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A Bulletin of Range Management, Forestry,
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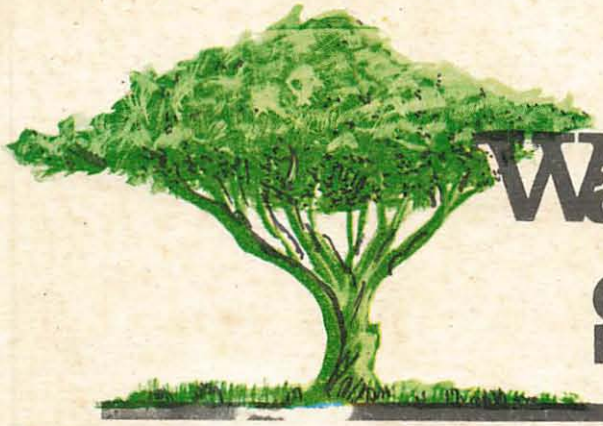

Warsidaha Daaqa Soomaaliyeed

Warsidaha Maareeynta Daaqa, Dhirta,
Ugaarta & Maadooyinka la Xiriira.

NATIONAL RANGE AGENCY
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MOGADISHU-SOMALIA

S O M A L I R A N G E B U L L E T I N

No. 13, SEPTEMBER, 1 9 8 2

C O N T E N T S

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Technical and Semi-technical articles on Range Management, Forestry, Wildlife and related subjects are accepted for publications.

The articles should be neatly typed in double space and may not exceed ten pages. At the moment facilities for the reproduction of half-tone pictures and figures are not available but simple graphs and tables are accepted.

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BEERAHA AAN JOOGTADA AHAYN (Shifting Cultivation) IYO CARRA : GUURKA DABAYSHU KEENTO*

MA BEERAHA GUURA AYAA SABAB U AH CARRA GUURKA DABAYSHU KEENTO IYO HOOS U DHACA WAX SOO SAARKA DHULKA EE 3da GOBOL EE DHEXE, MUDUG, GALGADUUD IYO HIIRAAN ?

Waxaa jirta in meelo yaryar beerid xumo iyo hababka banaynta dhulka oo aan hagaagsanayn ay dhibaato u geystaan dhulka.

Daraasada ayaa muujiyey in meelaha qaar beeraha aan joogtada ahayni aanay sabab weyn u ahayn carro-guurka dabaysha. Haddii la isticmaalo habab wanaagsan waxaa suura gal ah in dhul ballaaran la beerto iyada oo aan dalka wax dhibaato ah loo geysanayn. Waa in si weyn looga taxadaraa dhulka qalalan ee Soomaaliyeed si aan loogu geysan dhibaato joogta ah.

SIDEEBAA LOO FALAN KARAA BEERAHA AAN JOOGTADA AHAYN IYAGA OO AAN KEENEYN CARRA GUUR ISLA MARKAANA KORDHINAYA WAX SOO SAARKA DHULKA ?

1. Waa inaan marna la beeran meelaha u nugul carro-guurka. Meelah haasi waa meelaha ciida bacaadka ah leh dhirta iyo geed hoosaadka dabaysha ka celinlahaana ku yaryihiin. Bacaadka dhushiisa, kuraha iyo buuraha dabaylaha lehna waa inaan la beeran.

2. Beeralaydu waa inay hubiyaan in dusha sare ee carrada beerahoodu ay ka daryeelantahay dabaysha iyaga oo dhulka ku dhaafay dhir iyo waxyaabaha ka hadha dhirta.

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* Waxaa laga sii daabacay (Extension leaflet No. 1, April 1982) ee ay soo saartay Qaybta Waxbarashada Dadban/Fidinta Daaqa, Mashruuca Horumarinta Daaqa Gobollada Dhexe ee W.D.Q.

2.1 Marka ay beeralaydu goostaan waxyaabihii ay beerteen, ama xoolaha daajiyaan beerahaas waa inay hubiyaan in lagu reebo dhir iyo waxyaahaha dhirta ka hadha ee aan la wada goyn ama la wada daaqin, taasi waxay kaalma weyn ka geysaneysaa hagaajinta qaab-dhiska iyo tayada carrada.

Beera qodatada Gobollada Dhexe ee Soomaaliyeed waxay beerahooda xoolaha kaga celiyaan deyr ood ah. Deyrkaas ooda ah waa in loo daayaa beerta sannadkoo dhan si aan beerta loo daaqin una xaalufin.

2.2 Marka caws ama baad loo jarayo xoolaha waa inaan la soo dhufan geedka xididna la soo saarin ama aan laga jarin meel dhulka ka dhaw.

3. <u>Qaabka iyo habka meelaha la beerto waa in loo qorsheeyaa sidii loo yarayn lahaa carra-guurka.</u>

Ooda ku wareegsan beeraha waa in loo isticmaala dugaal ahaan ama qaab hakiya xawliga dabaysha. Hakinta xoogga dabayshu waxay dhimaysa ama yaraynaysa carra-guurka dabayshu keento. Guud ahaan waxaa fiican in ooda beertu dheeraato xajmi weyna lahaato.

Deyrka beerta waxaa laga samayn karaa iyadoo lagu beero xoday iyo dhirta la midka ah si ay u yaraato dhir jaridu.

3.1 Dabiiciyan, dhulka daaqa, dhirta iyo geed hoos ayaa dabeysha hakiya ama celiya. Dhirta waaweyn ee beeraha ku dhextaal waa inaan la jarin. Haddii loo baahdo xaabo ama ood waxaa haboon in laamaha la jaro oo geedka intiisa kale la dhaafo si uu ub baxo.

