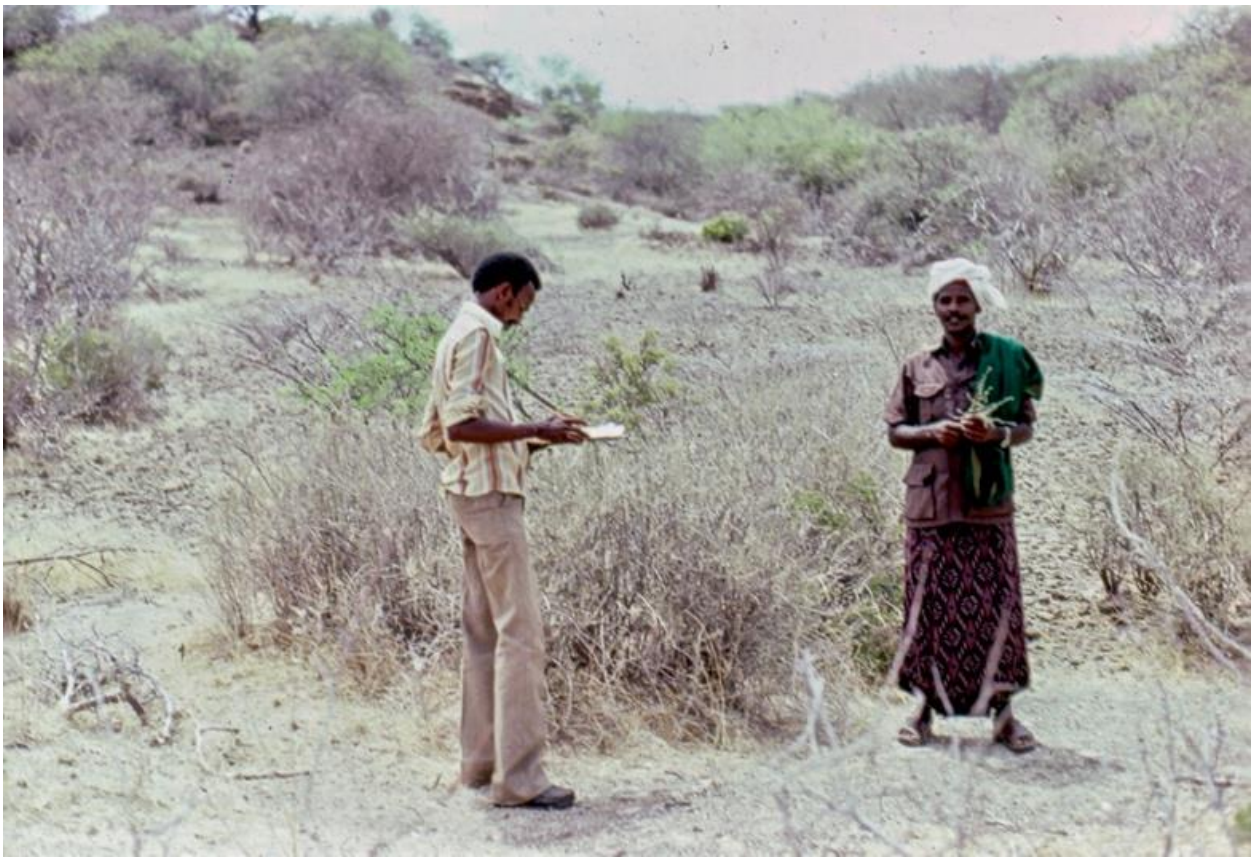
1990 – 1993



Obtaining plant uses and palatability information from a plant expert on a walkabout in eastern Bulo Berte District. We also collected plant specimens for evaluating back at camp.

Photo: Peter Kuchar

Abdullahi, AM & HE Jahnke 1990 ***Some aspects of pastoral supply behaviour and rural livestock marketing in Africa: the case of Central Somalia.*** Q. J. Int. Agr. 29: 341-359.

Did weekly mkt surveys in Beletweyne.

Useful generalities on pastoral strategies re. stock use & disposal & then treats the CR case.

Note the very useful/illuminating simple fig (p.356) showing the rel. between envir. conditions & pastoralist's response.

Barker, Jerry R, Thomas L Thurow & Dennis J Herlocker 1990 ***Vegetation of pastoralist campsites within the coastal grassland of central Somalia.*** Afr. J. Ecol. 28: 291-297. [Had been done as Barker et al. 1988]

Deshmukh, Ian 1990 ***Terrestrial ecology baseline studies*.** Jubba Envir. & Socioecon. Studies, Vol.2: Environmental studies. USAID and Associates in Rural Devel., 131p.

Based on 3 JESS (Jubba Envir Socioecon Studies) repts, 2 by CF Hemming, 1 by Deshmukh. These were part of studies in relation to Baardheere Dam Project and Jubba Valley devel. The studies included airphoto interpretation and ground studies. Ground monitoring sites were established, vegetation described, and seasonal visits made. Found a greatly accelerated rate of change in the last few years, with average loss of (natural) vegetation and gain in farmland increasing tenfold in 1983-87 compared to 1960-83. At this rate all riverside land will be cultivated by the end of the century.

The veg classification system separates bushland and woodland by height (5 m)! However, sensibly overall follows the well-known structural classification of Pratt et al. 1966. And a useful-looking modification on canopy cover by using 20% increments: 2-19% sparse, 20-39% open, 40-59% medium, 60-79% dense, 80+% thicket. Veg sampling with sites (actually, plots or quadrats) 10x10 or 20x20 m, enumeration and measurement of woody plant individuals. Point-frame for proportional (i.e. relative) cover of herbs and dwarf shrubs.

Distinguished floodplain and river-dependent zone (within 30 km of floodplain). Table of most abundant spp, quantified by density, in these 2 zones. Actual forest is a very small percentage of the floodplain and river-dependent zone, most of the land is open, medium and dense bushland.

Big list of names w/ vernacular name, alphabetical by latter. A total of 313 plant species were recorded, of which 131 only in the floodplain and 121 only in non-floodplain sites. The most abundant woody plant on the floodplain was Phyllanthus somalensis, but also abundant were Acacia zanzibarica, Thespesia danis, Terminalia brevipes, Dichrostachys cinerea. Most abundant in the river-dependent zone was Acacia reficiens. Also abundant Commiphora spp, A. horrida and many somewhat less abundant plant species. Sporobolus helvolus was a strongly dominant grass on the floodplain.

A section on plant uses by the people. Forage use: the floodplains attract large concentrations of livestock in dry seasons. Average consumption is c50% of available forage. Browse yield differs among vegetation types and is highest in forest, thicket and dense woodland.

A section on wildlife.

Table of palatability ratings of most abundant plants, based on Herlocker & Kuchar 1986 *(which was not in Refs!*) or local residents. Some not in H&K86.

Elmi, Ahmed A 1990 ***Mineral contents of some major plant species that camels consume in Ceeldheer District, Central Somalia.*** Camel Forum, Work. Pap. No. 34, 6p.

Simulated camel bites were clipped from several plants of each species, taken to Utah State U for analysis (Ca,P,K,Na). Found P deficient in the browse, and P and K were significantly lower in dry-season forage. No difference seasonally in Ca and Na levels. The main problem is the

imbalance in CA:P ratio, far below the 2:1 generally recommended for optimal livestock production. Camels were observed chewing bones they had found, suggesting P deficit.

The results of analysis show that camels consume a variety of plants regardless their mineral status, they eat whatever is available.

Didn't mention how diet was investigated, I think it was by counting bites; but there's a table indicating % diet by species and % composition (presumably meaning relative abundance though parameter not indicated; I hope composition numbers are an index of veg abundance otherwise all the following summary is a mess!). The table includes 97% of dry-season diet and 65% of wet-season diet; what was the missing 1/3 of wet season? This same table also has proximate analyses - which is very unusual, I don't recall seeing a single table that combined both.

Compared milking and non-milking camels for major forage classes. Found that milking camels took significantly more evergreen spiny forage and significant less deciduous spiny forage. Evidently took a lot more evergreen nonspiny, less suffrutescents, more vines, less grass, more succulents - *but none of these statistically significant.*

Overall diet mineral content in dry vs wet season: Ca 1.68 vs 2.11, P 0.06 vs 0.11, K 1.19 vs 1.65, Na 0.26 vs 0.15, and Ca:P ratio 28 vs 19.

Leguminous plants formed 1/3 of wet-season diet and 2/3 of dry-season diet. In the wet season almost 30% of diet was provided by Mimosaceae; this increased to 40% in the dry season but Papilionaceae also contributed 25% of dry-season diet. Caesalpiniaceae were only represented by 1 species with minor contribution. Major genera included *Acacia* (16% wet season, 22% dry season), *Dichrostachys* (18% dry season), Albizia (10% wet season), Indigofera(16% dry season). The top 3 genera in camel diet were legumes: Acacia, Dichrostachys, Indigofera.

Burseraceae were completely absent from the results of this meticulous study. The listing included 31 species of trees and shrubs and 17 species of other categories. All these species are also found in neighboring Buulo Burte district, which has a plethora of Burseraceae, often codominants with acacias, and of many species. The contrast is especially striking as *Commiphora* and *Boswellia* in Buulo Burte are a major source of camel fodder. Presumably Ceeldheer District has Burseraceae but they are very minor in camel diet - or they are part of the undefined 1/3 of wet-season diet.

Elmi, A. A 1990b ***Relationship of forage species cover and its proportion in camel diets*.** Camel Forum (Somali Acad. Sci. Arts) Work. Pap. No. 35, 4p.

Line transects for cover. Camel bites. Found positive correlation between % cover of forage species & its proportion in camel diet in wet season. "Camels browsed as if they were sampling" the greened-up browse, which meant longer distances travelled. No significant rel in dry season: camels concentrated on those plants that stayed green.

Friis, I & Mesfin Tadesse 1990 ***The evergreen forests of Tropical Northeast Africa***. AETFAT, Mitt. Inst. Allg. Bot. Hamburg 23a: 249-263.

"The forests of Djibouti and Somali are much depleted. Dry forest may well have covered large parts of the area above 1,500 m, but presently only the Dai Forest in Djibouti and forest patches at Sheik, Erigavo, El Madu and a few other places in N. Somalia are extant. Also the riverine and coastal forests of S. Somalia are very depleted, and only a few very small patches survive."

Of the 7 forest types described, 3 are found in Somalia, all are poor representatives or fragments. (The third is not in Ethiopia.)

