: 511-544.

Such patterned veg, comprising veg bands separated by nearly bare ground, was first appreciated by Macfadyen 1950 from study of airphotos in N Somalia. He showed that such patterns occurred over very large areas of the Haud, and the bands ran approximately parallel to contour and appeared concave downslope in valleys. Such patterning had been noticed in N Somalia by Gillett 1941 and later Gilliland 1952 but neither seemed to recognize that it might be extensive. Arcs have also been recognized or suspected in Sudan, W.Africa, Arabia, Iraq, Australia.

Bands clearly show up on airphotos though are sometimes hard to distinguish at ground level, though it's usually enough to stand on the roof of a car to make the outlines clear. The uphill edge is clearer and more abrupt than the downhill boundary, since scattered plants are often found on the bare ground below the arc and dead plants are often found toward the downhill edge of the arc.

Slope averages 1 in 240, ranging from 1 in 100 to 1 in 450. Ground surface covered ranges from 25-60%. Arc width varies from 15-70 m, and rhythmic interval 45-256 m.

Some arcs include woody plants but all those observed were dominated by either *Schizachyrium kelleri* or *Chrysopogon aucheri*. The narrow front (uphill) zone is often dominated by stoloniferous clump grasses, mainly *Sporobolus*. Table 5 has a long list of spp in arcs, simply as +/- . A few are common in all zones of arcs (front, body, bare) but may be characteristic of or restricted to one particular zone. The front is the richest zone with 73 spp, the body of arc had 49 spp, the bare zone 22 spp.

The cover within the arcs is by no means dense. Some limited point-transect work came up with 7.5-8% cover within the body zone, and 20% in the front zone of *Chrysopogon* arcs.

Soil (from ltd studies) is loam or clay loam, with increasing clay with depth, and the subsoil is clay. The surface has a thin crust, sufficiently impermeable to cause rainwater to run off (except where broken e.g. by hooves). During a rainstorm water moves downslope as a shallow sheet and collects as a pond (to 2.5 cm deep) at the front of the arc, gradually infiltrating the body of the arc. Infiltration into the soil is deeper within the vegetated body of the arc than outside it.

Are arcs advancing upslope? Conflicting info: seem to be moving in some places but stable elsewhere. Likely that both stable and moving arc systems exist in N Somalia. Fire, overgrazing or prolonged drought may destroy arcs.

332 *Schizachyrium kelleri* Tussocks to >2 m and diameter >1 m at ground level; the base may be raised as much as 10 cm above the ground surface by soil collecting between the culms. Not found on gypseous soils. The typical dominant of vegetation arcs (banding) found in plains and valleys in N Somalia where rainfall is <250 mm. The woody stems are used to make the mats used for covering Somalis' portable homes.

332 *Chrysopogon aucheri* Tussocks to 70 cm across and may be 1 m high when flowering. Perhaps the most valuable fodder plant in N Somalia, the leaves are eaten even at the height of the dry season when they are dry. Occurs both on gypseous and non-gypseous soils, and mainly where rainfall is >250 mm. In N Somalia is the dominant of some vegetation arcs (banding)

147 *Acacia bussei* Some *A. bussei* woodland exhibits banding (vegetation arcs), with *Chrysopogon aucheri* or *Schizachyrium kelleri* as the dominant grass

147 *Acacia etbaica* Some *A. etbaica* woodland in N Somalia exhibits banding (vegetation arcs), with *Chrysopogon aucheri* as the dominant grass

136 *Euphorbia robecchii* The commonest tree in some *Schizachyrium kelleri* vegetation arcs (banding) in N Somalia

147 *Acacia tortilis* The commonest tree in some *Schizachyrium kelleri* vegetation arcs (banding) in N Somalia

332 *Cynodon dactylon* In N Somalia, the dominant on old dung heaps wherever nomadic stock-owners have camped

Hemming, CF 1965 *Vegetation arcs in Somaliland*. J. Ecol. 53: 57-67.

Veg arcs occur widely in the southern part of N Somalia. Not found on coastal plains. Study site SW of Las Anod. New colonization is at upslope edge, while dead trees/shrubs are found below the downslope edge. Body of arc *Schizachyrium kelleri*. Much rather inconclusive speculation about veg dynamics, effect of physical factors, grazing, etc. I doubt his explanation for the genesis of arcs through initial overgrazing (of presumably a *Chrysopogon* grassland).

“It is suggested [*by whom?*] that the arcs have a water supply equivalent to about twice the rainfall.” (*That’s why perennial grass can thrive well below 250 mm, e.g. 150 mm near Las Anod. Arcs are a natural water-harvesting system.*)

332 *Schizachyrium kelleri* The dominant plant of all vegetation arcs (banding) seen in N Somalia. It forms the body of the arcs and other species are found growing within the clumps or colonizing the edges. Small stools of *Schizachyrium* may be found in the colonization zone at the upslope edge of the vegetation bands, along with other grasses. The body of the arc supports low trees and shrubs, which are largely dead below the lower edge of the arc.—Aside from vegetation arcs, in N Somalia this grass is found only in areas receiving some inflow of water, and is particularly common around small depressions where pools form during the rains, and along sides of tracks which act as seasonal watercourses. The enhancement of water infiltration, both in vegetation arcs and small depressions, suggests that *Schizachyrium* clumps “represent a climax corresponding to twice the rainfall actually received over the whole area.”

147 *Acacia bussei* In N Somalia vegetation arcs (bands) are found mainly within the *A. bussei* open woodland zone. This acacia has been decimated over parts of its range; areas of several square miles may be covered by dead trees on bare soil, with the only live ones found in remnant patches of grass, often in vegetation arcs dominated by *Schizachyrium kelleri*.