3.2 Dhulka la beeranayo waa inaan ballaciisu ka ballaaran 50 tilaabo (50 mitir) dhinaca waqooyi/koonfur. Haddii ay intaas ka balaaranaadaan oodu si fiican dabaysha u celin-meyso, laakin waxaa la kordhin kara dhererka dhinaca Bari/ Galbeed.

4. Carradu waxay isugu dhegentahay hab dabiici ah oo ay iskaga celiso carra-guurka.

4.1 Xoolaha iyo ugaadha waa in laga celiya meelaha la beerto intii suuragal ah, si aan qanjaafilahooda iyo lugahoodu u burburin lakabka sare ee carrada uguna nugleyn carro-guurka.

4.2 Sida kale waa in aad looga taxadaraa in waxyeelo loo geysan lakabka sare ee carrada marka geedaha la beerayo ama beerta la goosanayo.

==========oo0oo==========

S U M M A R Y

In Some very small areas of Central Regions bad cultivation and clearing practices have had an undesirable effect on the land. Observations suggest, however, that in most cases shifting cultivation has not caused significant wind erosion. In fact in some case it has improved the country. With good management and great care it is possible to cultivate many areas without harming the country. Methods & precautions are explained.

==========oo0oo==========

SIGNS OF DESERTIFICATION IN THE CENTRAL RANGELAND AREAS

By: M.A. Ayan
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Desertification is the spread of desert-like conditions in areas where they did not exist in the past. Spread of sand dunes into crop and rangelands is a typical example of desertification in the Central Rangelands of Somalia. Among the many factors responsible for dune formation are Drought, Overgrazing and improper Agricultural practices. These factors lead to serious Socio-economic problems such as reduction in grazing lands, abandonment of farming, blocking of major transport routes, and the consequent pressure on the remaining unaffected areas.

The problem of mobile sand-dunes cought my attention during a recent trip to the Central Rangeland areas from 31st May to 11th June. Based on my observations an attempt has been made in the following paragraphs :

A. To identify and discuss the major factors leading to the formation of mobile sand-dunes in parts of the Central Rangeland area.

B. To bring to the attention of the authorities the magnitude of the problem.

C. To propose some possible solutions for the problem.

The problem area

The area under consideration starts in the Mudug region in the village of Gawan, just 30 kilometers from the historic town of Hobyo. It runs parallel with the coast, and runs across Hara-dhere, through El-Dheer, up to Adale in the Middle Shabelle region. In the Hiran region, people on their way to Belet-wein can see the Jallalaqsi sand-dunes advancing towards the Shabelle river. In the Bulo-burte district, through which the river passes, many villages are engulfed by the dune and sand is directly blown into the river.

Nature of the problem

Stable sand-dunes are the major land form in the coastal strip, giving way to mobile fronts in the area of contact with the Savana. This zone of contact is the area where the process of desertification is taking place. It is an area where a mixed economy of livestock production and crop cultivation is practised. Three types of landuse are known to exist in the area:

1. Permanent cultivation of crops with supplementary animal husbandary.

2. Opportunistic crop production in which crops are grown in certain seasons, but with livestock production as the major occupation.

3. True Nomadism with livestock production as the only economic activity.

In the first case, one or two, mainly fast growing crops, such as sesame or beans are grown by the household. This is supplemented with few cows to provide the family's milk needs. During the time when crops are growing, livestock are allowed to graze outside the family enclosure, but after the crop is harvested, animals feed on the stuble of the oil rich crops. Traditional ownership of land is recognized in this case.

In the second case, crop production is not permanently practised, but is supplementary to animal husbandary. Whenever rainfall is adequate for crop production, and the family can spare labour, some members of the family plough the land and raise one of the major crops. If the next season is not as good as the previous one, the family will resume the usual mode of livestock production.

In the third case of nomadic livestock production, people depend wholly on livestock for a living either through direct consumption or trade. The characteristics of nomadism such as mobility, livestock variety and accumulation of livestock are therefore to be expected.

Effect of the land use

All the three types of land use contribute to the expansion of the sand-dunes into the arable land. In other words the creeping deserts are man made. The problem starts with the plough or with the hoe as used in the area. Land is first cleared of the vegetation cover, and the soil surface is exposed.

After three months, the end of major rainy season (Gu) beans or sesame is sown. The crop is harvested and the remaining stuble is consumed by livestock.

At the end of the major rainy season (Gu) the process of wind erosion may start, but there may not be a danger of severe wind erosion if rainfall is adequate in the next major rainy season (Dayr). However, in Somalia where the rainfall is uncertain and it is common to have one or more years of drought, this might not be the case. When there is drought, plant growth is reduced and the land becomes susceptible to both wind and water erosion in the absence of vegetation, nothing is left to reduce the wind velocity. Fine particles of sand are carried away by the wind and deposited on the previously cultivated field.

There is an interesting fact related to the deposition of particles on farmland. Local farmers believe that fine particles are good for the growth of their crops and say that it enhances the maturity of crops. They call these particles Siifad. If a field is covered by a thin layer of deposited particles, it gives the farmer confidence in the harvest. The result of this is devastating. All land clearing takes place in front of the advancing dune and new farms tend to be concentrated in areas close to a Siifad i.e. close to a dune.

Fine particles are not the only material carried by the wind, deposition of coarse material follows and the farm turns into a giant sand-dune. When this happens, farmers have no choice but to abandon the land and start the process on another piece of land on a similar location (i.e. close to a dune).

Farms also tend to be located along road sides. This is probably done so that one can have access to towns. The benefit of being close to roads is offset by the danger of blocking the road itself. The major road linking Haradhere with Mogadishu, and that between Haradhere and Galcaio both face the danger of being blocked by the dune. The history of the area is filled with routes being changed because of the advancing dune. Every year, new road get established since the old ones get burried.