Upland dry evergreen forest (Eritrea, E Ethiopian Escarp., N Somalia mt chain). Rocky ground, 1600-2400 m, rainfall may be 400-700 mm. A drier forest than main Ethiopian plateau. Barbeya oleoides and Tarchonanthus camphoratus along margins, Berberis holstii in undergrowth. Dry, very open Juniperus forest verging on woodland, 10-15 m, mainly juniper. Also Catha edulis, Olea europaea, Pistacia aethiopica, Pittosporum, Schrebera alata. Various shrubs.

Riverine forest. Basically fragments (along Shabelle and Jubba Rivers).

Coastal forests of S Somalia. On calcareous sands at 0-50 m ASL, rainfall c700 mm. Very common between Bad Dadda and Raas Kaambooni. Canopy very open and low. Common trees are Afzelia quanzensis, Cassipourea euryoides, Dialium orientale, Diospyros cornii, Craibia brevicaudata, Croton megalocarpoides, Givotia gosai, Haplocoelum inopleum, Newtonia erlangeri, Millettia usaramensis, Oldfieldia somalensis, Spirostachys venenifera, Suregada zanzibarensis, tabernaemontana elegans, Vitex schliebenii, Zanthoxylum holtzianum. A rich shrub flora, climbers also important.

A stand of tall riverine forest along a temporary stream had Parkia filicoidea, Memecylon sansibaricum, Mimusops fruticosa, Diospyros greenwayi, Cordia goetzei. Understory of Antidesma, Drypetes parviflora, Grandidiera boivinii, rawsonia lucida, Rinorea elliptica, Dombeya taylori, Cola, Oxyanthus zanguebaricus, Polysphaeria multiflora.

Hassan, AS & BT Styles 1990 ***Acacia senegal (L.)* Willd. and *A. circummarginata* Chiov**. *in* A Conspectus of Somali Acacias. Oxford, UK; Oxford Forestry Institute, 1-122. (Somali Forestry Ser. No.4)

Detailed botanical description of *Acacia senegal,* which is widespread in Somalia in the *AcaciaCommiphora* woodland occurring on rocky limestone hills or on limestone overlain by alluvial gravels, and also along gypseous drainage lines. Occurs to 1500 m altitude. Somalia is the centre of diversity of this taxon, and nearly all the members of the *A. senegal* complex (18 species) occur here. Describes the variation in the species, and because of intermediates does not maintain var. *kerensis. A. senegal* var. *leiorhachis* is also treated as a separate species, *A. circummarginata.* Only the tree form of var. *leiorhachis* occurs in Somalia, with striking yellow peeling bark.

Perrier, Gregory K 1990 ***The contextual nature of range management.*** ODI Pastoral Devel. Netw. Pap. 30c, 9p.

I love the aphorism that heads his paper: Rationality is a contextual construct, what is rational in one domain is idiotic in another. But then oops, I see where he's heading. "The American based range profession has assumed that the paradigms and models underlying range management are applicable in any context, be it the United States, Peru, Somalia, or Afghanistan (CRDP 1983 [Comments on USAID Evaluation Report, Project 649-108, CRDP, Mogadishu, 14p])."

The normative model is the one developed by range management professionals in the U.S. and a few other countries. However, "Most range-livestock production systems in the world do not operate in this normative context. Pastoral systems generally have multiple goals, emphasising human survival, milk production, capital accumulation in livestock, and risk aversion. Commercial meat and fibre production are frequently low priorities. In many pastoral systems species other than cattle and sheep play important roles. In most pastoral systems livestock are herded and land use is communal or open access. In many non-industrial nations, infrastructure is poorly developed, isolating rural populations and constraining government services. Furthermore, pastoral populations are frequently politically weak, having little influence on official policy. And finally, pastoral people come from a wide variety of cultural, religious, and historical backgrounds creating a diversity of cultural mindsets."

His aim seems to be to demonstrate the poor fit of the normative vs. the traditional, and used as examples 3 projects (CRDP, a Masai project in Arusha, & one in Lesotho). All similar in main aims/methods, & this "illustrates the assumed universality of Western range management. It is as though a standard list of range-livestock development objectives existed that could be inserted into any development project design. There was very little modification of this standard list to fit local context." This list includes: demarcate a controlled grazing area, create a grazing association to manage it, establish a rotational grazing system to improve the range, upgrade animal health services, & train gov. staff in range mgmt; also breed improvement, water devel, increase commercial meat or fiber production.

Info on local grazing mgmt strategies was left to rural sociologists, who were not trained in livestock or grazing mgmt. Role of sociologist often ill-defined, or seen as convincing pastoralists to adopt project innovations. Significant sociological info was not available till the final yrs of the project. In CRDP as in the other projects, sociological analysis pointed to poor fit between project objectives & local context, & the considerable diversity within the local production system.

"During implementation of these projects, the range management staff struggled with the conflicts created by the poor fit between the local production systems and the existing paradigms and models of their profession. The modifications made were basically pragmatic responses to poor cooperation and lack of compliance by pastoralists to grazing management plans. By the end of the projects, few of the grazing management objectives had been achieved."

So, the problem according to him is that in the normative context there is centralized decision-making, 'greater control is better', whereas in the traditional system numerous independent households make most of the decisions at the household level, never mind that all are using a common resource. The development projects responded to this similarly: demarcate areas to control access, implement grazing schemes, and since these schemes required centralized control, such was developed viz. a group of producers, a committee and chairman to create a management model as analogous to a ranch. Bad, says the writer: the correct approach would be to fit the local context, which would mean a sound understanding of the local context and junking normative management theory and practice. That would require project staff to develop the social science skills required to work with pastoralists, which he says they are reluctant to do.

But hey, is it wrong, a priori, to address problems, e.g. loss of valuable grazing through overstocking or water devel or cultivation? And what if the local system simply has no precedent for addressing such problems, or they may not even be perceived as problems. That is, no IK, no traditions for resource management. Hence some kind of system of collective awareness and responsibility for safeguarding the resource had to be instilled. And did anyone mention tragedy of the commons?

In E Hiiraan I eventually knew damn well what the problem was: pastoralists were eating out the yeheb and they had no indigenous institutions or traditions for conserving this resource. That is why we tried to install a grazing committee system and seasonal reserves. It wasn't a matter of socialization; it was communication that was required. Naturally we held lots of meetings and workshops with representatives of pastoral communities to explain all this. What else could we do? Work within the traditional system, which had no hope whatsoever of conserving the resource because it simply wasn't part of their way. The best the writer can say is: "Structures must be developed that create groupings that cut across disciplines and establish formal means for interdisciplinary discussion and interaction. To make such studies feasible and useful, information required for further planning must be identified and efforts limited to collecting this data by efficient methods. One result of such a study should be a statement providing a development goal, objectives to achieve that goal, and the general framework of a strategy to achieve those objectives."

This is about planning and organization, some of it is dense sociology-speak, it still doesn't address the specific problem, i.e. how we would go about solving the problem. He says normative range science lacks understanding of the theory of pastoral production. The best he can say is, "Communal land tenure and the investment role of livestock in pastoral systems have profound effects on range production economics, but we do not yet know how they affect a household's production strategy. Again, the projects' grazing plans ignored these factors entirely, in part because the discipline of range science offers few answers to such questions." We have no answers in the pastoral-theory context not because we are socially inept but because there are no answers within the context of local tradition, the pastoralists themselves have no answers. But a paradigm shift may succeed, we have answers in terms of a system with which we are familiar, one which incorporates an ecological land ethic rather than a system focused entirely on the heedless (reckless) maximization of livestock. It is instructive to read (Mansur 1995 Contrary to a nation: the cancer of the Somali state, p.107-116 in Ahmed, ed., The invention of Somalia, Red Sea Press) that camels are considered the highest form of

wealth in Somali pastoral society. Camels are therefore coveted, "making them the cause of perpetual conflict and serious clan warfare in the countryside." Their system, their tradition is what got them into trouble, it is what was reducing range condition (something the writer seems to pass over, he suggests that a lower condition is okay), it is what was reducing the carrying capacity of the entire system and dragging it into a lower state.

The beauty of the CRDP corrective is that it addresses a problem affecting all the people of a degaan. We as range professionals can identify and target range problems, and a satisfactory parley with the people or their representatives is called communication, not some complicated sociological 3rd degree. (Besides, if we were sociologists plus range ecologists, sociologists would be out of a job.)

Synnott, TJ 1990 ***Forestry in the Jubba Valley***. Jubba Envir. & Socioecon. Studies, Vol.2: Environmental studies. USAID and Associates in Rural Devel., 29p.

An earlier version was JESS Rep. 27, 1988.

Most of the Jubba Valley has woodland and bushland, subject to cutting and other uses by local residents and nomadic pastoralists. Most of the vegetation is in good condition. Fuelwood and poles are gathered without deterioration. Commercial gathering of mostly dead wood for firewood is widespread without causing significant depletion. Small-scale charcoal production often uses dead wood or trees felled for land clearance but if demand grows, the impact and deterioration will be much greater. In Luuq District, the concentration of refugee camps has resulted in great local consumption of wood and browse, and degradation of vegetation and soils over a wide area is extreme and steadily getting worse. In the southern Jubba Valley, agricultural products and concentrations of workers have also greatly reduced the available supplies of firewood and other wood products. The remaining small areas of riverine forest and closed woodland are rapidly being cleared for agriculture, eliminating important resources of large timber and a unique natural plant community. Conservation is thus justified. Tree planting, especially of fruit and shade trees, is practiced throughout the Jubba Valley though on a very small scale. A list given. Proposals for vegetation monitoring are given.

A table (from Watson & Nimmo 1985) gives wood volumes (m^3/ha) for 46 ecological groups within geomorphological groups. Woody biomass values are also presented for the major structural vegetation types. Various wood uses discussed.

Takar, AA, JP Dobrowolski & TL Thurow 1990 ***Influence of grazing, vegetation life-form, and soil type on infiltration rates and inter-rill erosion on a Somalian [sic] rangeland.*** J. Range Manage. 43: 486-490.

"Management of communal grazing lands throughout arid and semiarid Africa is affected by a series of factors that make soil and water conservation particularly difficult. Even though the region is arid to semiarid, periodic flooding associated with monsoonal rainfall occurs causing severe water erosion. Little rangeland watershed research has been conducted in sub-Saharan Africa other than to document that the problem is extreme. Ethiopia is estimated to lose 1-3

billion tons of topsoil every year." *Do they mean million? And anyway, most of this is from the highlands, it's irrelevant for this paper.*

In Somalia, a combination of monsoonal rainfall, heavy grazing pressure and rapid phytomass decomposition cause organic cover (what exactly do they mean by this, is it herb cover, litter, all plant cover??) to decrease from near 100% at the end of the growing season to 5% at the end of the dormant season. Intense storms combined with sparse plant cover at the start of the rainy season may result in overland flow and erosion even where sand content exceeds 90%.