196i *Acacia-Commiphora* vegetation may be associated with vegetation arcs (banding) in parts of N Somalia. Hemming (1965) described vegetation arcs of *Schizachyrium kelleri* with acacias, commiphoras and some other woody species within the body of the arc. Woody plants below the lower edge of the arc were largely dead (*suggesting that the arc microenvironment enables woody plants to grow, likely through enhanced water infiltration*).

036 *Boscia minimifolia* In an area SW of Las Anod, N Somalia, with c150 mm rainfall, a component of *Schizachyrium kelleri* vegetation arcs (banding), and the only woody species alive in numbers on the bare ground between the vegetation bands. Most other woody species (deciduous) only thrived within the vegetation bands and were dead on the bare intervening ground.

Glover, PE 1966 *Some notes on Hodotermes erithreensis (Sjostedt) Minor Harris (Somali name: ‘Abor aro madu’) in British Somaliland*. E. Afr. Wildl. J. 4: 47-49.

Termites seem to be an important ecological factor particularly in the devastated areas of N Somalia where many parts are seriously overgrazed and eroded. But based on his observations, Glover (1966) concluded that “the damage done to herbaceous vegetation by *Hodotermes*, even in regions where it is very numerous, is as nothing compared with that caused by stock, even under conditions of moderate grazing and trampling.”

332 *Leptothrium senegalense* Leaf and stem observed harvested by termites (*Hodotermes*)

103 *Cucumella robecchii* Leaf observed harvested by termites (*Hodotermes*)

332 *Aristida* spp Observed harvested by termites (*Hodotermes*)

132 *Hibiscus* Dried leaves observed harvested by termites (*Hodotermes*)

259 *Blepharis edulis* The commonest forb in *Chrysopogon* grassland in a N Somalia study

Glover, PE 1967(b) Further notes on some termites of northern Somalia. E. Afr. Wildl. J. 5: 121-132.

Description of mounds.

Hemming, CF 1966a *The vegetation of the northern region of the Somali Republic*. Proc. Linn. Soc. Lond. 177: 173-250.

The NW portion of Somalia. This veg account serves as basis for studies of desert locust and to help in forecasting behavioral changes due to changing plant ecology (i.e. vegetation).

Uses ‘climax’ as “the most highly developed vegetation that one can find, often only as small relicts.”

“The nomadic Somali grazer is an extremely good botanist and the quality and type of grazing available in different areas forms an important conversational subject. Most plants have a local name, which may vary from one tribal area to another, and this name, in the case of plants of grazing importance, will refer to only one species. This specificity is, however, directly related to the grazing importance of the plant; thus the broad-leaved plants of the Malvaceae in the genera *Abutilon*, *Hibiscus*, *Pavonia* and *Serra* all have the same Somali name – ‘Balambal’.” (see also my comment in Gilliland 1952)

Botanical investigations in Somaliland began in 1853 with Cruttenden, then Hildebrandt 1873 & 75, and periodically collecting since. The first ecological study covered NE Somaliland (Collenette 1931), then W Somaliland and Harar Prov of Ethiopia (Gillett 1941), then Edwards 1942 and Gilliland for British Somaliland grazing areas. Glover worked on an ecological survey mostly in W Somaliland for several yrs in the 1940s. Except for a checklist (1947) his report vols remain unpublished – though Hemming has drawn on them extensively. Pichi-Sermolli (1957) physiognomic classification of veg of Som-Eth. Grazing was a significant

part of Hunt 1951 and Macfadyen 1952. Veg stripes & arcs by Boaler & Hodge 1962, 1964 and Hemming 1965.

Veg zones are significantly associated both with rainfall and altitude. Physiography: low-lying coastal plain (*Guban*) and uplifted plateau S of it, comprising the mts and the plateau proper. *Doesn't get to the veg types till 20 pp in.*

Between c1880-1920 Somaliland was visited regularly for game hunting. The dominant impression from written accounts is a country with relatively sparse vegetation (*though remember these are hunters, not ecologists, they will not appreciate decent veg esp in the dry season when it may appear rather grim even when quite healthy*) but teeming with game, enormously reduced since the turn of the century and some totally gone, e.g. rhino, oryx, elephant, hartebeest, and much reduced wild ass, lion, leopard. *This was due to uncontrolled hunting, though he doesn't say what of this was due to white hunters and what was due to the coming availability of guns.* Also huge livestock numbers, and much veg change for the worse.

Not a formal veg classification, and the veg groups or types are identified in some cases edaphically, or by geographic area, or geomorphology. No releves or tabulated species lists except a few very raw line intercept data; *basically it's just a narrative description that includes rainfall, physiography, some of the dominant or characteristic plant species, and short lists (as sentences) of other presumably characteristic species.* For each 'zone' gives the veg name used by each of Gillett, Gilliland, Glover and Pichi-Sermolli. *Reads like ad hoc field notes lacking a database or real synthesis.*

Common along coastal dunes in N Somalia: *Suaeda monoica*, *Arthrocnemum glaucum*, *Halopyrum mucronatum*, *Odysea mucronata*.

Subcoastal plain of N Somalia: dominant are *Acacia* and *Commiphora*, and generally similar to the Haud vegetation. Main species along watercourses are *Acacia tortilis*, *Balanites glabra*, *Ziziphus hamur* and *Conocarpus lancifolius*, a tree to 30 m, growing in wide *tugs* both on coastal plain and subcoastal zone.