The time span needed for the formation of the dune is not exactly known. It depends on how adequate are the conditions. If land clearing, heavy winds and season of low rainfall coincide, it may take only one season to cover the nearby land. Otherwise it might take years to have the land covered. If the conditions are favoured the whole dune might get stabilized, and movement might cease. However, the time of formation of the dune might have limited practical application. The important factors to consider are those which contribute to the formation and spread of the dune. Once these are identified solutions might be found. So far, land clearing and drought are known to be immediate causes. Overgrazing has not been considered. The mechanism through which overgrazing contributes to dune formation and its spread is not clear. More important, we do not [illegible] exactly know if overgrazing is actually taking place in the above area. What we know is the relationship between already degraded land and the pressure of grazing. If a naturally vulnerable land is intensively used for farming, there is no doubt that grazing after wards will speed up the process of desertification.

Approaches to dune stabilisation in the central regions.

To combat desertification, so far, is the responsibility of National Range Agency. The activity of N.R.A. is concentrated on certain spots (areas close to towns and new roads) in an uncoordinated way, in the district of Haradhere. Two hundred and fifty labourers have been employed with the help of World Food Programme to tackle the dune problem. The district range officer and his staff place all their energy in the dune stabilization work. The methodology is simple, and effective as elsewhere in the country (Shalambot). Local cuttings of Commiphora species, known to sprout easily in a variety of soils, are planted. The bushes were first obtained from a nearby area, but as the operation grew larger, the most close areas got exhausted in a short time. Today, the Commiphora bushs are four kilometers from the centre of dune stabilization, and the problem of transportation of cuttings are increasing.

It is said that a N.R.A. truck was used formerly for the transportation of cuttings, but due to the engine failure the truck is not serviceable, presently the cuttings are carried by men to the dune stabilization site. The operation is difficult and time consuming. An average man, for example, brings about two trees in a day i.e. two hundred men will bring 400 trees a day. It seems that most of the labour energy will be consumed in bringing Commiphora bush, and no man power will be left for transplanting. The use of other methods needs investigation. One alternative is to use a tractor with a trailor. Another suggested approach is the use of camels to bring the Commiphora bush. In each case,

men are needed to cut the trees, load them on camelbacks or trucks and finally plant the cuttings. Lastly the bush makes handwork more difficult. Injures are common and most of the time it is hard to get complete attendence of workers because of job related illness. Under the circumstances it appears that two hundred and fifty men, right now in operation, are far from being enough.

The number of cuttings planted a day, as well as the area so far reclaimed is not known. The dune affected districts lack the technical expertise to assess the value of the ongoing operation. Information on the effectiveness of the different tree species on dune stabilization, the spacing of the wind breaks, as well as the timing of the operation are all important. The principle that in order to stabilize the dune, the velocity of the wind must be diffused, is in fact there, but use of the techniques of accomplishing it successfully are not applied.

Summary of Major Points

1. The advance of sand-dunes into range and arable land in the central rangelands, is nothing but part of a global problem known as desertification.

2. The dune problem is endangering rangelands, farm land, towns, major roads and rivers.

3. Improper farm operations in a naturally susceptible environment is the major cause of dune spread.

4. The National Range Agency is the only entity involved in the dune stabilization process.

5. So far the problem was approached in a localized manner in different districts.

6. Both the financial and technical requirements are high, and are beyond the current budgets available for the affected regions.

7. The dune problem has solutions, because the experience of other parts of the country are positive.

R E C O M M E N D A T I O N S

1. Advance of the dune needs recognition as desertification.
2. Formation of an anti-desertification committee should be the first step. The committee might possibly include: the General Manager of N.R.A., directors of Forestry & Range and any other expatriate as seen necessary.
3. Special Funds and staff should be allocated to handle the problem.
4. Since desertification is gaining international recognition, world support, both financially and technically might be sought.
5. Experience gained in sand-dune stabilization in Shalambot area will be the most valuable one.

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SOME FIREWOOD SPECIES OF SOMALIA

By: Dr. S.M.A. Kazmi
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Five million people in Somalia, except a neglegable number, who use electricity, gas or kerosine oil in the large towns of Mogadishu, Hargeisa and Kismayo, all meet their energy needs through firewood or charcoal.

Firewood scarcity is probably most acute today in all the underdeveloping countries of the world specially in Somalia. Unlike oil, wood is not shipped thousand of miles but in some areas it is used in making charcoal, which is often transported hundreds of miles. The local population who have no alternative source of energy, therefore, must live with the fuel available around them and this source is the trees or shrubs.

The total land area of Somalia is 63.8 million hectars, of which 2.5 million hectars is reasonably stocked Acacia Savanna and 6.2 million hectares sparse digraded Acacia scrub. Acacia bussei is the main fuelwood and charcoal species which produces approximately 1.3 to 2.6 million m^3 of the fuelwood per year whilst the consumption of wood for fuel and charcoal production in 1980 was quoted as being 5.6 million m^3. This shows the rate of overcutting that has been a regular feature in Somalia for several decades. It is presumed that fuelwood consumption will continue to rise to an estimated 7.6 m^3 and beyond by 1990. Apart from overcutting for fuel, the areas are overgrazed by 5.3 million camels, 4 million cattles and 9.4 million sheep and 15.3m goats

and wildlife, because the number of domestic animals is too high for the carrying capacity of available grazingland.

The Government of Somalia is acutely aware of the problems of overgrazing and overcutting and has included in its Three years National development Plan a tree plantation programme for the purpose of providing firewood to meat the needs of the population.

Some of the important firewood species are given below which can be grown easily in Somalia and have also some additional uses. It is intended to continue this list in future for the benefit of our foresters and those who are interested in contributing to this national effort.

Acacia nilotica (L.) Willd. ex Del.