This study S of Afgoi. Water infiltration rate on sandy soil 170 mm/h. On clay site infiltration rate declines during the first ½h and levels off at 120 mm/h. Because livestock are unable to graze under the shrubs (Acacia spp, Dichrostachys), more litter accumulation and OM on the soil surface, which promotes water infiltration, hence a potential benefit from the presence of shrubs.

Much greater interrill erosion on clay compared to sand, and this was partly due to forbs dominating ground cover on clay compared to grasses on the sandy site. Forbs decompose rapidly and forbs have poorer interception characteristics. Alas, the abstract screwed it up, it says just the opposite about clay vs. sand erosion!

Unruh, Jon D ***1990 Integration of transhumant pastoralism and irrigated agriculture in semi-arid East Africa.*** Hum. Ecol. 18: 223-246.

Lower Shabelle near Marka.

Zech, Wolfgang, Pay Drechsel & Martin Kaupenjohann 1990 ***Mineral nutrition and boron toxicity in forest plantations on arid sites in the Central Rangelands of Somalia.*** Pl. Res. Devel. 32: 26-41.

To combat desertification due to woody plant loss and soil degradation, CRDP began reforestation: Azadirachta, Cassia siamea, A. nilotica, Prosopis chilensis, Leucaena, Conocarpus lancifolius, Tamarindus, Parkinsonia aculeata, Eucalyptus camaldulensis. Tree survival is usually only possible if they are irrigated in the first year(s), but plantations show mineral nutrition problems. Hence this study of plantations near Bulo Burti, Beledweyne, Dusa Mareb and Galcayo.

Much evidence, both as foliar symptoms and very high concentrations in foliage, of B toxicity in certain plantation sites. High leaf S (above 0.2-0.3%) suggests gypsiferous soil. According to the lit, high B in fodder results in gastrointestinal diseases and higher death rate in sheep.

Some plantation trees e.g. Cassia siamea are sensitive to excess B and excess Cl on floodplain soils and under irrigation. They propose Acacia spp, Prosopis spp and Conocarpus lancifolius.

Al-Najim MN 1991 ***Changes in the species composition of pastoral herds in Bay Region, Somalia***. ODI Pastoral Devel. Netw. Pap. 31b, 14p.

A definite shift to cattle at expense of camel. This due to water devel (i.e. shorter distance to water, therefore able to use unused grazing resource), also improved vet service & marketing facilities. Consequence: more grazing pressure & a decline in availability of the preferred herbaceous species. Therefore. the range becoming less able to sustain cattle herds.

Drechsel, Pay & Fassil Assefa 1991 ***The relevance of native trees and shrubs in the Somalian rangelands, taking Cordeauxia edulis by way of example***. Pl. Res. Devel. 33: 73-79.

Note extensive refs to my work.

Somalia's cattle population for 1984 was 40M animals (that can't possibly be right! It's based on Hübl 1986 in P Conze & T Labahn, Somalia - agriculture in the winds of change, No.2:55-72). Further on they obviously confuse cattle and camels, viz. "in the dry seasons the relatively large cattle herds develop a greater demand and tolerance for the few available evergreen species…"

Rainfall in yeheb range 100-330 mm with great inter-annual variation. Preferred substrate is the deep, salt-free red sands of the Nubian Jesomma Formation (e.g. SE of Mataban), also the shallow (red) sands (N of Galcayo) (cf Watson et al. 1982). Low content of lime and gypsum, which overlie the surrounding marine lime and gypsum sediments. Soils alkaline, the high pH of the deep red sands does not drop to 5.5-7.0 till a depth of 1.8 m is reached.

Not palatable in wet season, not surprising viz the hard leathery leaves, and tannin at 2.5-2.7% is at threshold of the amount that exerts its greatest negative effect on digestion.

There are indications in the lit that yeheb is capable of fixing N2, but Kleiner (pers com) found no nodules in yicib in the Ogaden.

"The primary reason for the decline [of yeheb] is overgrazing, which seems to affect the seedlings in particular." - that's wrong on 2 counts, it's overbrowsing, and it's a direct issue of this and not eating of seedlings which is simply an hypothesis since no one has seen it happen. Maybe seedling production is episodic. In any case, the acute problem is rapid loss of stands due to overbrowsing.

Outside the red haud sands occurs only sporadically. Has been disappearing from its former range and severely threatened in 50% of the remainder *(due to overbrowsing - Say it!).* Other reasons: fire, seed collection, and possibly the plant's episodic reproduction cycle. Dry season reserves of the kind established E of the Shebelli seem to be the only sensible measure to counteract loss *(presumably reafforestation attempts near Omad and Dusa Mareb).*

A pers comm by Mizrahi (1988) reports that in planting trials in Israel, yicib attains a height of c70 cm in 3 yrs with drip irrigation and fertilizing with salty water, on soil of pH 7.8.

Took leaf and soil samples in the yicib reserve of the CRDP/GTZ forest component near Omad (Coomaad) 27 km S of Mataban. Comprehensive proximate analysis.

Elmi, Ahmed A 1991 ***Livestock production in Somalia with special emphasis on camels***. Nomadic Peoples No. 29: 87-103.

Stats on stock in Som. 1988-9

	CAMEL	**CATTLE**	**SHEEP**	**GOAT**	**TOTAL**
Somalia	6.6M	4.8M	13.2M	19.7M	44.3M
C.Somalia	30.1%	19.3%	21.2%	37.4%	

In C Somaliia, camel dietary selection 1986-7

YEAR	**SEASON**	**TREE & SHRUB**	**LOW SHRUB**	**GRASS**	**VINE**	**FORB**
1986	xagaa	41%	46	11	2	0
	dayr	91	6	2	1	0
1987	jilaal	75	6	18	1	0
	gu	97	1	0	2	0
	xagaa	91	1	2	5	1
	dayr	90	4	3	1	2

The seasons are

Xagaa – dry summer

Dayr – wet fall

Jilaal – dry winter

Gu – wet spring

Dikdik (Madoqua) caught by a hunter who belongs to a clan separate from Somalis but lives in their villages to do skinning, spear-crafting, etc. Dikdik (3 species in region) by far the commonest wild animal in Hiraan Region bushlands. Can be a significant protein supplement in nomad diet.

Photo: Peter Kuchar

Leslie, AD 1991 ***Agroforestry practices in Somalia***. For. Ecol. Manage. 45: 293-308.

Mostly a prose account, also a couple of small tables. Species mentioned, mostly for live fencing, boundary markers, shelterbelts, retained on cultivated land.

Thurow, TL, DJ Herlocker & KA Gelle 1991 ***Rangeland development innovations for communal land management: A Somali case study***, p83-97 *in* New concepts in international rangeland development; theories and applications, Proc. 1991 Int. Rangeland Devel. Symp., Society for Range Management, Washington D.C. (Online in Central Rangelands of Somalia – published papers and reports, Dennis Herlocker)

An overview of the Central Rangelands Development Project (CRDP), a 10-year multi-donor program designed to improve rangeland productivity in C Somalia through improved range management practices (notably establishment of deferred grazing systems) and water development. A need was seen due to rising livestock population and hence range degradation, along with increasingly severe consequences of droughts.

Unruh, JD 1991 ***Nomadic pastoralism and irrigated agriculture in Somalia*.** GeoJournal 25: 91-108.

Subtitle: "Utilization of existing land use patterns in designs for multiple access of 'higher potential' areas of semi-arid Africa"

"The persistent interplay of food production problems, land degradation, and social and climatic difficulties on the Horn of Africa result in recurring famines in spite of vast sums of money spent on agricultural development. As land resources - which undergird both social and production systems in Africa - become increasingly degraded, development efforts, especially in problematic areas, need to become part of comprehensive resource use programs that consider the existing regional land use ecology. Designs which disrupt the ecology of established land uses can lead to extensive degradation because such uses are linked to wider areas; and the effects of such disruption can ultimately threaten the viability of the proposed schemes themselves."

"Intertwined nature of climate, food production, land degradation, and social problems" across africa; leading to famines.

Note lots of refs! Maybe this paper's best for its overviews & biblio.

Baas, S & P Drechsel 1992 ***The Central Rangelands of Somalia: natural environment and patterns of land use*****,** p.2-23 (+ 5 pages of maps) in M Baumann, ed., Factors limiting pastoral production in Central Somalia, GTZ Documentation.

Isn't this the same as their paper p33-60 in Baumann et al. 1993?

Most of CR people belong to Hawiiye & Darood clan families, rivals for gov since the 1991 collapse.

Landforms map p57. Also cf. rainfall, veg maps. Most of CR (Mudug & Galguduud) is Interior Plateau or Mudug Plain, gradually sloping toward Indian Ocean. It merges into the 10-40 km wide Coastal Ridge consisting of the ridge itself and stabilized dunes, also a band of active dunes. The Coastal Plain 8-35 km wide. Note this broad zonation is in from ocean. In contrast, the landforms and zonation of Hiraan are E-W from the ± S-trending Shabelle River. The zones are the River Valley including floodplain, Western Hiraan (sic), and to the E the Hawd of deep red sands.

Acc to rainfall map (and in contradiction to text), extreme SW Hiraan almost reaches the 500 mm isohyet and progressively decreases northward to ≤200 mm in extreme N Hiraan. Most of Galguduud is 200-300 mm, most of Mudug (100)150-200 mm acc to map.