Acacia bussei open woodland. Covers large areas of Somaliland, total c50,000 km². But over large tracts all the trees are dead, and a range of speculative reasons were formulated by earlier workers. Formerly the associated grass was *Chrysopogon aucheri*, now overwhelmingly *Sporobolus variegatus*, a low dense stoloniferous grass able to resist quite heavy grazing and a very good sand binder. Speculation that the acacia trees died due to reduced amount of water reaching the roots following destruction of the perennial *Chrysopogon aucheri* cover by heavy grazing. *Boscia minimifolia* is found alive even where all acacias are dead. Also *Grewia* spp. *Acacia reficiens* an important shrub widely in N Somalia. Characteristic of slightly wetter sites in *Acacia bussei* zone are *Acacia mellifera* and *Blepharispermum fruticosum*, also *Acacia nilotica*. Toward SW limits of the *A. bussei* zone is the transition to the haud, which is a mixed bush on red sandy soils with a small but sizeable percentage of clay. Where *A. bussei* woodland has been destroyed, a considerable increase in unpalatable *Sansevieria ehrenbergii* and *Aloe rigens*. Dead *A. bussei* wood is used a lot for charcoal-making, also for fencing graves.

Bans are extensive treeless areas in the *Acacia bussei* zone and in the haud. Some may be natural, others induced. Some have vegetation stripes.

Acacia etbaica open woodland. An estimated 20,000 km² in Somaliland, along the N edge of the main plateau and below the evergreen scrub zone. Rainfall c350-500 mm, wide range of soils. Formerly *Chrysopogon* grass layer but only remnants due to overgrazing, and prominent species enhanced by the grazing include *Lycium europaeum*, *Ballota hildebrandtii*, *Ipomoea argyrophylla*, *Lasiocorys argyrophylla* [*Leucas argentea*], *Ochradenus baccatus*, *Solanum incanum*, *Withania*, *Aloe* spp (e.g. *megalacantha*, *scobinifolia*). The main species may be unpalatable or graze-resistant *Acanthaceae* especially *Hypoestes hildebrandtii*.

Evergreen scrub zone, above *Acacia* plains notably just above the *A. etbaica* zone and below *Juniperus* forest. Best indicators are *Buxus hildebrandtii*, *Cadia purpurea* and *Dodonaea viscosa*, normally shrubs 1-4 m but *Buxus* locally as tree form and can form a low closed forest. Also significant components are *Aloe eminens* (tree aloe to 15 m), *Cussonia holstii*, *Dracaena schizantha*, *Euphorbia grandis*, *Pistacia lentiscus*, *Rhus somalensis*, *Sideroxylon buxifolium*. Commonest low shrubs are *Psiadia arabica* and *Solanum renschii*. Other locally important components of the zone: *Barbeya oleoides*, *Celtis africana*, *Clusia richardiana*, *Nuxia cf oppositifolia*, *Olea africana*, *Osyris compressa*, *Ruttya fruticosa*.

Juniperus forest.

Haud-type mixed bush. Some call it *Commiphora-Acacia* scrub, Pic.-Ser. called it (*in part*) broken xerophilous open woodland. "The best physiognomic term for this type of vegetation is *bush*, a term well known throughout East Africa." In Somaliland it is S of *Acacia bussei* woodland and occupies an area along southern boundary, continues southward through the Ogaden (and Cent and S Somalia and) covers much of NE Kenya. Most is calcareous reddish loamy sands with a significant amount of clay that apparently enables the plants to use a high proportion of the incident rainfall. Much of this land has no incised drainage system: nearly all rainfall is absorbed where it falls, without runoff. Another factor is 2 rainy seasons.

The vegetation is not severely impacted because the virtual absence of permanent water means that stock use is seasonal. The haud offers the best grazing in Somaliland and Ogaden and escapes the evils of overgrazing. And even where the grass cover is stripped, the surface absorbs water rather than allowing heavy runoff. The vegetation is very species-rich, essentially woody, the important species mainly being shrubs 1-5 m high with occasional trees (emergents) to 10 m. The dominants are *Acacia* and *Commiphora* [note not a single species listed!], with an open network of taller trees, usually *Acacia tortilis*, *Albizia anthelmintica*, *Delonix elata*, *D. baccal*, *Gyrocarpus hababensis*. The commonest acacias in the shrub layer are *A. senegal*, *A. horrida* and *A. edgeworthii*, and somewhat less common are *A. reficiens*, *A. nr gloveri*, *A. hamulosa*, *A. zizyphispina* and, in moister areas, *A. oerfota* and *A. stuhlmannii*. *A. mellifera* on slightly heavier soils. In the lower shrub layer (1-2 m), *Grewia* spp are important notably *G. erythraea*, *G. penicillata*, *G. tenax*, *G. villosa*. Other common species in the tall-shrub layer (note that some of these are more properly tree layer) are *Boscia minimifolia*, *Boswellia* spp, *Senna ellisiae*, *Cordia sinensis*, *Cordyla somalensis*, *Cordeauxia edulis* locally, *Dalbergia commiphoroides*, *Dichrostachys kirkii*, *Erythrophysa septentrionalis*, *Euphorbia robecchii*,

Gardenia sp, Jatropha dichter, Maerua crassifolia, M. socotrana, Sesamothamnus busseanus, Sterculia africana, Terminalia polycarpa, T. orbicularis which forms dense clumps. T. polycarpa is particularly important in Wardheer area in Ogaden where forming the densest vegetation of the haud, a low open woodland. Common smaller species: Aerva persica, Cadaba glandulosa, Corchorus cinerascens, Erythrochlamys spp, Euphorbia spp, Jatropha villosa, Indigofera ruspolii, Iphiona [Iphionopsis] rotundifolia, Loewia glutinosa, Melhania phillipsiae, Seddera spp, Solanum spp.