Characteristics: The wood is hard, tough, resistant to termites, impervious to water, the calorific value of sapwood is 4,800 Kcal. per Kg. while that of heartwood is 4,9.50 Kcal per Kg. The wood is heavy with sp. gravity of 6.67 - 0.68. Bark and pods contain tanin from 12-20 percent. Leaves and pods contain 15 percent crude protein.

Uses: Wood is used for firewood and charcoal, making handles of agriculture tools, carts and oars, is good for carving and turnery. Leaves and pods are good fodder for goat and sheep. The bark and pods are used as tanning material in leather industry. The gum is used in the manufacture of matches, inks, paints and confectionary.

Acacia senegal (L.) Willd.

Characteristics: The calorific value of wood is 3,200 Kcal. per Kg. Foliage and pods are rich in protein.

Uses: Wood is used for firewood and charcoal, poles and making agricultural implements. The root fibers are utilized for rope and fish nets and for lining wells. Gum is used in foods and beverages in pharmaceutical preparations and confectionery. Leaves and pods are an important feed for camels, sheep and goats Seeds are dried and preserved for human consumption as vegetable.

Acacia tortilis (Forsk.) Hayne

Characteristics: The calorific value of heartwood is 4,400 Kcal. per Kg. Pods have 19 percent protein.

Uses: Wood makes superior firewood and charcoal, and is used for fence post and for manufacturing small implements and articles. Pods are eaten by wildlife, goats, sheep and other domestic livestock. The foliage is also palatable. The thorny branches are used to pen cattle, goat and sheep.

Azadirachta indica A. Juss.

Characteristics: The calorific value of wood is high. It is relatively heavy with sp. gr. 0.56 - 6.85., wood resembles Cuban mahogany. It resists decay and insects and is tougher than teak.

Seeds contain up to 40% oil. Bark contains 12-14 percent tannin. Seeds and leaves yield azadirachtin a component that repels insects, desert locust and nematodes.

Uses: The wood is used for firewood and charcoal. It is excellent for construction and furniture making. It produces poles which are straight and strong and are seldom attacked by termites. The oil from the seeds is used as fuel for lamps and lubricant for machinery, a useful ingredient in soap and disinfactents and in pharmaceuticals and cosmetics. The fruit pulp is a promising substrate for generating methane gas. Leaves and twigs are used as mulch and fertilizer. The seed and leaves yield azadirachtin which can be used in the manufacture of pesticides.

Casuarina equisetifolia L.

Characteristics: The wood has a sp. gr. of 0.8-1.2 and calorific value about 4,950 Kcal. per Kg. Bark contains 6-18 percent tannin.

Uses: The wood has been called the best firewood in the world and is used for both domestic and industrial fuel. It makes exceptionally fine charcoal. The timber is used for house posts, rafters, electric poles, mine props, roofing shingles, tool handles, oars, yokes and wagan wheels. The bark is used for tanning and produces a fairly plump, plicant, and soft leather of pale reddish-brown color. The trees are used in erosion control and as wind breaks.

Gmelina arborea Roxb.

Characteristics: The wood is relatively light with a sp. gr. of 0.42 - 6.4. The calorific value of sapwood is about 4,800 Kcal. per Kg.

Uses: It is used as firewood and for making charcoal. The straw-coloured gmelina wood is used for particle board, plywood core stock, pit props, matches and sawtimber for light construction, general carpentry, paking and furniture. The wood pulp gives average yield of paper with properties superior to those obtainable from most heartwood pulps. The flowers produce abundant nactar from which high quality honey is produced.

Eucalyptus camaldulensis Dehnh.

Characteristics: The wood is moderately dense with a sp. gr. of 0.6 and fuel value of 4,800 Kcal. per Kg.

Uses: When fully dried, the wood is an outstanding fuel. The reddish heartwood is moderately strong.

Tamarix aphylla (L.) Karst.

Characteristics: The light coloured wood is hard and durable. The ash percentage is high. It is slow to catch fire.

Uses: It is used in some countries as firewood and charcoal. It is useful for carpentry turning plough and furniture. It is valuable for stabilizing sand-dunes.

Zisyphus mauritiana Lam.

Characteristics: The wood is hard strong, fine grained and of reddish colour with sp. gr. of 0.93 and a heat content of 4 900 Kcal. per Kg. Bark contain tennins.

Uses: The wood is hard and heavy and is an excellent fuel and makes good charcoal. It is often used for making agricultural implements sandals, tent peg golf clubs. Fruits are eaten either fresh dried or pickled and can be made into a floury meal a butter or cheese-like paste. The juice can be made into a refreshing drink. Leaves can be used to feed silk worms, and makes good fodder for cattle camels and goats.

Zizyphus spina-christi (L.) Desf.

Characteristics: The wood is red or dark brown in colour and hard.

Uses: The wood burns with an intense heat. It is also used for making spear shafts, posts, roofing beams, and house hold utensiles, and is good as cabinet wood. It is said to be termite proof.

Conocarpus latifolia

Characteristics: The wood is hard with sp. gr. of 0.9 and calorific value of about 4,900 Kcal. per Kg.

Uses: It makes excellent charcoal. It is hard and polishes well and is used for poles, rafters, farm implements and specially for the shafts and axils of carts.

NOTES ON BIRD LIFE IN SOMALIA

By: Michael H. Madany
Instructor, Range Management Agricultural, Livestock, Forestry & Range School, Afgoi.*

The many species of birds that are found in Somalia play important roles in forest, range and agricultural ecosystems. Most of their activities, though not all, are beneficial to man: the eating of animal pests, spreading seeds, scavenging caracasses, and providing aesthetic enjoyment by their songs and colorful plumage.