Geology & soils. The interior plateau of C Somalia has shallow orange sands over limestone and gypsum, classified as Regosols and Arenosols. These soils extend into extreme W Hiiraan Region, and limestone bedrock often crops out. Most of W Hiiraan above the Escarpment has deep sands, The Jesomma sandstone formation forms the Hawd landscape with its typical deep red or stronger orange sandy soils. They are free of easily soluble salts and nutrient status is fairly low. The Haws is flat or very gently rolling, and most of the area has little surface drainage as all rain soaks immediately into the sands. However there is a series of broad shallow steps proceeding downward toward the east. Some of thes steps include broad (1-5 km) shallow (5-25 m) bowls with slightly heavier soils (loamy sands) due to inwash. The soils of the Shabelle River floodplain were developed from fine-textured, recent or older river deposits, the materials derived mainly from erosion of soils originating from carbonate-rich materials of the Upper Shabelle areas. The soils are classified as Vertisols, Fluvisols and partly Solonchaks. The Vertisols are widely irrigated. These soils contain different amounts of gypsum and soluble salts, especially in the subsoil. Adjacent to the floodplain the fine-textured river sediments gradually change to limestone rubble and fragments. Western Hiraan has virtually no sand. Almost all the land is a complex of low limestone coutcrops with pockets and small plains of silts. Gypsum plains, recognizable by the very light-colored surface, are found in W Jalalaqsi. Unique to a portion of W Hiraan, especially west of the floodplain in the Buulo Burte area, are basalt plains supporting rich brown stony soils,

Height of the vegetation layers and basal cover decrease (except in the coastal plain) from SW to NE in the CR, due to climatic factors (notably decreasing rainfall from S to N). Bushland covers all of Hiraan except parts of the Hawd where it appears natural. Bushland is also absent on the floodplains of the Shabelle River and the basalt plains with dwarf-shrub grassland or shrubland, some of it a consequence of land use and fallow. Acacias and commiphoras are the most frequent

dominant and subdominant bushland genera on both sand and limestone series. In gypsum areas species of Suaeda, Limonium and Salsola are typical. Most bushland species are deciduous though some retain their leaves into the dry season. About 5-10% of the bushland vegetation is evergreen. It rarely exceeds 2% cover except in the Hawd where Cordeauxia edulis is locally abundant. A dwarf-shrub layer is also usually well developed, with Indigofera ruspolii outstanding. Basal cover of perennial grasses averages 1-2% in the bushlands, with very uneven distribution, and absent in overused areas and within a few km of permanent water points. An ephemeral growth of annual forbs and grasses is extremely variable in amount and composition, and very much a seasonal phenomenon. Three types of grassland are found here and there in Hiraan. Pockets of mostly Aristida occur, possibly related to fire, in the Hawd. Very slightly broad depressions on alluvial plains support mostly Sporobolus. Finally, Echinochloa grassland areas occur on the floodplains. (this mostly Kuchar 1989)

True woodland may once have been common in the river valley and areas west. It may have been largely Terminalia spinosa and relicts exist but were probably eliminated by settled pastoralists. Fragments of Acacia nilotica woodland can be detected on the alluvial plains, some stands still to be found in Jalalaqsi and southward. (Kuchar 1989)

Veg summary heavily based on my repts. Quotes me as writing (1989) that dS areas represent strongly altered and poor condition. How did I come to that conclusion? Bushland, dSG, S (e.g. part of hawd looks natural, other is result of overuse), G,W (Terminalia & Acacia, both becoming relicts).

Degaan, the traditional grazing area for a group, family or clan, defines wet-season home range. During drought or prolonged dry season this home range is left for more widely dispersed food and water, but long-distance movements are much less frequent than usually assumed, and most herders keep animals in single areas, around a single WP, rather than moving between different WPs.

Is CR overstocked and are the rangelands degraded? CRDP ecologists and the pastoralists themselves say no. Most range is in fair condition though some overused and degraded areas. Certain invader plants are indicators of overuse, e.g. around wells and permanent settlements.

Cordeauxia, Boscia minimifolia & Cadaba glandulosa are important dry-season browse though palatability not high, even avoided in wet season.

An acute threat from big increase in construction of *berkeds* (cement-lined water reservoirs) and water devel activities since mid-1980s. This mainly in Hawd region where berkeds can be easily constructed due to the sandy soils, can offer water year-round when supplied by tanker, and overgrazing the consequence. A network of berkeds might result in extensive range degradation.

Agropastoral zone ± coincides with dunes along coastal ridge (± not Hiraan); shifting cultivation, cowpea, sorghum, melon. Smallholder cropping in Shabelle valley; altered – see p50, some or all based on Kuchar 1989.

Deshmukh, Ian 1992 ***Estimation of wood biomass in the Jubba Valley, southern Somalia, and its application to East African rangelands***. Afr. J. Ecol. 30: 127-136.

Photo-interpretation of the area involved a stratified random sample of 560 air photos at 1:1000. Ninety sampling sites were established in the study area, covering the range of 10 vegetation types identified. Outside the floodplain, bushlands comprise c70% of wood biomass. At each site a 10x10 or 20x20 m square laid out and canopy diameter of all plants >2 m was measured.

Evaluated 20 regression equations from E.Afr. on woody plant dimensions (mostly crown diam) vs. biomass and selected the 'best' ones. A lot of fussy messy detail on evaluating various regressions from the lit. Bushland has 1-30 T/ha dry wt of wood, woodland 2-75 kg/ha (disastrously, the abstract cites these numbers as kg/ha!). He says NM Bird [1988] criticized the Western et al. 1981 wood biomass estimates as too high. And anyway, he says it's prudent to underestimate – which is not a reason.Tab.4 gives median and range of woody biomass estimates for each vegetation type. Open to dense bushland biomass is c4-10 T/ha.

A regrettable error in abstract, the units of biomass are given as kg rather than T per ha. Used a modifed Pratt & Gwynne 1977 veg classification, using cover & height similar to Grunblatt et al 1989 but retaining terms like bushland, since such terminology is more familiar for EA rangelands.

He says the biomass estimates of Western et al 1981 for Kenya rangelands are high, and Bird 1988 & pers comm (acc to author) questions the methods and results – and Bird's work is lauded as the best there is for eastern Africa. Hmm.

Acacia zanzibarica The dominant tree of floodplains of the Juba R, S Somalia

Thespesia danis An abundant tree of floodplains of the Juba R, S Somalia

Terminalia brevipes An abundant tree of floodplains of the Juba R, S Somalia

Acacia horrida The dominant acacia of *Acacia-Commiphora* bushlands of the upper Jubba R region, S Somalia

Acacia reficiens The dominant acacia of *Acacia-Commiphora* bushlands of the lower Jubba R region, S Somalia

Acacia bussei Wood sp.g. c1.0, which is higher than other acacias or other common range species

Elmi, AA, TL Thurow & TW Box 1992 ***Composition of camel diets in central Somalia***. Nomadic Peoples No.31: 51-63.

In Ceeldheer Dist, 1986-7. Cover & composition by line transect. Bite counts. Much comparison of milking & non-milking camel diets but by forage classes. These classes are: Deciduous non-

spiny, Deciduous spiny, Evergreen non-spiny, Evergreen spiny, Suffrutescent (dS, wF), Grasses, Vines, Forbs, Succulents

Overall diet 81% woody, 11% suffrutescent, 6% grass, 2% vine, 0.5% forb, 0.1% succulent.

No evidence that armed plant spines reduce leaf & shoot losses. However, plants with small, hooked thorns, e.g. Acacia mellifera, A. reficiens, A. senegal, Terminalia spinosa are browsed more than other acacias and Balanites with long spines.

Talle, Aud 1992 ***Trading camel milk: coping with survival in a Somali pastoral context***, p.139-157 *in* Anders Hjort af Ornäs, ed., Security in African drylands: research, development and policy, Dep. Human Physical Geog, Uppsala Univ., 192p.

A wonderfully lucid, logically constructed, informative paper. Observes the productive activities of pastoralists in western Beledweyne Dist., ultimately focusing on the use and economics of camel milk and its important place in livelihood strategies. *(I have much more writeup.)*

Abdullahi, Ahmed M 1993a ***Livestock policy in Somalia: past and present status and future prospects,*** p.61-76 *in*MPO Baumann, J Janzen & HJ Schwartz, eds., Pastoral production in Central Somalia, GTZ, Eschborn, Germany, 356p.

"The majority of the country's population are nomadic herders, pastoral livestock production is the main foreign exchange earner and sizeable commercial sales from national herds have been routine for decades. The pastoral livestock sector can therefore be regarded as modern rather than traditional. A large part of herders are in a phase of transition from a traditional subsistence-based system to a market-integrated commercial system."

Livestock contributes to foreign exchange earnings and gov revenues thru export-related fees, export and domestic taxes. The national economy is overwhelmingly based on trad livestock production i.e. the nomadic pastoral sector, and it achieves this fairly cheaply since capital inputs are minimal, and despite the small % of budget allocated to programs benefiting pastoralists or the devel of the sector.

The livestock trade started here as early as the 1300s. It escalated in the 1950s with increasing demand for live animals in Arab countries, and till the mid-70s Somalia was the world's largest exporter of live animals. In 1985 it still ranked 3rd after Aust and Turkey in shoat exports.

Throughout the 20th century pastoralists had little political clout therefore little say in policies affecting them. They have made limited advances compared with other groups and still occupy peripheral social, economic and political positions [though high in rhetoric and self-image]. Pastoral nomads in Africa head the list of rural peoples resistant to change, or at least that's the attitude they have been accused of. An underlying objective of devel initiatives appears to have been to settle them, to bring these 'backward and irrational people' to modernity. Meanwhile their quality of life has not improved in proportion to the sector's contribution to the national economy. Analysts have accused the state and powerful stock merchants of conspiring vs the interests of rural pastoral producers in Somalia.

"The pastoral livestock sector has undergone considerable disintegration and change in the last two decades. The pattern of pastoral livestock raising shows signs of drastic changes taking place which will have far-reaching implications for the entire socio-economical system. With increasing commercialization and a social shift away from the traditional pastoral way of life based on family and on socio-economic cooperation between groups, social ties and control are weakened resulting in the collapse of the whole traditional social system." As elsewhere, land under cultivation is increasing at the expense of free rangeland, with marked consequences for land tenure practice. Fencing is being promoted not only to protect crops but as a labor-saving device in herding. Pasture and water are the determining factors of production, therefore privatization and enclosure excludes resources from pastoralists dependent on the trad production system. This will produce many dispossessed families whose future will depend on the ability of the national economy to absorb their labor. Other changes are happening. Herd composition is shifting away from cattle and camel to small ruminants for cash sale. Goats are by far the largest source of cash income for most families in central Somalia, and sheep are important in N Somalia. Less milk is being used for family subsistence, leaving more for young animals but forcing increasingly more purchase of market foods for pastoral diets. Families are becoming increasingly dependent on exchange of stock and stock products for purchased foodstuffs, and this makes families vulnerable to unfavorable terms of trade. "Fewer animals are being used for reciprocal and redistributive networks of animal loans, gifts, and other transfers, and are being sold instead. Social relations traditionally based upon livestock exchanges have been weakened further."

Though virtually all livestock is owned by pastoral nomads, and is the major source of meat for local and exporter markets, the sector has been ignored by gov. The 5-yr devel plans 1960-85 neglected the nomads and their share of gov investment budget was <2%. Now the sector's prognosis is uncertain due to civil war and destruction of basic infrastructure.