The most important grass is Chrysopogon aucheri and may have been even more abundant in the past. The most abundant grasses today are Aristida kelleri, A. nr paoliana, A. papposa, and numerous less frequent other grasses include Cenchrus ciliaris, Chloris roxburghiana, Dactyloctenium scindicum, Digitaria rivae, Enneapogon somaliensis, Eragrostis aulacosperma, Latipes [Leptothrium] senegalensis, Pennisetum stramineum, Tetrapogon spathaceus, and clumps of Schizachyrium kelleri where runoff provides additional water. "It is unlikely that it was ever dominant over large areas." (that's pure speculation) Severely devastated herb layer around villages and permanent wells, and here cover is very low and the plants are unpalatable. Characteristic of such overgrazed areas are Abutilon hirtum, Aerva persica, Calotropis procera, Citrullus colocynthis, Gomphocarpus fruticosus, Indigofera articulata, Iphiona rotundifolia, Ipomoea spp, Solanum spp, Withania sp.

Reduction in haud rainfall from W to E is mirrored in reduced height and density of the bush, in the E the dominant acacias and commiphoras are low-growing or completely prostrate. As in Acacia bussei region, the haud has open treeless plains (*bans*) and these have more Chrysopogon than Aristida. Throughout the haud, slight depressions from a few metres to several hundred metres wide. The soils are clayey and the larger ones may hold water for several months. The smaller ones support large clumps of Schizachyrium kelleri, also near them are Acacia mellifera and dense patches of Blepharispermum fruticosum. Larger depressions, 50-300 m wide (*ballehs*), may support a continuous stand of Sesbania somaliensis. The largest *ballehs* remain flooded much of the year and vegetation is only toward the edge, a low zone of Glinus setiflorus and Vahlia goddingii and a broken ring of Acacia tortilis trees. Less clearly defined than the *ballehs* are *dohas*, areas that flood shallowly and widely after rain. They are covered with grass notably Chloris roxburghiana and Cynodon dactylon, and support Acacia tortilis trees.

Gypseous areas. Cover 36,000 km² of N Somalia. Anhydrite deposits may be several hundred metres thick and outcrop here and there, though most of the surface anhydrite is altered to gypsum. Zygophyllum is abundant. Other species, locally dominant and indicative of heavy grazing pressure, are Aloe scobinifolia, Ipomoea argyrophylla, I. sultanii, Leucas argentea, Lycium europaeum and Ochradenus baccatus. Former climax was likely Chrysopogon aucheri though only small amounts remain, and now dominants are Sporobolus ruspolianus, S. variegatus and Dactyloctenium robecchii which can be dominant over wide areas. But mostly unpalatable plants such as Aloe spp, Kellersonia quadricornuta, Zygophyllum hildebrandtii. In Nogal valley the most typical tree is Cadaba heterotricha, also lines of Acacia tortilis. Commiphoras are particularly abundant at edge of the Nogal valley where limestone overlies gypsum. The central part of the Nogal is mainly saline plains with Sevada schimperii dominant, also some Atriplex coriacea, Ipomoea sultani, Momordica sessilifolia. In the most saline areas Sevada is replaced by Limonium axillare and the only grass is Urochondra setulosa.

Acacia tortilis Almost ubiquitous in Somaliland, from coastal plain to 1500 m, on a wide range of soils including saline and gypseous. One of main trees along watercourses of the subcoastal plain of N Somalia. A common taller tree of haud bushlands. It cannot be regarded as an indicator of ecological zones, though lines of trees may indicate underground water. *Ballehs* (shallow depressions in *Acacia bussei* zone and the haud) are normally surrounded by a circle of *A. tortilis* trees. *Dohas*, areas that flood shallowly and widely after rain, within the haud bushland region of N Somalia and Ogaden, support *A. tortilis* trees. Lines of trees in the gypseous Nogal valley.