While on a recent plant collecting expedition with Dr. Kazmi, I was struck by the diversity and abundance of the birds encountered in the field. Our travels were in the Lower Shebelli Middle Juba and Lower Juba Regions between 26 June and 4 July 198 Our route traversed mainly rangeland with some major areas of cultivation being encountered in addition to one substantial urba area (Kismayo).

In the following list I have given the English, scientific names and vernacular names of the birds I observed on the trip, with remarks on location, habitat, abundance, and behaviour. I noticed that the vernacular names varied among people, reflecting either regional differences, inaccurate identification by the informant or the use of a broad generic term that covers a

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number of species of similar appearance. Spellings should be regarded as provisional because of my lack of fluency with the Somali language.

As a relative newcomer to Somalia, I would appreciate comments and corrections from readers concerning these names. I hope to continue this series, as time and travel permit, in an effort to encourage interest in, and record details of, the rich avifauna of the Somali Democratic Republic.

The guide used for identification and nomenclature was Williams and Arlott (1980).

DARTERS: Anhingidae

African darter. Anhinga rufa, "Bolo-bolo". Along road 15 km soutwest of Bulo Xaj, Lower Juba Region, Badade District. One seen near water impoundment.

HERONS, EGRETS, & BITTERNS: Ardeidae

Cattle egret. Ardeola ibis. Along paved road southwest of Brava, Lower Shebelli Region, Brava District. Many seen in association with cattle herds in shrublands with scattered marshy areas.

Reef heron. Egretta garzetta. Along paved road between Kismayo and Jamame, Lower Juba Region, Kismayo District. Many observed in large marshland.

Black-headed heron. Ardea melanocephala. "Mas". Along paved road near Merin Gulweyn, Lower Shebelli Region, Brava (?) District. Commonly observed in marshy depressions that punctuate the prevailing Acacia tortilis woodland.

STORKS : Ciconiidae

Woolly-necked stork. Ciconia episcopus. Along road betwee Kolbiyo and Badade, Lower Juba Region, Badade District. One observed flying along road that bisected dense tall shrubland. Scattered wetlands in vicinity.

Marabou Stork. Leptoptilis crumeniferus. "Bambu"; "Antily In Kismayo and Badade, Lower Juba Region, Kismayo and Badade Districts. Very common in both urban and village settings. Seen scavenging for food inside the city. Roosts in large numbers in trees and shows much tolerance for human presence.

Yellow-billed stork. Ibis ibis. Along road 15 km southwest of Bulo XAj, Lower Juba Region, Badade District. Four seen in wetland associated with water impoundment.

IBISES & SPOONBILLS: Threskiornithidae

Sacred ibis. Threskionrnis aethiopicus. "Antilya". Abundant and seen in large flocks in wetlands and adjacent woodlands throughout entire route of our trip in the Lower Shebelli, Middl Juba and Lower Juba Regions.

Hadada ibis. Hagedashia hagedash. Along paved road between Kismayo & Jamame, Lower Juba REgion, Kismayo District. Large flocks observed in extensive marshland area, in association with sacred ibis and reef herons.

DUCKS & GEESE: Anatidae

White-faced tree duck. Dendrocygna viduata. "Bolo-bolo". Along paved road near Merin Gulweyn, Lower Shebelli REgion,

Brava (?) District; also seen by paved road between Kismayo and Jamame, Lower Juba Region, Kismayo District. Commonly observed in small flocks in marshes, in the same habitat as herons, ibises and egrets.

Egyption goose. Alopochen aegyptiaca. Near paved road near Merin Gulweyn, Lower Shebelli Region, Brava (?) District. Seen in association with the preceding species but not as abundant.

VULTURES, EAGLES & HAWKS: Accipitridae

White-backed vulture. Gyps bengalensis. "Gorgor". On road about 50 km north of Jamame. Several observed on camel caracass; prevalent vegetation in vicinity was Acacia tortilis woodland.

Tawny eagle. Aquila rapax. "Galayr". On paved road just southwest of Garisa Weyn, Middle Juba Region, Gelib District. One seen on spotted hyena caracass in association with several unidentified vultures. Area dominated by Acacia tortilis woodland.

GAME BIRDS: Phasianidae

Vulturine guinea fowl. Acryllium vulturinum. "Digeran". Seen throughout course of entire trip in Lower Shebelli, Middle Juba and Lower Juba Regions. Often observed in flocks of 3-12; individuals rarely seen alone. Conspicously absent in the vicinity of Bulo Xaj and Yamani, Lower Juba Region, Badade District. Here, an unidentified species of francolin seem to have replaced this bird. The vegetation in this particular region was characterized by Delonix elata. Its physiognomy - mixed woodland and

tall shrubland - did not seem to differ from other areas where this guinea fowl is abundant.

PLOVERS: Charadriidae

Spur-winged plover. Vanellus spinosus. "Wilo". Commonly sighted throughout entire course of journey in Lower Shebelli, Middle Juba and Lower Juba Regions; in a wide range of shrubland and woodland habitats but most frequent in open, grassy situations near wetlands.

Blackhead plover. Vanellus tectus. Along paved road in Lower Shebelli Region, Brava District. Fairly common in both woodland and shrubland situations.

GULLS & TERNS: Laridae

Sooty gull. Larus hemprichii. Beach at Kismayo. Many seen along seashore.

White-winged balck tern. Childonias leucoptera. Beach near Waamo Hotel, Kismayo. Tentative identification; in nonbreeding plumage; 5-10 seen.

OWLS : Strigidae

Verreaux's eagle owl. Bubo lacteus. "Gumays". Near road southwest of Merin Gulveyn, Lower Shebelli Region, Brava (?) District. One seen in baobab tree, in area dominated by Acacia tortilis.