The livestock sector has entered a process of radical change, and likely will look very different from the present one. The key question is, will pastoralists view livestock mgmt as a sufficiently profitable enterprise compared to income potential in alternative activities. A changing attitude is coming re the land/labor dynamic. Boserup 1965 argued that people in extensive systems of production will not adopt more intensive production methods without some kind of pressure. Pop growth and lack of alternative employment opportunities will eventually force families to increase land productivity thru increased labor, hence the growth of enclosures and crop production. Spontaneous rise of enclosures in the CR in the 1980s, with emphasis on control of water and intensified production systems, will inevitably squeeze out (pk) small herders, reflecting growing intra-herder wealth differences and the underlying problem of too many people dependent on limited range resources. Devel initiatives should address both the socioeconomic situation of poorer pastoralists needing alternative occupations, and the livestock mgmt situation of optimizing land use and mgmt for the remaining (larger) stock producers.

Prerequisites for sustainable devel of the pastoral stock sector: political stability, socioeconomic stability especially the problem of marginalized producers, land-use policies that harmonize traditional tenure with privatization. All this requires massive external support. A drastic intervention would be to take exhausted rangeland out of production for some years. (*This is grazing reserves!*)

Abdullahi, Ahmed M 1993b ***Economic evaluation of pastoral production systems in Africa: an analysis of pastoral farming households in Central Somalia***, p.129-148 *in* MPO Baumann, J Janzen & HJ Schwartz, eds., Pastoral production in Central Somalia, GTZ, Eschborn, Germany, 356p.

Despite limited understanding of household-level economics in pastoral production systems, interventions calling for increased cash expenditures for household systems are frequently proposed. (*This parallels exactly the calls for transforming subsistence agr to a cash-based economy, and I bet some of the same obstacles hold – conservatism-based reluctance to change, uncertain implications of land-use intensification, unwillingness to increase labor inputs, uncertainty about markets esp after extra efforts are made, and inevitable transformation of societal status quo*).

Premise: wealth differences among households & groups will have profound effects on their access to the essential elements of production, patterns of income & expenditure, and marketing strategies.

Livestock holdings (as TLU=250 kg) are taken as the measure of wealth status. Small herders have 0.1-6.5 (x 3.0) TLU per active male, large-scale (wealthy) herders 7-12.5 (x 8) TLU. Size of holdings is assumed to have a major impact not only on the production system itself but on farm household income, ability to ensure the continued basis of production and its influence on decision-making. He studied 104 households in Buulobarde and Ceel Dheere districts.

Production resources (& constraints) include grazing land, herds, and household labor. Cash income of small vs large household:

smallstock sales 76 vs 59% (and goat 59 vs 44)

milk 9 vs 15%

camel sales 1 vs 10%

hides & skins 5 vs 9%

Food (caloric equiv) of small vs large household:

milk 22 vs 32%

sugar/tea 34 vs 23%

grains 36 vs 36

Cash income/expenditure is negative in small households but positive in large ones. Small herd owners are forced to buy and sell on a contingency basis and are at the mercy of unfavorable price fluctuations. Most are continuously in debt. Furthermore they are more vulnerable to drought every 5-6 yrs (with 30-70% stock losses) and disastrous drought every 20-25 yrs. Small

herders cannot therefore build up their herd resource base. Small herders sell 2/3 of their total stock production but only 42% for large households.

Baas, Stephan 1993 ***Range resources and range condition in the Central Rangelands of Somalia***, p.227-264 *in*MPO Baumann, J Janzen & HJ Schwartz, eds., Pastoral production in Central Somalia, GTZ, Eschborn, Germany, 356p.

Suggests that when people talk about **range capacity** it's as the amount of **range resources**, and originates from **CC**, indeed historically in range mgmt range capy = CC which includes not just fodder but water, hazards, etc. I've never heard such relationships suggested in the range discipline; he is 'erroneously confused' as he quotes an FAO accusation of **grazing capacity** vs CC confusion. This guy may be a solid student of vegetation but he should stay out of US range science if he's going to confuse terms – and it's a danger sign when his chief ref is a 1987 FAO guide, plus 2 refs not in his biblio.

Fieldwork 1989 in Dhuusamarreeb area. Methods are referred to a German pub of his, though he used a bunch of steps based on the FAO guide as well as the range units (RUs) mapped by RMR 1979 (though was that ever critically evaluated or followed up?). The 5 relevant RUs are described. The one in the SW portion, in Mataban area, is the hawd red sands, the others are limestones & gypsum.

For each RU he stratifies into dS, wF(& herb), S, T, perenn-bienn grasses. For the hawd RU no.24: 25 dS, 21wF, 30 S, 29 T, grasses not compiled. Cover (%) per layer is 13.5, 1.7, 11.8, 18.2, 1.0, respectively. Per layer, 2 or 3 dom species listed, each with % density/layer (what's that??), and 2 or 3 subdominants.

Palatability as H,M,L for wet season and H,L,U for dry season; U never eaten. The dry-season fodder resources are evergreens, avoided as long as leaves of deciduous species are available. Many more species are palatable for camel & goat than for sheep & cattle. Avoidance is lowest among goats. In dwarf shrubland there is a higher fodder capacity for a mixed herd because even cattle can find sufficient fodder during the wet season, none of the vegetation is out of reach. For the study area, 79% of fodder potential (kg/ha) was H or M, only 6% U. For goat the ratio is 80% to 3%. For sheep 34% to 30%. For cattle 24% to 63%.

Litter is plentiful at the start of the dry seasons but hardly any by the end of these seasons. Even some unpalatable plants when fresh are eaten as litter.

Deciduous woody vegetation is protected from severe degradation because the fodder capacity of the dry season limits stock densities. This holds both for bushland and dwarf shrubland. The dwarf-shrub areas are more threatened; pastoralists prefer these areas as range, it is easier for them to move about here. The perennial grass layer is decreasing, particularly within 1-3 m radius of permanent water, and undesirable invaders increase with length of use. Evergreen plants, the favorite dry-season fodder, are heavily browsed and severely threatened throughout the study area.

Veg cover (%) in 200 m^2 plot and proportion LP(low palat)+UP(unpalat) in relation to Water Pts. The numbers are % plant cover/% LP+UP plants.

Frequent water use (yrs)			>10 km from water
10	5	3	
Balli Cad 21/44	Lebi Hiraan 24/20	Dhumaaye 34/9	33/7
Guri Ceel 41-18/40	Dhudhumood 27/30	Gal Xamur 28/10	47/2
Dhuusamar.13/56	Gadoon 39/37	Siligle 46/20	26/4
Tuulo Cali Xasan 17/29			50/18

Range units (LSUs of RMR 1979) (note that the map p.246 indicates the unit numbers for the whole unit and not specific stand locations)

LSU 16 Bushland. Limestone formations. Numerous small depressions and hills (5-10 m) in SE part. Limestone 60%, pale orange sand in wavy bands 40%. Calcaric regosols, lithosols.

LSU 24 Bushland. Haud type. My CR4. Deep red [orange?] sand. Eutric regosol.

LSU 31 Bushland. Gypsum/anhydrite exposures 85%, pale-pink gypseous sandy silt 15%. Lithosols, regosols, yermosols.

LSU 44/45 N & E of Haud type. Dwarf shrubland. Probably my CR7 (or could it be CR2?). Red-orange sand over limestone which surfaces 5-10%. Calcaric regosols, arenosols.

LSU 47 Shrubland. Taleh limestone formation. Orange sand 40%, limestone 60%. Calcaric regosols, lithosols, arenosols.

	TREE	SHRUB	DW.SHRUB	WF (& HERB)	PEREN.GR
LSU24					
No.spp.	29	30	25	19	
% cover	18	12	13.5	1.7	1.0
LSU44/45					
No.spp.	14	27	28	24	
% cover	2.3	17	18.4	1.2	0.4

LSU24 DOM & SUBDOM SPP (% density/layer)

TREES dom Acacia tortilis 18, C. horrida 10, Caesalpinia erianthera 7

Subdom Acacia hamulosa 5.6, Bosw. neglecta 5.3, C. gurreh 5.3

SHR dom Cordeauxia 15.6, Acacia turnbulliana 14.8, Acacia edgeworthii 9

Subdom C. lobatospathulata 6.8, Acacia zizyphispina 5.5, Ipom donaldsonii 5.3

DW.SH.dom Indigofera ruspolii 45, Pleuropterantha revoilii 22

Subdom Triumfetta ?heterocarpa 5.4, Indigofera intricata 4.6, Solanum ?forskaolii 4.1

WF dom Melhania ?incana 67

Subdom Pavonia arabica 9, Heliotropium 5.6, Pavonia pirottae 4

GRASS dom Aristida kelleri, Cyperus esculentus

Subdom Leptothrium senegalense

LSU44/45 DOM & SUBDOM SPP (% density/layer)

TREES dom C. ancistrophora 37, Acacia hamulosa 16.4, Acacia tortilis 9.4

Subdom Sesamothamnus busseanus 8.5, C. horrida 7.6, Acacia senegal 6.6

SHR dom Acacia edgeworthii 42, C. lobatospathulata 15

Subdom Loewia glutinosa 7.2, Euphorbia cuneata 6.6, C. incisa 5.9

DW.SH. dom Indigofera intricata 42, I. ruspolii 21, Pleuropterantha revoilii (4?)

Subdom Triumfetta ?heterocarpa

WF dom Pavonia pirottae 19, Melhania ?incana 12.2, Pavonia arabica 12.2

Subdom Tephrosia uniflora 7.7, Pavonia kotschyi 6.6, Heliotropium 4

GRASS dom Aristida kelleri, Cyperus sp.

Subdom Cenchrus ?ciliaris

Where has he published individual palatability ratings and abundance values?

Other findings & conclusions: Virtually no effect of soil differences on biomass production. ***Very close correlation between % woody cover and biomass production*** (thus use his estimates of % palatable, and within plant size limit of 4x4 m; for goat max 1.75 m ht; and for evergreens, reduce by 70% to get onlly seasonal increase of biomass). It is doubtful that calculation of biomass production in arid bushland based only on rainfall is sufficient: also need veg cover. Proportion of unpalatable species should be considered an indicator of range condition.

It's clear that satellite data can't give such detailed, acurate (sic) info; they can only give range potential.

TLU-based calculations may lead to incorrect assessment of range productivity if stock type is not considered.

He's happy with my 1987 dry-season fodder resources paper, I think because being German he likes a mechanistically stepwise, detailed set of calculations. He doesn't like Naylor's 1984 rept for its lack of methods and inaccurate analysis. Objects strongly to Deshmukh 1984 regression as used by Food Early Warning System Dept (or by Herlocker 1986 though that's unclear).