Acacia-Commiphora bushland, aka haud-type mixed bush (Hemming 1966) and broken xerophilous open woodland (Pichi-Sermolli 1957), ranges from the southernmost part of N Somalia and the Ogaden south and east to much of NE Kenya (Hemming 1966 in part). Most is calcareous reddish loamy sands with a significant amount of clay that apparently enables the plants to use a high proportion of the incident rainfall. Much of this land has no incised drainage system: nearly all rainfall is absorbed where it falls, without runoff. Another factor is 2 rainy seasons. The vegetation is not severely impacted because the virtual absence of permanent water means that stock use is seasonal. The haud offers the best grazing in Somaliland and Ogaden and escapes the evils of overgrazing. And even where the grass cover is stripped, the surface absorbs water rather than allowing heavy runoff.———The dominants are *Acacia* and *Commiphora*, with an open network of taller trees, usually *Acacia tortilis*, *Albizia anthelmintica*, *Delonix elata*, *D. baccal*, *Gyrocarpus hababensis*. The commonest acacias in the shrub layer are *A. senegal*, *A. horrida* and *A. edgeworthii*, and somewhat less common are *A. reficiens*, *A. nr gloveri*, *A. hamulosa*, *A. zizyphispina* and, in moister areas, *A. oerfota* and *A. stuhlmannii*. *A. mellifera* on slightly heavier soils. In the lower shrub layer (1-2 m), *Grewia* spp are important notably *G. erythraea*, *G. penicillata*, *G. tenax*, *G. villosa*. Other common species in the tall-shrub layer (note that some of these are more properly tree layer) are *Boscia minimifolia*, *Boswellia* spp, *Senna ellisiae*, *Cordia sinensis*, *Cordyla somalensis*, *Cordeauxia edulis* locally, *Dalbergia commiphoroides*, *Dichrostachys kirkii*, *Erythrophysa septentrionalis*, *Euphorbia robecchii*, *Gardenia* sp, *Jatropha dichter*, *Maerua crassifolia*, *M. socotrana*, *Sesamothamnus busseanus*, *Sterculia africana*, *Terminalia polycarpa*, *T. orbicularis* which forms dense clumps. Common smaller species: *Aerva persica*, *Cadaba glandulosa*, *Corchorus cinerascens*, *Erythrochlamys* spp, *Euphorbia* spp, *Jatropha villosa*, *Indigofera ruspolii*, *Iphiona rotundifolia*, *Loewia glutinosa*, *Melhanianthus phillipsiae*, *Seddera* spp, *Solanum* spp.———The most important grass is *Chrysopogon aucheri* and may have been even more abundant in the past. The most abundant grasses today are *Aristida kelleri*, *A. nr paoliana*, *A. papposa*, and numerous less frequent other grasses include *Cenchrus ciliaris*, *Chloris roxburghiana*, *Dactyloctenium aegyptium*, *Digitaria riva*, *Enneapogon somaliensis*, *Eragrostis aulacosperma*, *Latipes [Leptothrium] senegalensis*, *Pennisetum stramineum*, *Tetrapogon spathaceus* and *Schizachyrium kelleri* where runoff provides additional water. Severely devastated herb layer around villages and permanent wells, and here cover is very low and the plants are unpalatable. Characteristic of such overgrazed areas are *Abutilon hirtum*, *Aerva persica*, *Calotropis procera*, *Citrullus colocynthis*, *Gomphocarpus fruticosus*, *Indigofera articulata*, *Iphiona rotundifolia*, *Ipomoea* spp, *Solanum* spp, *Withania* sp.———Reduction in haud rainfall from W to E is mirrored in reduced height and density of the bush, in the E the dominant acacias and commiphoras are low-growing or completely prostrate.

Chrysopogon aucheri Formerly the dominant cover in *Acacia bussei* woodlands of N Somalia. Destroyed by heavy grazing, and this is suggested as the reason why the acacia trees have died in some tracts: reduced amount of water reaching the roots after the grass was eliminated. Formerly the dominant cover in *Acacia etbaica* woodlands of N Somalia and E Ogaden but only remnants due to overgrazing. The most important grass of haud bushlands of N Somalia and Ogaden, though likely more abundant in the past. *Aristida* spp are dominant in the haud bushlands at least currently, except on treeless plains (*bans*), these have more *Chrysopogon* than *Aristida*. Likely the former climax grass of the extensive (36,000 km²) of gypsum in N Somalia though only small amounts remain.

Glover, PE 1967 *Notes on some ants in northern Somalia*. E. Afr. Wildl. J. 5: 65-73.

Observations made 1944-46.

Several species of harvester ants in N Som, the main one *Messor barbarus*. It makes large nests in the ground, diam often as much as 2 m, and on the plains there may be one per 2-3 acres. Makes roads & runways as long as 120 yd, for collecting seeds and bulbils, and husks are thrown out into a refuse mound near or around the crater. Very common in the haud but not on the greyish, more clayey soils of the *dohos* probably because these become flooded. Glover doesn't suppose that the great amount of seed collecting has any ill effects on the vegetation. How does he figure that?

Stink ants (*Paltothyreus tarsatus*). Termites seem to be the main diet.

Soldier ants (*Megaponera foetens*). Also prey on termites. Difficult to handle: they bite and sting, and make a loud squeaky stridulating noise.

Tree ants (*Crematogaster*) in acacia galls. They cultivate insects (aphids). Unpleasant if disturbed.

332 *Chrysopogon aucheri* The dominant grass of the *haud*, a region of *Acacia-Commiphora* bushlands in the southern part of N Somalia and the Ogaden

332 *Andropogon kelleri* (cyrtocladus) Sometimes a dominant grass of the *haud*, a region of *Acacia-Commiphora* bushlands in the southern part of N Somalia and the Ogaden

SOGREAH 1982 North-West Region Agricultural Development Project. Feasibility study and technical assistance tech. rep. no. 6, Range and livestock survey. Ministry of Agr., Somali Democratic Republic, Somalia and SOGREAH Consulting Engineers, Grenoble, France

Lockwood 1967-68 *Agricultural and water surveys: Somalia*; final report, 6 vols. Lockwood Survey Corp. and UNDP, FAO, Rome.

Includes a summary of the FAO Livestock Devel. Survey of 1966.

Vol.1 (261pp) appears to be an overview and summary and was seen. The study region was the area between and around the Shabelle and Juba rivers. Much on soils based on aerial photo interpretation and fieldwork, also the rivers and groundwater, agriculture, extension.

Fourteen natural regions mapped in detail. Those in Hiiraan Region include (1) the Upper Shabelle Valley from Bullo Burte north, of valley proper and flanking hills; (2) the Mudugh Plain to the east, a featureless sandy plain; and (3) Central Uplands Plain to the west, a featureless limestone plain of shallow-soil areas broken by areas of deeper soil that are cultivated in places. Nineteen landforms, 77 soil types described and classified. Surveys on agr production and rangeland. The rangeland survey mapped 200,000 km² of which 25,000 ha were grass and 6600 ha were unused agricultural land. Livestock surveys indicated the land is dangerously overstocked with nearly 3.5 million animals. Animal husbandry engaged over 70% of the population. Drilling recommended for more wells for livestock.