MOUSEBIRDS: Coliidae

Blue-naped mousebird. Colius macrourus. Grounds of Waamo Hotel, Kismayo. Several seen in tall shrubs.

KINGFISHERS: Alcedinidae

Pied kingfisher. Ceryle rudis. Juba River at Jamame, Lower Juba Region, Jamame District. One observed flying along Juba River.

Brown-hooded kingfisher. Halcyon albiventris. South of Merin Gulweyn, Lower Shebelli Region, Brava (?) District. One seen in an area of mixed Acacia woodland and shrubland with nearby wetland areas.

BEE-EATERS: Meropidae

Carmine bee-eater. Merops nubicus. Along paved road between Afgoi and Jamame, Lower Shebelli Region. Commonly seen in both woodland & shrubland. Observed near Brava using a camel as an elevated perch from which it could locate its prey: bees, wasps and hornets.

ROLLERS: Coraciidae

Lilac-breasted roller. Coracias caudata. Near Bulo XAj and elsewhere in the Lower Juba Region, Badade District. Occasionally seen in Terminalia woodland and tall shrubland.

HORNBILLS: Bucerotidae

Trumpeter hornbill. Bycanistes bucinator. One km north o Jamame District. Solitary bird seen at edge of Acacia woodland near fallow fields.

BULBULS: Pycnonotidae

Yellow-vented bulbul. Pycnonotus barbatus. Common on the grounds of the Waamo Hotel, Kismayo.

HELMET SHRIKES: Prionopidae

White-crowned shrike. Eurocephalus ruppelli. About 50 km north of Jamame on roadside. Probably in Middle Juba Region, Gelib District. One seen perched on tree in area of dense Acacia shrubland/woodland.

SHRIKES: Laniidae

Long-tailed fiscal. Lanius cabanisi. Kolbiyo, Lower Juba Region, Badade District. One observed in tree at edge of village

WAXBILLS: Estrildidae

Green-winged pytilia. Pytilia melba. Near Bulo Xaj, Lower Juba Region, Badade District. One seen in Dense shrubbery. Not a positive identification; the individual may have been a Orange winged pytilia (P. afra).

WEAVERS, SPARROWS & WHYDAHS: Ploceidae

Red-billed buffalo weaver. Bubalornis niger. Southwest from Merin Gulweyn near paved road, Lower Shabelli Region, Brava (?) District. Several dozen seen in large baobab tree that was festooned with scores of their large nests (composed mainly of sticks). Surrounding woodland dominated by Acacia.

White-headed buffalo weaver. Dinemellia dinemelli. "Bulyo". Frequently observed in our travels in the Lower Shebelli, Middle Juba and Lower Juba Regions.

STARLINGS: Sturnidae

Superb starling. Spreo superbus. "Ajelanjil". Badade, Lower Juba Region, Badade District. Very common in pastures on margins of village.

Red-billed oxpecker. Buphagus erythorhynchus. Occasionally seen perched on camels or cattle in the Lower Shebelli Region.

CROWS & RAVENS: Corvidae

Pied cro[illegible]. Corvus albus. "Dafo", "Tuke". Kismayo. Several seen flying above market area.

Dwarf raven. Corvus edithae. "Dafey". Several seen thr[illegible]ughout journey in Lower Juba Region. Not a positive identification - may have been Fan - tailed raven (C. rhipidurus).

In addition to the above species, there were some birds observed that were not identified beyond genus. These include goshawk (Melierax sp. "Shimberley" or "Galeer"; francolin (Francolinus sp.); bustard (Eupodotis sp. "Bola"); dove (Streptopelia sp. "Golo"); swift (Apus sp. "Gurii"); swallow (Hirundo sp.); various sunbirds (Nectarinia spp.); and a yellow-plumaged weaver (Ploceus sp.).

REFERENCE

Williams, John G. and Norman Arlott. 1980. A field guide to the birds of East Africa. Collins, London, 415p. (Available in most Nairobi book shops for 198/k.sh.).

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CONSERVATION AND INTRODUCTION OF SPECIES

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I N T R O D U C T I O N

Forests of one sort or the other formerly covered all the regions except where pronounced deserts, arctic or extreme alpine conditions prevail and also with the exception of extensive grass-pampas of South America and steppes of South East Russia and adjoining Asiatic territories.

In Africa, as we see today, there are also potential grass lands with scattered trees which suggest that the tree growth had been more extensive before human activities largely eliminated it.

It emerges that forests evidently had covered by far the greater portion of the world's surface. It is estimated that they must have occupied approximately 2/3 of the total land surface which comes to about 32 billion acreas. However, with the advance of the ancient man to agricultural phase, the man changed his attitude to the forests and started ruthless cutting. Actually very large areas have been cut and denuded from their original growth by human activity so that on an approximate estimate, now, only 1/4 or less than 8 billion acres, still carry forests.

The plants supply latex, pectins, resins, oleoresins, dyes, tannins, gums and other exudates apart their major products like timber, fuels and its use as a chemical raw material. Only the annual consumption of wood for manufacture of pulp, in the year

1954, stood at the astonishing figure of 4 3/4 billion cuft., which roughly could be understood, in one or other country, about 10 million acres of forests being cleared every year for pulp alone. Despite the modern space age, demand on wood is ever increasing. There are many other important uses of plants in the field of medicines, fibres, food supplies, fodder, etc., inviting its indiscriminate cutting. Therefore, the earth's stock of species is being depleted even more rapidly than several of its most previous mineral deposits. (Extract from "the Exhausted Earth" TOPIC).

In Somalia among many species which are at the verge of extinction one can find an example of Cordeauxia edulis, locally known as Yehib, which is at the verge of extinction. Yehib is native to the arid, semi-arid border regions between Somalia and Ethiopia. Despite its potential and economic importance evidently nothing has been done so far to protect this useful species from extinction. It is important that this plant is not only saved in its habitat but also disseminated outside its indigenous area.