Acacia tortilis Remarkable in terms of biomass production, being both available and consumed for greater part of both wet and dry season. But note that much of it may be unavailable (due to height).

Baumann, MPO, J Janzen & HJ Schwartz 1993 ***Pastoral Production in Central Somalia***. Technical Cooperation – Federal Republic of Germany (GTZ), Eschborn. 356 pp + 4 maps.

A set of 17 papers from the 1980s GTZ project in the Central Rangelands (CR) of Somalia. I have summarized some of them here.

A brace of color plates bound in the centre adds a lot – camel country, pastoralists, landscapes, some so familiar to me.

The short foreword (by H Grell & T Labahn, who are they?) says Somalia looked in an envious position because unlike other African states the Somalis "are linked by the common bonds of language, culture and religion." That is a continuing myth, so it's less surprising than if they'd been what they envision it as, to witness the meltdown.

GTZ was involved 1982-89 in CRDP designed by WB. GTZ was responsible for veg and forestry components, central workshop and part of formal training.

Herlocker, DJ, HJ Dirschl & G Frame 1993 ***Grasslands of East Africa***, p.221-264 *in* RT Coupland, ed., Natural grasslands. Eastern Hemisphere and resume. Ecosystems of the world, vol. 8B, Elsevier Sci. Publishers, Amsterdam, 556p.

Grasslands without any significant woody growth are extremely limited in E.Afr. Such grasslands are found under local edaphic or pyric conditions. Most grasslands include a woody

component and appear to have been derived from woody communities through burning and clearing (several refs). (*Technically most are not grasslands but other veg or formation types, but this conforms with the history of range and vegetation classification in E.Afr. Ever since classifications were devised, the emphasis was placed on perennial grasses, never mind the actual structure of the plant communities. This highlighted grasses as the feed base of livestock specifically cattle, and of grazing wild herbivores that made up the bulk of the game populations and biomass. The authors – like many others – may frankly admit that true grasslands are rare in E.Afr., yet the grass motif is the tradition.*)

Warm regions with moderate rainfall but a definite dry season support climax evergreen bushland and broadleaf combretaceous woodland & wooded savanna in which tall Hyparrhenia grasses are associated.

Medium to high elevations with a drier, variable rainfall regime and a long dry season support vegetation ranging from dry evergreen forest to deciduous Acacia-Commiphora bushland. Associated grasses are medium-height Themeda triandra and tall Hyparrhenia filipendula.

Hot low drylands with low and extremely variable rainfall and a long dry season support Acacia-Commiphora bushland with either a Chrysopogon plumulosus or Leptothrium senegalense grass layer, or dwarf shrubland and annual grassland where short Aristida species are characteristic.

Their classification comes up with 8 major vegetation regions or 'grassland' types.

One of these is Chrysopogon mid-grass region ['mid' refers to grass height]. It includes much of Somalia (including a SE portion of C Somalia), E half of Ethiopia, E half of Kenya and NW Kenya. Rainfall in 2 rainy seasons but low and highly variable. Chrysopogon grasslands in C Somalia occur in association with Commiphora-Acacia bushland. Some grasses include Cenchrus ciliaris, Dactyloctenium scindicum, Heteropogon contortus, Leptothrium senegalense, Tetrapogon cenchriformis and T. villosus. Overgrazing of Chrysopogon leads to dominance by annual grasses, forbs and dwarf shrubs [or loss of all perennial herbs and sometimes most annual cover].

Another is Leptothrium mid-grass region, and includes most of C Somalia, 150-400 mm. The actual dominants are shrubs [and trees], mainly Acacia and Commiphora. The main grasses are Leptothrium senegalense, Cenchrus ciliaris, Aristida sieberiana and Sporobolus somalensis.

Janzen, Jörg 1993 ***Mobile livestock keeping in Somalia: general situation and prospects of a way of life undergoing fundamental change***, p.17-32 *in* Baumann et al. *in* MPO Baumann, J Janzen & HJ Schwartz, eds., Pastoral production in Central Somalia, GTZ, Eschborn, Germany, 356p.

nomadism = nomadic pastoralism = migratory pastoralism

No. livestock in Somalia p18. General on climate, physiography. The big (attempted?) change in nomadic life in 1969 with the new socialist regime, it nationalized all tribal lands and attempted to deprive traditional leaders of their power. Nomad response was mistrust, esp as

legal uncertainties confused jurisdictional meaning re water and fodder resources. The regime aimed to settles as much of nomad pop as possible and was helped by the great *Dhabaadheer* drought of 1974. c120,000 nomads were settled on 3 farming and 3 fishing settlement projects which were failures.

After the break with USSR in 1978, Somalia received much devel aid from W donor countries & int'l organizations. Much of this was for irrigated agr but it also supported 2 rangeland devel projects whose primary objective was to improve the productive conditions for export-oriented livestock husbandry, the main emphasis being measures to protect rangeland.

The NRDP was doomed to failure due to lack of basic research, inadequate involvement by nomads in planning & implementation, disregard for rotational grazing, private enrichment of certain nomad groups.

The CRDP aimed to avoid the massive interference with the way of life and econ system of the nomads. It hoped to improve production conditions and preserve pasture areas by improving water supplies, setting aside drought reserves, and vet services. Control of desertification, the consequence of inappropriate land use, was a big issue. The author doesn't blame the pastoralism for it, he says it was due above all to the nat'l devel policy oriented towards the interests of the urban upper class (but no specifics). Also due to "ecologically inappropriate political decisions, such as the construction of deep wells in certain clan regions, by means of which the government of the time intended to secure the political and military loyalty of those groups." The author says signs of desertification were limited in those parts of the country where traditional patterns of livestock husbandry were intact, but symptoms of desertification could be serious where massive interventions in the established structures.

Reasons for advancing desertification: increasing stock numbers, settlement, reduced migration distances (fewer camels and more shoats, also restricted cross-border movement), mkt orientation prompting water devel (wells dug almost everywhere by gov, cisterns privately) which enabled stock to stay in vicinity of water long into dry season, expansion of irrigated agr into riverine areas traditionally used in dry season by nomads, escalation of certain acacias felled for charcoal to urban mkts and negative consequence for bush encroachment therefore grass reduction.

Nomadic pastoralism is an optimal adaptation to drylands and the only way of using such pastures economically without a big injection of capital. Proper use of the OW arid zones is close to traditional use, it is not gov-enforced settlement programs nor "technocratic pasture farming systems imported from the industrialized countries." Here I think he's referring delicately to the US range mgmt system. He particularly stresses mobility, it optimizes conservation and renewal of soil & veg resources. Fencing (land privatization) is an impediment. "Government tutelage of nomads has not paid off anywhere," therefore keep interventions and change to a minimum. Furthermore, it's important to preserve (or support preservation of) TK of envir & skills in care & breeding of stock. "Greater efforts should be made to record and scientifically investigated these proven methods so that they can be used in the practical planning and implementation of development projects."

Janzen, Jörg, Horst Jürgen Schwartz & Maximilian PO Baumann 1993 ***Perspectives and recommendations for pastoral development in Somalia,*** p.343-351 *in* MPO Baumann, J Janzen & HJ Schwartz, eds., Pastoral production in Central Somalia, GTZ, Eschborn, Germany, 356p.

Only 2 refs (one of them Fratkin 91) and I suspect the ideas are merely off the top.

Pastoralism is a risk-aversion system. It was stable i.e. had centuries of continuity. Now conditions are changing: pop pressure, land loss to agr, breakdown of trad social assurance systems, reduced mobility due to political & administrative restrictions and widespread political & ethnic strife. Devel aid over 3 decades has tried 2 approaches, improving stock productivity and improving the forage base.

Stock improvement thru genetic upgrading with high-yielding exotic stock has failed so far, but animal health programs have had success.

The forage-based approach, the attempt to conserve &/or rehabilitate rangeland by controlling stock numbers & movements, "has been tried over and over again since the early colonial times everywhere in Eastern Africa." That's a falsehood, and note it is unsupported. This has been "a story of total and dismal failure," and counterproductive wherever combined with enforced sedentarization. This is a harsh and ± out-of-the-blue indictment: are these guys, not one of them range specialists, qualified to utter it? And especially when, after trashing range management they disingenuously indicate that range management (land conservation) is the only way to use pastoral lands. Do they mean that all past attempts have failed because the methods were wrong, or because of uncontrollable externals such as climate and overpopulation? They state that range improvement will only be possible by reducing grazing pressure. Isn't that precisely Am-style programs with their grazing-reserve ideology? There are too many pastoralist, they conclude, and employment opportunities must be sought outside the pastoral sector.

By eschewing supporting lit and documents, the authors feel free to make uninformed generalizations, contradictions, to rush to ideology without considering concrete case studies, evidence of success or at least the right direction in pastoral devel, derailed not by the philosophy or technology but by extrinsic, uncontrollable (or controllable but not given their due in project planning) such as corruption, poor communication, inappropriate technology, low capacity.

Finally they start speaking my language: The primary aim in pastoral development should be preservation (conservation and rehabilitation) of the resource base viz vegetation cover, soils and water resources. On the social side this should be integrated into a traditional ecologically adapted land-use system, viz the *degaan* unit, managed acc to communal law. (*But see how it collapses with e.g. new boreholes and extirpation of yeheb!*)

Kuchar, Peter 1993 ***YICIB (Cordeauxia edulis).*** SERP Info. Leaflet, draft, 6p.

INTRO Yicib [The name of the plant is actually *gud*, with *yicib* designating the fruit. Internationally however, *yicib* has been used interchangeably for plant and fruit and is the better-known term. *Yicib* is pronounced ye-eb or yeheb, and often that spelling will be encountered in the literature.] is a compact evergreen shrub in the Caesalpiniaceae, one of the

three families of leguminous plants (the others being Mimosaceae and Papilionaceae). Well-known members of Caesalpiniaceae in this part of Africa include *lebi* (*Delonix elata*), *jaleelo* (*Senna, Cassia*) and *Tamarindus indica*.

Cordeauxia edulis is the only species in the genus, and is restricted in distribution to parts of central Somalia and Ogaden, where it inhabits bushlands on deep stable rather sterile sands. It can also be found on sandstones, but strictly avoids limestones and alluvial soils. The more widespread variety *muqle* typically forms communities 1.5-2.5 m high but can grow to 4 m; the smaller-leaved, more twiggy variety *suley* may average only 1 m or slightly more.