The main vegetation is a low, arid to semi-arid shrub and tree steppe. Northward toward the Ethiopian border the vegetation is a dwarf-shrub steppe. Some areas of grassland and dense shrub cover. Riverine forest along the rivers though much of it cleared for cultivation.

Graham, Anne MS 1967 *Northeast Africa*, p.97-160 in BW Hodder & DR Harris, eds., *Africa in transition*, Methuen, London, 378p.

Note how monolithic the Somali ethnic region is, the only intrusions are small enclaves of Negroid (mainly Bantu) remnants within the region. Presents the perceived knowledge of Somalia as populated by a single ethnic group. Yet indicates that the Somali are divided into 2 sections, the Somali proper (4 main clan families, the Dir, Isaq, Hawiye, Darod), and the minority Sab (with the Rahanwein and Digil) in the area between the 2 rivers.

The main area of Somali cultivation is shown as much of southern Somalia, specifically the area between the 2 rivers, also extending up into SE Ethiopia along the Shabelle. *I think that's a bit misleading because when you go west of the Shabelle in central Somalia, it's still mostly pastoralism though I admit there are some patches of cultivation in low spots.* Both rainfed and flood irrigation cultivation. In rainfed agr, farmers concentrate runoff onto their fields by means of channels and bunds. Mostly sorghum. There is considerable agricultural potential, but nomads are slow in overcoming prejudice against cultivation. Somalis have practised agr in the south for several hundred years, having learnt it from the Bantu; in the north cultivation was introduced only in the 20th century.

The haud is indicated along the northern boundary of the Ogaden, just W from the Ogaden 'horn'. Despite good rainfall the haud plateau lacks permanent wells and can only be used seasonally. But recently, lined *hafirs* have been dug which, together with the sale of water from trucks, prolong the period of occupancy by families and flocks.

Box, Thadis W 1968 *Range resources of Somalia*. J. Range Manage. 21: 388-392.

Abst: Livestock production from native rangelands is the most important agricultural enterprise in the Somali Republic. The ranges of Somalia have a potential for much greater production than

is currently realized. Many of the areas described in the literature as desert are grassland savannahs. These areas can support large numbers of livestock if properly managed. The major problems are development of water, use of grazing systems, proper stocking, and application of range management principles.

Various surveys (1957 to 1961 cited) indicate that Somali range has potential for 2 or 3x the amount now being produced (presumably he means beef offtake).

In 1966 an FAO survey team did a plane-assisted recce of the rangelands. Locals were questioned and overland trips made to examine the veg. Found range mostly overgrazed now or in the recent past.

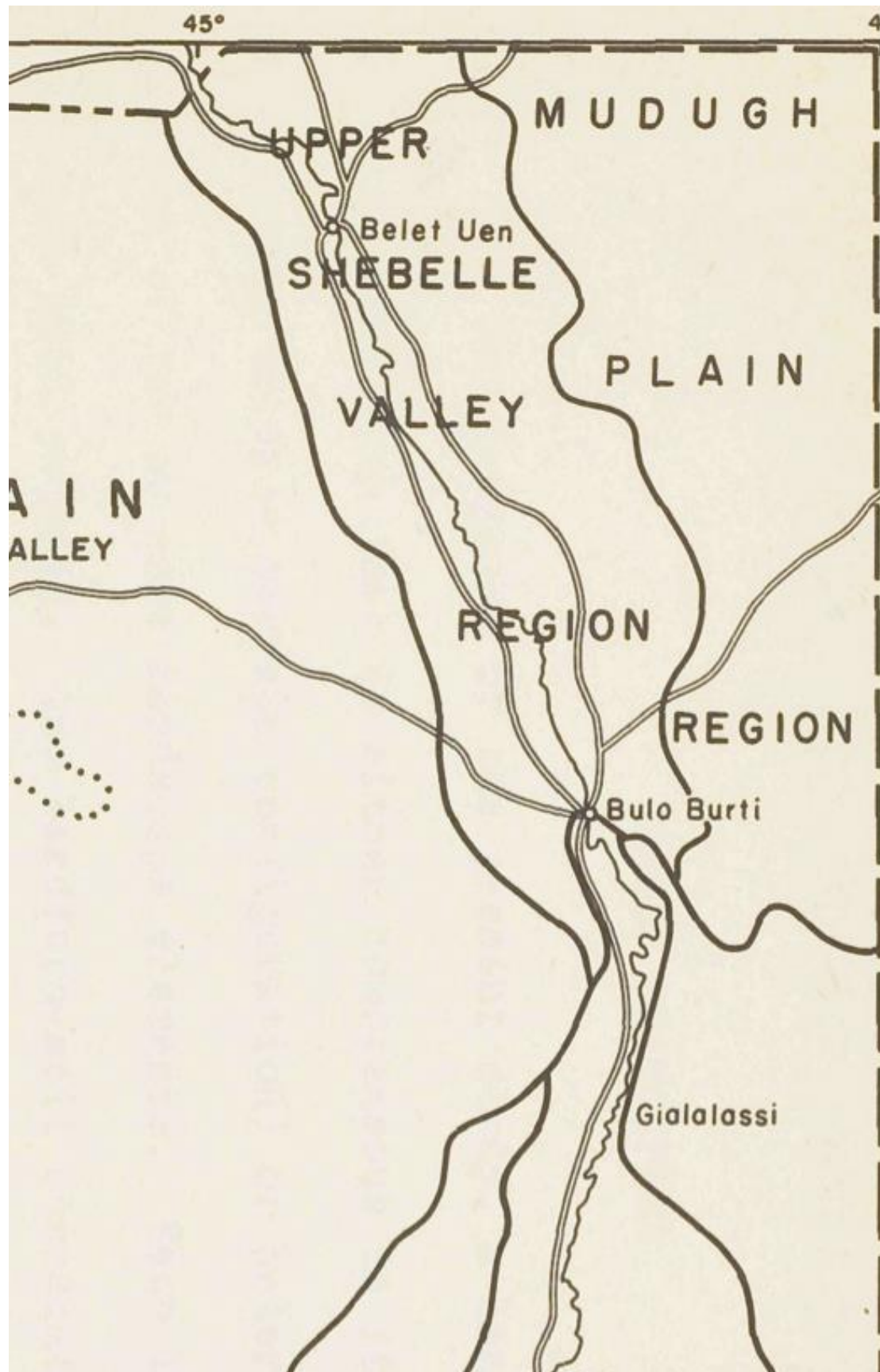
Found that though surveys in the 1940s in the former British protectorate (N Som) listed perennial grasses, now most of the lower-elevation range was totally lacking in perennial grasses. At higher elevations, relict areas suggested the perennial grass potential.