The indiscriminate cutting of trees in the past and the continuation of the process presently in Somalia resulted in the acute shortage of fuel, fodder, and timber, which can only be remedied by preservation and extension of the indegenous species and introduction of useful exotic species on large scale.

The nurseries play a role of paramount importance in this campaign to safeguard the world's wealth of species. Not only bulk of growing stock of the indigenous species could be prepared every year for re-afforestation, but it can also serve as a permanent station for exotics put to trail for observation versus indegenous species, according to the ever growing demands and needs of the country.

O B S E R V A T I O N S

In view of the above a number of plants, viz Acacia arabica, Zizyphus jujuba, Punica granatum, Erythrina subrosea, Prosopis specigera, Sesbania grandiflora, Calliandra calothyrusus, and Elongolus angustifolia were tried at the Afgoye Nursery. The seeds were sown in different mediums i.e. pure sand, and mixture of sand & clay. The observations are shown in table 1.

RESULTS AND RECOMMENDATIONS

Sesbania grandiflora germinated in 4 days in mixed soil and in three days in pure sand. It can be appreciated that with minor changes of planting medium and nursery techniques the germination period can well be improved and in the same way a plant, by the changed tending operation etc. can be put to vigorous growth.

Subsequent to the germination of Sesbania grandiflora, it has been planted out, in 30 days period, in Bwello village near Afgoye and in the premises of Afgoye nursery. The plant in the Afgoye nursery has attained about 3 meters ht. in 5 months.

From these trails it can be observed that the S. grandiflora has behaved satisfactory with promising results and further needs to be tried in harsh conditions viz sand dunes etc. The plant has the potential to produce firewood, forage, green manure, food, and raw material for pulp production. The plant can play an important role in finding its place in agroforestry. Against the present trend of destruction, the tree has remarkable power of regeneration through coppice after it is harvested. Although it is not

T A B L E 1

Species	Type of Soil	Sow Date	Treatment to seeds	Germination Dt/ Period	Irrigation	Remarks.
Prosopis specigera	Clay & Sand	13/8/81	24 hrs., hot soaking.	17/8/81/ 4 days	Daily	The seed has hard coat, therefore should be treated before sowing.
Acacia arabica	"	15/8/81	untreated	27/8/81/ 12 days	"	The seed is hard coated, but was sown untreated, therefore, germinated in 12 days. Germination can be hastened by treating the seed
Erythrina sub-rosca	"	15/8/81	untreated	19/8/81/ 5 DAYS	"	Seed can be soaked in cold water for faster germination;
Zizyphus jujuba	"	15/8/81	untreated	28/8/81/ 13days	"	Same as A. arabica.
Punica granatum	"	26/8/81	untreated	14/9/81/ 19 days	"	The seed was sown with pulp , which delays germination. Seed can be dried in shae, soaked in cold water for 24 hrs; for quick germination

Species	Type of Soil	Sow Date	Treatment to Seeds	Germination Dt/ Period	Irrigation.	Remarks.
Elongolus angustifolia	Clay & Sand	16/12/81	UNTREATED	9/1/82/ 24 days	Irregular	Germination can be improved by soaking the seed in cold water and improving irrigation.
Sesbania grandiflora	Clay & Sand	24/12/81	Untreated	28/12/81 4 days	"	It will be interesting to note as to how minor changes, can effect the germination period.
"	Pure sand	24/12/81	"	27/12/81 3 days	"	
Caliandra calothyrsus	Mixed	26/12/81	Untreated	30/12/81 4 days	"	Same as S. grandiflora
Leucaena leucocephala	Mixed	26/12/81	Untreated	4/1/82/ 9 days	"	Improved irrigation and soaking seed can well alter the germination period.

very good firewood, yet its multiple uses and outstanding quality o its rapid growth firmly advocate for its wide propogation, with river fed areas to start first. The plant being native to many other countries, has been widely distributed in southern Florida, West Indies, as well as from Southern Mexico through most countries of Central America down to South America. It has also been cultivated in Mauritius (Firewood crops, US, National Academy of Science

Also, some plants of Erythrina suburosa, Punica granatum, Prosopis specigera, Acacia arabica, have been planted in the premises of nursery. This is a step to form a collection of different plants in the nursery to provide opportunity to observe their behaviour and also help forestry students in tree identification. However, this effort can be made more fruitful if more attention is given by the National Range Agency to this aspect to constute an independent unit equipped with necessary transport and finances, assigned with specific job of collection of indigenous seeds locally and exotics from abroad and ultimate preparation of data depending upon the behaviour of various plants. The venture, I am confident will prove a mile stone in the development of forestry in the country and a meaningful contribution to the relief of exhausted earth.

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ECO-SYSTEM AND THE ROLE OF MAIN IN ENVIRONMENT

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Eco-system:

In a simple way, a habitat is referred to as an ecological system or an eco-system. Eco refers to the environment and the system includes the inter-acting and inter-dependent complexes in nature. In a wider sense, a square meter of a forest area or of a grass land or any large area of nature where living organisms and the non-living substances are inter-acting and exchanging materials between them, result in a working system which is known as ecological system or eco-system.

The earth itself is a great eco-system where biotic and abiotic components are continuously acting and re-acting with each other, thus resulting in structural and functional changes. This vast eco-system is known as biosphere. The Eco-system is divided into two parts.

1) The natural Eco-system :- This is again divided into many sub-divisions.
2) The artificial Eco-system :- It includes the man made eco-system.