Yicib has several extraordinary features of ecological and economic significance. It is an abundant and locally dominant component of otherwise deciduous bushlands. It is a locally outstanding dry-season browse. It yields an edible nut of potential economic significance. Despite this quite amazing combination of outstanding attributes, yicib has received no concerted research effort, only small sporadic attempts have been made to grow and preserve it, and even the absolutely basic aspects of its ecology have until very recently been unknown or misunderstood.

Yicib thrives in a rather hostile environment of high day and night temperatures (almost never falling below 20C), low and highly unpredictable rainfall (possibly as little as 150 mm/yr), and nutrient-poor sands (Drechsel & Zech 1988). Its success here is all the more remarkable since it is evergreen and at the same time can be dominant. Yet another feature underscores its uniqueness: it yields a large edible nut which in the past has been the mainstay of some nomadic populations. This fruit has obvious potential as a commercial nut crop, and could place it in that very small group of arid-land plants whose secondary products have commercial viability (e.g. gum arabic, frankincense, myrrh, jojoba).

Adding up all these facts, the uniqueness and potential of yicib is indisputable. It may be an ideal multipurpose crop for enormous areas of semi-arid lands in Africa and elsewhere, the very areas now being threatened by or actively undergoing desertification. The only significant drawback is its low germination success and its very slow growth, but as with other agronomic plants, a biogenetic survey would likely uncover superior accessions.

Schwartz, Horst Jürgen 1993 ***Pastoral production systems in the dry lowlands of eastern Africa***, p.1-16 *in* MPO Baumann, J Janzen & HJ Schwartz, eds., Pastoral production in Central Somalia, GTZ, Eschborn, Germany, 356p.

Very general characteristics; includes almost all Somalia and Djibuti, large parts of K and Eth. Can be seen as E extension of Sahel zone. Pratt & Gwynne's (1977) 6 ecoclimatic zones for eAfr: it's zones 4-6. Drought = complete failure of 1 rainy season, and occurs in these zones 2-3x/10 yrs. Complete failure of 2 consecutive rainy seasons occurs 2-3x/30 yrs, and of 4 consecutive rainy seasons might happen once in 30 yrs. Where does this info come from?

Based on Schwartz 1991 as modification of Le Houerou & Hoste:

rainfall	DM	DM	Permissible

mm/yr	herb layer	herb+shrub	offtake (%)
100	450	600	25
200	1080	1600	30
300	1710	2600	40
400	2340	3600	50
500	3160	4600	50

What kind of veg is this in, or is it supposed to be a broad generalization?

Mentions some pastoral production systems p6-7.

Traditional adaptive strategies: increase stock nos, herd diversification and dispersion (vs disease outbreaks and to utilize pastures more efficiently), mobility of households and herds.

Now emergence of market-oriented over trad subsistence production. Associated (generally negative) changes p10-11.

"Livestock movement was never very extensive in Somalia, it was restricted as much as possible to traditionally demarcated ranges known as *degaans*. Movement across *degaans* was usually observed only in dry years or in the very dry inland areas. Recently, induced by intensive water development, commercialisation and emigration of labour, herds became more and more attached to semi-permanent settlements in the vicinity of watering points." Related to increased sedentarization in Somalia is enclosure and privatization of former communal range by pastoralists themselves. "This practice has gained momentum through water development, the accelerated breakdown of social structures regulating range utilisation, changing government land tenure policies which promote agricultural activities in marginal areas, commercialisation of forage production, the emergence of an urban milk market and other factors."

Negative effects of change from long-ranging, highly mobile to a short-range, semi-sedentary herding system: envir degradation, production risks due to loss of trad adaptive mgmt strategies, and breakdown of social structures formerly serving as a form of social security.

Modern adaptive strategies p13.

If increased sedentarization is to have some positive effect on livestock production, 3 sectors need especial attention: improved stock productivity, improvement and mgmt of range, and stratification of pastoral economy (by which he means non-pastoral forms of livelihood).

I don't like his paucity of refs, even for numbers he obviously couldn't have dreamt up.

Talle, Aud & Ahmed M Abdullahi 1993 ***Labour resources in pastoral production: some implications of increased trading***, p.113-128 *in* MPO Baumann, J Janzen & HJ Schwartz, eds., Pastoral production in Central Somalia, GTZ, Eschborn, Germany, 356p.

A main incentive for families to live together is the need to pool and share labor resources. There is little tradition of hiring labor or recruiting manpower outside the extended family. The pastoral economy has become more market-oriented, families becoming increasingly dependent on exchange of stock and products for nonpastoral foodstuffs and consumer goods, and this has consequences for division of labor and allocation of labor resources. Labor that was traditionally 'free' is becoming a commodity.

Research based on interviews & questionnaires in Beledweyne, Buulobarde & Ceel Dheere.

Enclosure practices in CR resemble land-grabbing to benefit wealthy herd owners, the result being many people losing their basis of production and thus being driven out of the pastoral sector. Most migrate to the towns or Gulf states.

Pastoral strategy includes high survival rate for female stock, male:female ratios 1:5 for camels and 1:10 for shoats. With commercialization comes rearing of shoats at expense of camel, while in more traditionally oriented areas the social and economic benefits of a large camel herd are still appreciated. Cattle and donkeys mainly among agropastoralists. The more diversifed the herd the heavier the demand on household labor resources.

The camel is seen as the most valuable animal and a large herd is a sign of strength, power and prestige. As property it is strongly associated with patrilineal kinship, a major principle in Somali society and culture. The camel in Somali society is the image of continuity and reproduction, and a source of security in drought and misfortune. Camels have great potential for survival in sustained droughts, a recurrent phenomenon. Shoats, by contrast, are far more disposable, and the market system, viz export, has given them a value they did not have traditionally.

The nomadic residential unit, the *reer*, normally comprises a group of closely related males and their families. It varies from 2-6 nuclear families or households, 5-6 members each, of which >½ are <15 yrs old. Seasonal split-up of the production unit (family) into a camel camp, moving over long distances, and a shoat hamlet, more sedentary and remaining close to the home area except in severe conditions. Social division of labor yields 'female' and 'male' tasks, intersected by age. Generally women care for shoats, men for camels except transport camels which are traditionally a woman's responsibility. Cattle cared by either sex though more often men. Donkeys by women. Women traditionally had discretionary power over shoats but this has become curtailed by recent commercialization of shoats. Traditionally men's involvement with shoats was minimal and they had little specific herd knowledge. With commercialization of shoats, men help more but this doesn't mean women work any less.

Women also perform all domestic chores: tend children, collect water and firewood for domestic use, process ghee, clean & smoke milk containers, cook, deal with portable houses, make bldg materials, ropes and milk vessels, and (sometimes) handicraft items. Ropes from bark of *maydhax* tree.

Men deal with the hard life of camel herding, grazing and water conflicts, and also busy touring and asking about conditions. Men also do fencing, well-digging and carving household utensils. Much of their work, especially in dry season, is watering the stock. Donkeys are labor-savers for women selling milk but they have to be watered at least every other day, which is extra labor for women.

Unruh, JD 1993 ***An Acacia-based design for sustainable livestock carrying capacity on irrigated farmlands in semi-arid Africa***. Ecol. Engin. 2: 131-148.

This is more a think exercise rather than a true blueprint for development. It puts some ideas down, for a specific place, which happens to be the lower Shabelle floodplain not far from Marka, Somalia. Even the title is unfortunate, as it's yet another paean to Faidherbia. Still, he pulls some numbers together and gives an estimated carrying capacity, which varies depending on the expected kind of year it will be.

As agr expanded along the Shabelle floodplain, the dry-season pastures were greatly reduced (refs given).

Unruh, JD 1993 ***Refugee resettlement on the Horn of Africa: the integration of host and refugee land-use patterns***. Land Use Policy 10: 49-66.

Abstract The enormity of the African refugee problem underscores the importance of resettlement issues in land use planning. Efforts to resettle subsistence-oriented agricultural populations have often come into conflict with host, or in-place land uses as competition for scarce resources lead to land degradation, violence, and the failure of resettlement schemes. The success of refugee resettlement will depend to a large extent on the degree to which host and refugee land-use patterns can become integrated or reconciled. The majority of African refugee populations reside on the Horn and in the Sahel, where arid and semi-arid ecologies predominate and pastoralism is a major form of land-use. This study considers a resettlement design which integrates refugee agricultural land-use patterns with those of the host pastoralist land-use in the context of the frequent droughts which visit the area. Given the magnitude of dislocation problems on the continent, successful resettlement will play an important role in African agriculture and development.

“The Horn of Africa is the most severely effected of Africa's drought and famine stricken regions. Due to their fragile arid and semi-arid ecologies and multiple theaters of conflict, Ethiopia, Somalia, and the Sudan have in recent decades been chronically afflicted by drought, famine, and social unrest with millions becoming displaced, and hundreds of thousands starving or migrating to refugee camps. At present these three countries contain more than half of Africa's hungry….

“Migration and resettlement brings migrant groups into contact with in-place societies and land-uses with which they are compelled to interact, each influencing the other reciprocally. Site allocation for resettlement schemes can thus be extremely difficult. While local land-use is often

governed by customary tenure regimes, national governments frequently ignore this and claim all land for the state, to be allocated according to mandate; further complicating successful resettlement. Disregard for customary tenure has caused numerous failures in resettlement efforts. Discord between in-place and resettlement land-uses can cause land degradation as production systems shift to utilize more marginal resources, and the host and refugee populations come to regard each other as potential enemies competing for scarce resources. The resulting total social organization is then insufficiently cohesive to mitigate the effects of deforestation, overgrazing and overcultivation…

"Areas occupied by transhumant pastoralists in the dry season can be attractive sites for resettlement schemes due to: the long absence of the land-users, the comparative fertility of these areas, and the marginal political nature of pastoralist groups. However occupation of these lands with settlement projects have led to serious problems in the past. Settlements in such well watered sites usually exclude transhumant herds which have traditionally used the area for dry season forage and water supplies. Unavailable or unaccessible forage in one part of the yearly travels of livestock herders can have disastrous effects on other larger areas, because pastoralists are then forced to use range resources that are already marginal during the dry season. Rangeland degradation occurs as the carrying capacity of these areas is surpassed due to overgrazing caused by higher dry season livestock densities. Such degradation places nomadic pastoralists, their herds, and the range, in a position of increased vulnerability to drought. This may become especially problematic considering that rangeland livestock production will be essential to many nations' ability to feed growing populations off of a land resource where transhumant pastoralism may not only be the only sustainable use; but may be one of the few assets possessed and easily exploited by largely agrarian economies…

"In Somalia the refugee problem is considerable. A series of droughts and wars in the 1970s and 1980s and the resulting livestock mortalities expanded refugee numbers at that time to between one-quarter and one-third of the entire population. Recent political unrest in 1988 and 1989 has resulted in the displacement of hundreds of thousands of Somalis, and hundreds of thousands of Ethiopian refugees resident in Somalia for as long as ten years have also been severely affected. In the north of the country the unplanned return of thousands of Somali refugees from Ethiopia has further strained an area which has very little food or water. Presently social unrest in Somalia and the still-turbulent--although much improved--situation in Ethiopia and the subsequent disruption of food distribution and relief efforts could put the entire population of Somalia at risk. In recent decades considerable rangeland degradation has taken place under year-long grazing and improper land-use. Along the Shabelle river, and especially near refugee camps, natural resources are severely stressed by overgrazing and deforestation.