Mudugh and Hiiraan & Benadir N (i.e. E?) of the Shabelle R “comprise one of the finest and least known range areas of Somalia.” Has 3 areas: coastal dunes, grass-low shrub plains, and mixed acacia bushland. The savanna grasslands of the high plains of Mudugh are in the best condition of any region visited; lack of water has prevented severe overgrazing, and there are vast plains of savanna grasslands. The acacia bushlands of Hiiraan and mid-Mudugh (does that include or indicate Galgaduud?) manifest a healthy woody layer but the herb layer shows evidence of heavy past use. (cf. for CR veg)

“Camels are the most desired form of wealth for the pastoral Somali.” Valuable for milk production and as beasts of burden and comprise the main source of ‘dia’ or blood money. Some millions of shoats of which 2/3 are goat; herded together; a cash reserve; sheep are the principal item of export for the Arabian markets. Goats are an indispensable part of the economy of the drylands. “Unfortunately, goat production has been officially discouraged due to influence of foresters who came into the country stating categorically that goats are the most destructive animals on the range.” Cattle esp W of the Juba R, but also lots in CR.

de Vries, L 1968 *Agricultural and water surveys in Somalia*, final report. Vol. III, Landforms and soils. FAO/SF:36/SOM-1, Lockwood Survey Corp. and FAO, Rome, 236p.

Reconnaissance soil survey and classification, landform inventory, landform-soils associations, potentialities and limitations of each landform-soil unit for agriculture, range and forest development. Mapping based on airphoto interpretation and field investigation. (I have only selected info apropos of Hiraan)



Natural regions: Mudugh Plain in the east (above the escarpment), Upper Shebelle Valley to S of Bulo Burti, Central Uplands Plain in the west, Shebelle Flood Plain from Bulo Burti south. (PETER: THE FOLLOWING DON'T SHOW ON THE MAP!!) a small wedge of Eluviated Plain Region west from Jalalaqsi, and Coastal Dune Region which is eastern Jalalaqsi with a narrow spur extending N-NW almost to Bulo Burti.

Landforms (I saw no maps)

Dissected plateau. Former peneplain dissected to form a hill and valley landscape. Along flanks of Upper Shebelle Valley region. Generally rounded hills with summit at 260 m, local relief 40-60 m. Soils shallow and rocky, with deeper soils on crests of flat-topped hills and boulder detritus in broader valleys.

Scarp. Marked topographic break on E side of Shebelle Valley between dissected plateau and smooth surface of Mudugh Plain region. Shallow rocky soils, talus accumulation at base of scarp.

Pediment. Land at base of hills and escarpments in Upper Shebelle Valley region, composed of detritus eroded from the sloping faces and occurring in small, isolated tracts. Soils variable and complex but classified as regosols.

Alluvial fan. In Upper Shebelle Valley region, found in association with dissected plateau landform. Slope normally regular and uniform and sorted into coarser sediments at upper end and finer sediments at base of fan; often incised with drainage channels. Soils classified as regosols.

Erosional remnant. Larger hills (burs) rising above general level of the plain. Found in Upper Shebelle Valley.

Mantled plain complex. Plains with residual material derived by weathering from the underlying bedrock. Four types of geological materials in southern Somalia: Jurassic-Cretaceous Limestones (the most extensive), Gypsiferous Limestones (within Cretaceous formation), Basaltic Materials, Crystalline Formation. Subdivided by soil depth, deep being soils >100 cm, shallow being 30-100 cm, very shallow being <30 cm. Also subdivided by topography: level, undulating, rolling, hilly. The Cretaceous formation has besides limestones, also sandstones, conglomerates and gypsum.

Level and undulating shallow and very shallow soil types included in Upper Shebelle Valley region.; regosol-lithosol.

Bugta Acable [Buqda Caqable] soil on level to depressional lands in Bugta Acable valley area. A reddish-brown fine-textured (clay loam) calcic soil. Surface has slight microrelief with solution holes.

profile	depth	pH	E.C.	CEC	OM	CaCO ₃	gypsum	texture
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1	(cm)	mmhos/cm	meq/100g	%	%	meq/100g	sand	silt	clay
	0-30	7.8	1.7	16.1	1.0	37.0			
	30-60	7.7	2.8	32.5	1.0	40.2	2.1	22	30 48

Mantled plain basaltic. Shallow dark red regosol-lithosol of a clay matrix with gravels and boulders. (is this in W-SW Hiiraan?)