Unruh, Jon D 1993 ***Restocking refugee pastoralists in the Horn of Africa***. Disasters 17: 305-320.

Abstract. Repeated and lingering famine on the Horn of Africa has produced enormous pastoralist refugee populations in a region where livestock production is a major form of land use. Permanently settling destitute pastoralists into pursuits other than herding has a record of failure, can disrupt host land-uses causing social and ecological problems, and can deny utilization of very large grazing areas where pastoralism may be the only ecologically and

economically sustainable land-use. Herd reconstitution needs to be considered an option in relief and rehabilitation programs for pastoralists. This paper examines a design where the most proven and immediate way of sustaining stockless pastoralists--farming--can be used to facilitate restocking objectives.

With data gathered in Somalia, estimates of livestock carrying capacity are linked with: characteristics of forage resources, land area, livestock units, and frequency of good, average, and poor (drought) water years, in order to explore the possibilities for incorporating restocking into refugee rehabilitation efforts.

Zessin, Karl-Hans & Dahir Abby Farah 1993 ***The Central Rangelands Development Project (CRDP) – an approach for the improvement of rangeland conditions and income generation in a pastoral area***, p.77-96 *in* MPO Baumann, J Janzen & HJ Schwartz, eds., Pastoral production in Central Somalia, GTZ, Eschborn, Germany, 356p.

See my last para on ideological conflict. Maybe use this as a case study on the clash between pastoral and national needs and ambitions. Thus it would not be direct criticism of Gov.

A really fine paper, fluidly and intelligently written and careful not to polarize itself. Odd that it didn't even mention the Watson survey which supposedly is a first baseline; there must be a story behind this.

Nat'l Range Agency (NRA) was established 1976 and in 1979 given responsibility for conservation or game, wildlife and forests. It was under Min. of Livestock, Forestry & Range, and had jurisdiction over range devel. It was the implementing agency for NRDP and CRDP. The central concept of these "was based on the perception that the rangelands were deteriorating because of overstocking and poor management. This decline had to be arrested by immediate and extensive measures to increase the offtake of live animals and by range management measures to provide some balance between livestock requirements and forage supply. The idea was to change the opportunistic grazing practices of independent and traditional herders into 'better management' through a planned, disciplined and fairly rigid system of controlled grazing. The introduction of a basically public pasture tenure system was thus seen as the central measure for providing such grazing control."

The NRDP focused on veg mgmt and resource conservation. "Based on a western-type, technocratic range model its measures centered on range protection, sufficient water supply and veterinary services. Grazing cooperatives and livestock associations were formed as local institutions to implement controlled grazing. Grazing cooperatives were favored by the military and initially socialistic government as the preferred method for adjusting pastoral land tenure towards anticipated modern conditions and grazing restrictions. Pastoralists were to join cooperatives to which grazing land was then allocated by the administration. Grazing associations, in contrast, had stronger indigenous roots in Somalian land tenure. Grazing associations, later renamed Range and Livestock Associations (RLAs) represent the interests of those families who traditionally use a given grazing area (Somali: *degaan*) and within it, the same permanent water points and dry season grazing areas. RLAs were organized by the project by forming committees composed of elders, other respected pastoralists of the *degaan*, local

government and party authorities as well as religious leaders. The pastoralists of the *degaan* elected the committee members who met at intervals to decide on the management of their grazing territory and its rules. This RLA system fitted better into the system of village and district councils and it allowed transhumant herding groups from outside the association region the right to limited grazing in the territory – a practice that the cooperatives did not permit. District Range Assistants, employees of the NRA, supervised the grazing operations and activities of the associations and also provided a certain amount of extension assistance."

CRDP project background p80-81. Original objectives… Achievements p85-6.

Hawd: a shrub-covered upland plain (is that E Hiraan?).

The range program inventoried natural resources, human & animal populations, habitations, WPs. Findings helped determine grazing reserves, form RLAs and develop stockwater supplies. Grazing reserves would be established: famine, range and village reserves. A range monitoring unit would record range condition as a basis for range mgmt. A non-formal training component would survey pastoral communities and inform pastoralists on program objectives; it would be responsible for formation of grazing associations. Then guarded grazing reserves would be established, each with a plan outlining the technical details of the reserve's use.

This was a very ambitious plan, as the ultimate goal was 45 village reserves of 400 kmsq each (about 4 per district) and a further 20 range grazing reserves of 900 kmsq, also a famine reserve of 600 kmsq in each district. A formal training program was established to overcome acute shortage of staff trained in range mgmt; this would include a Livestock & Range School and at Somali Nat Univ a Range Dept, also graduate scholarships overseas and on-the-job training for counterpart officers. A rangeland studies & trials component would research grazing systems and range improvement experiments. A vet services component to research animal diseases, monitor vaccination campaigns and train counterparts. Also infrastructural and further capacity building.

From the start doubts existed in the prof and donor communities on such a massive and rigid approach which in effect attempted to replace trad nomadic ways by imposing grazing controls. Several donors felt that the technical interventions weren't backed up and justified by available data. USAID modified the components it supported, emphasizing survey and pilot approach rather than full-scale implementation. This was strongly opposed by NRA and never officially adopted by USAID as an alternative design, but was adopted by other donors and was instrumental in modifying design and policy of their implementation.

As originally formulated CRDP was a complex multi-component, multi-donor project covering a large range area, but implementation was problematic from the start. Capacity and mgmt structures were weak, work was uncoordinated, communication between components was lacking, and there was increasing doubt that project objectives were justified considering the limited database on the natural and socioeconomic environment. In addition security concerns along the Ethiopian border shifted activities to Buulobarde, Ceel Dheere and Hobyo; based on a mid-term rev in 1984 these became the prio districts, scaled down from the original 13; a further 3, Jalalaqsi, Xarardheere and Ceelbuur were initiated in 1987. Performance improved but even by end of Phase I there was no proof that reserves would improve rangeland, nor that range

mgmt would lead to enhanced livestock production. It was felt that considerably more knowledge was needed about production systems before this could be asserted and acted upon. Funding for CRDP Phase II for a further 6 yrs was approved in 1989 by WB and ADB but implementation never materialized due to the civil war.

Even aside from its ambitiously overplanned as well as severely capacity-constrained conditions, CRDP labored under the widespread belief (ideology) among planners, donors and critics that livestock projects are doomed to failure in arid Africa. This legacy of negativity, associated with decades of famine, desertification, perceptions of lack of social control of pastoral societies, and sectoral neglect by national regimes, could hardly be conducive to the viability of CRDP.

From the start there was concern by planners, researchers and implementers regarding the institutional structure of CRDP, its mgmt capabilities, technical and socioeconomic baseline, and anticipated performance. The cumbersome superstructure (pk) was vulnerable esp to capacity-related quandaries, it had chronic unsolved logistical problems esp of fuel & equipment, lack of incentives leading to low Somali staff morale, and unsatisfactory coordination between components & donors. Despite considerable training efforts, both formal and in-house, the number of qualified & committed technicians was still small at the end of Phase I, a situation exacerbated by hyperinflation. It seems almost a miracle (pk), therefore, that significant progress was made in some areas, e.g. a structure in place able to collect & analyze data on range & livestock, and the ability to identify problem areas and intervene successfully in animal health, stock/crop linkages, WP devel and sand dune stabilization. Economic benefits were understandably limited but CRDP can be seen as a success in laying a solid research foundation and accumulation of baseline and techniques knowledge. By the end of Phase I a protocol of devel assistance had evolved which would likely have become extremely motivational in a second phase (pk). This was to use dialogue with RLAs to harmonize local community priorities with technical solutions in specific practical measures such as yicib mgmt, live fencing, intro of suitable crop varieties into the agropastoral system, disease incidence info. Throughout Phase I data was being compiled, progressively improving the technical base for recommendations leading to improved range & animal productivity. The project represented a learning process, noted as such I a 1987 USAID evaluation which stated that CRDP "was making a valuable contribution to the educational, scientific and technological basis for future implementation of improved rangeland management practices in Central Somalia."

Ends with 4 pp (90-93) on 'traditional' vs 'modern' range mgmt, & some space devoted to knocking CC. There's an initial ideological conflict in CRDP, between objectives of pastoralists (± subsistence) and those of Gov trying to increase GNP and export earnings through its no.1 sector, livestock production. Gov may cry 'Crisis' and bring in projects to 'fix' the overgrazing and CC though actually desiring to increase stock production. The authors believe pastoralists should be given a free hand in advancing their own interests, in controlling change and benefiting from it. (But that's not correct, you will end up with outcomes such as dispossessed poorer pastoralists after intensive enclosure-making, and on common range a continuing erosion of the resource base e.g. continuing loss of yicib.) Change is inevitable, forget the romantic notion of nomadism as a superior way of life which must be shielded from corrupting modernism. "No 'traditional' sector exists in Somalia. All aspects of nomadic life are affected by 'modern' conditions and thus are 'modern'. Various internal and external factors have led to a

loss in grazing areas, local high stocking densities, an increase in the number of settlements and increasing integration into the national and international markets. Investments in agriculture, schooling, urban migration and emigration are indicators of changes in the production orientation of pastoralists. At least a partial transition from a purely subsistence to a commercial system has taken place" especially as a response to the opportunity to export livestock to the Arabian Peninsula. Merchants and entrepreneurs recognize investment possibilities in the nomadic sector, e.g. in water delivery. Subsistence pastoralism is not only a particular mode of production but a way of life, it is a total social system, and changes in production orientation towards sale of live animals and payment for inputs such as water "have caused the entire system to react." Pastoralists are becoming more integrated into a consumer goods market, their diet is veering away from subsistence food, herd composition and size is being geared toward the money economy, and larger stockowners and investors are becoming increasingly more powerful and tending toward a privatization of land.