Eluvial plain. From Bulo Burti to Uanle Uen the plain is relatively narrow, derived from Cretaceous limestones.

Flood plain. Such plains exhibit a wide variety of depositional and erosional features, e.g. terraces, channel remnants, levees, meanders, slackwater areas. Soils vary greatly in texture and other features.

Bulo Burti soil. Fine-textured (dark) brown solonetz, in narrow tracts on both sides of the river. Often a dark brown sandy clay or clay.

profile	depth	pH	E.C.	CEC	OM	CaCO ₃	gypsum	texture		
	(cm)	mmhos/cm		meq/100g	%	%	meq/100g	sand	silt	clay
1	0-16	8.2	3.4	16.9	0.9	21.6		46	18	36
	16-27	7.9	6.5	13.7	0.6	15.5	31.4	44	46	10
	40-100	8.2	14.0	20.8	0.7	16.3	31.1	38	24	38
2	0-10	8.0	2.6	23.2	1.0	24.3		24	28	48
	10-25	7.9	3.2	23.4	0.9	26.1	16.1	28	16	56
	50-95	8.0	4.8	21.6	0.5	24.1	32.8	26	14	60
3	0-65	7.4	5.0	29.0	1.0	29.0	21.0	24	18	58
	65-90	7.8	10.0	33.8	0.9	26.4	29.0	22	18	60

Uebi levee soil. Sandy loam to sandy clay loam.

Flood plain active. Lands flooded almost every year, especially S of Jalalaqsi, smaller tracts N of Bulo Burti. Mainly sandy loams and sandy clay loams.

Sand plain. (1) In Mudugh Plain region, an almost featureless sand plain underlain by Jesomma sandstone formation. Sandy soil with little horizon development.

(2) Mogadiscio soil. Deep sand developed in older dune deposits, may be undulating. Reddish-brown to brown sand. Reaches the Upper Shebelle Valley and Mudugh Plain regions.

(3) Mudugh soil. Undulating sand plain, in (SE part of) Upper Shebelle Valley and Coastal Dune regions.

profile	depth (cm)	pH	E.C. mmhos/cm	CEC meq/100g	OM %	CaCO ₃ %	gypsum meq/100g	texture sand silt clay		
1	0-60	7.7	2.5	2.9	0.5	2.9		84	4	12
	60-120	7.8	1.7	2.9	0.2	2.9		84	2	14
	120-180	7.6	2.2	2.9	0.2	3.0		84	4	12
2	0-16	8.1	1.5	5.9	0.5	2.7	1.1	86	2	12
	16-65	7.8	2.4	3.7	0.3	2.6	0.8	84	2	14
	65-120	8.0	2.4	2.2	0.2	2.6		84	2	14
	120-200	7.7	1.4	5.6	0.3	2.6		86	0	14

E.C. <4 – low salt hazard

4-8 – medium salt hazard

8-16 – high salt hazard

ILO 1968 *Technical meeting on problems of nomadism in the Sahelian region of Africa* (Niamey, 9-20 September 1968). Int. Labour Organisation, Geneva, 146p.

Subtitle: "*First item on the agenda: Integration and sedentarisation of nomadic populations in the Sahelian region*". A very telling title! Largely based on reports by J. Petit & AH Abdulla. *The total lack of refs much degrades this rept.*

"In many parts of the world, there has been considerable encroachment by nomads on lands which are suitable for cultivation. This is the result of spontaneous sedentarisation in particular." *Don't they have it backwards? Isn't the problem the encroachment of cultivation onto pastoral land by agriculturists.*

"Advocates of sedentarisation consider nomadism...to be destructive and wasteful. Vast stretches of good land are left for grazing at the time when with little effort they could be reclaimed and brought under the plough. In years of drought, nomads, and to some extent semi-

nomads, become a real burden on their respective governments and put much strain on the economy of the settled populations, who have to divert large amounts of grain and foodstuffs in urgent assistance." *(Is that what governments used to do, before food aid became an int'l growth industry? I tend to doubt it.)*

Opponents of sedentarization derive their arguments mostly from the results of earlier efforts at sedentarization. In most cases sedentarization policies have been only moderately or even inadequately commensurate with efforts, time and money spent. Nomads tend to resist any restriction of movement by central authorities. They despise farming practices and know nothing of them. "Nomads seem to like their nomadic life and cannot see why they should alter it."

Sedentarization most often begins with nomads starting to cultivate. *(Is it that simple?)* Spontaneous sedentarization happens out of necessity. But this doesn't bring about a complete economic change, because these newly settled people continue to practice stockbreeding and migrate with their herds.

Advocates vocational training of nomads: better stock management, introduction of new animals, processing of animal products, better tools and improved methods for handicrafts, introduction of new handicrafts, pasture management, agriculture, cottage and small-scale industry. Your average nomad already knows many trades even if his skill level in each may be low. The organization of vocational training is complicated by their mobility - but nearly all nomads spend at least some time in one place, coinciding with grazing seasons, i.e. a few months at a time.

This earlier report on sedentarization lacks any kind of rigor or maybe hope. A 1967 report by Konczacki (Nomadism and economic development of Somalia. The position of the nomads in the economy of Somalia. Can. J. Afr. Stud. 1: 163-175) similarly urges increased agr and sedentarization: access to education, new skills, health services. Income will improve living standard and make a larger tax base. Even the USAID, preparing for CRDP, may be hinting at sedentarization with this objective: "prepare for the gradual concentration of pastoral communities, which would help in the provision of social services." (Thurow et al. 1991 (Rangeland development innovations for communal land management: a Somali case study. 4th Int. Rangeland Congr., 14 Jan