In every ecosystem, there is an inter-relationship among various organisms and they are linked through different food chains and thus the entire community in an eco-system forms a sort of

wele, which is known as the food wele. The plants are the producers, the animals and man are the consumers and the parasites and fungi are the decomposers. The green plants are the primary producers in the eco-system. They consume CO_2 as a raw material and the same quantity of Oxygen is released by them as a biproduct, into the atmosphere. Thus the green plants maintain an equilibrium of CO_2 and O_2 in the atmosphere. A large number of biotic and abiotic factors are operative in the environment.

Role of Man in Environment.

Man is a part of eco-system. As a result of evolution of the central nervous system, man has emerged, as the most powerful and intelligent component of the biosphere and he keeps on modifying the various eco-system to his oven advantages. He is the greatest consumer and is using the natural resources and energy at an alarming rate. Man is one of the biological factors of the environment.

Man creates favourable environment for his welfare although he is just a small component of nature and by disturbing the environmental balance, he is inviting trouble. Deforestation, construction of roads, urbanisation, construction of dams, canal irrigation, shifting cultivation, sewer and waste disposals, automobiles and atomic explosion are some of the activities which are rapidly changing the environment of our planet. If by any means the equilibrium of CO_2 and O_2 in the atmosphere is disturbed, the entire biosphere will be in jeopardy.

The man is using plants and other resources without caring for the after-effects. Over-population and industrialization have contributed to the general deterioration of the environment. The pollutants reach us through the air we breathe, the water we drink the food we eat, and the sound we hear. Some detergents like aldrin, flit, DDR and gammexane are a threat to human beings as they have become a part of food chain. The domestic waste and raw sewage affects in life of water animals and aquatic plants as well as man because it leads to the shortage of oxygen in water.

The consumption of petrol not only produces poisnous gases but also utilizes the Oxygen of the atmosphere. One motor vehicle (to travel 960 kms) needs as much Oxygen as a man inhales in one year. Similarly the radio-active substances and the harsh sound are hampering the physical and mental status of man, slowly and steadily.

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THE ADVANTAGES OF GAME FARMING OVER TRADITIONAL STOCK RAISING

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All scholars unanimously agree that the only system, in the term of biomas which guarantees the best possible productivity of any biotype, is the balance and interaction of the natural fauna and vegetation everywhere, or in the other words any kind of transformation, even slight, in a natural habitat will unavoidably reduce its productivity and start a mechanism of progressive impoverishment. Practical experience has also shown that when the process of degradation reaches a certain stage it is not possible to stop it.

Among the most fragile habitats where the possibilities of recovery are more limited, are all the arid tropical habitats: steppe, savannas, praeiries, scrub and bushlands. In these environments climate and soil features are such that once the natural vegetation has been severely damaged true desertification sets in.

Most of the Sahelian countries are presently faced with this problem which is the result of a chain of events started with the arrival of the first pastoralists, centuries ago, and, if the process of impoverishment is not stopped, soon, large areas will turn into uninhabitable wastes.

Vast areas inhabited by millions of Gazelles, Buffalos, Zebras, Elephants and so on, a few decades ago, are now left with a few destitute families with a few starving heads of cattle, who

scourge the land to find something to eat. The explanation, why such areas which were able to sustain the greatest concentrations of wild ungulates as known in modern times, have been so rapidly degraded by the introduction of their relatives, the domestic cattle, is simple. The fact is that every kind of wild animal have evolved for hundreds of thousands of years to adapt better and better to their environment. Herbivorous animals especially are finely adapted to exploit either only or preferably only some plants or parts of them, so that a whole range of different animals can live together without competing among themselves for food and so that the vegetation is never overexploited. A further adaptation common to all species native to arid environments is a reduction of their need for water. For example the Wild ass, usually drinks every second or third day, the Oryx, drinks only occasionally, while the Gerenuk never drinks. The great advantage of such adaptations is a uniform exploitation of all grazing areas, independently from the availability of drinking water, and of course, saving enormous energy by not trecking from the regularly grazing areas to water-holes and back and instead rest quietly to chew their cud during the hottest hours. This economy in energy reduced their food requirements.

Unfortunately Mankind did never understand these facts and has always tried to substitute domestic stock for wildlife, thus creating for themselves perpetual labour and worries. In fact traditional domestic animals are all species of Asiatic origin coming from a completely different environment and thus poorly adapted to African environments, except for the Camel. In love for their domestic animals pastoralists worked hard for their handicaped stocks, they cut the trees to build protection, they

killed the wild animals to save their stocks, and they got the areas overgrazed, their stocks cut the soil by a cris cross of tracks thus distroying the top soil and making the land vulnerable to soil erosion. The damages thus made to the environment and soil are so enormous that at some places the recovery is impossible.

Since some times in some African countries, such as Zambia, Zimbabwe, South Africa, Namibia, farmers have tried meat production by game animals and results have been quite positive and encouraging. Of particular significance to Somalia is a recent experiment done in Kenya, where accurate comparison has been made between the results of range utilization by cattle and by Gazelles. The results have been astonishing.

About 150 hectares have been fenced, divided into two equal parts. One has been stocked with Gazelles while the other had a normal stock of cattle. After barely three years the results were quite sensational and could be summarized as follows:

The ecologic results were that while in the area stocked with gazelles the amount of grasses was 32% more than in the cattle range and the number of species present was 100% more. Moreover there was no trace of overgrazing around the water point, which was finally removed as the gazelles did not use it.

As far as meat production was concerned it was found that in cattle only 32% of the gross weight is usable, in gazelles this is over 47% and the quality is greatly superior as it is practically devoid of saturated fats, which are unhealthy. As the number of gazelles which may live per unit of rangeland is greater than

that of cattle and they grow quicker; meat production with Gazelles is about double than with cattle grown under ideal experimental conditions and as much as 15 times greater than meat production by the traditional nomadic cattle.

In addition to meat production we must also consider the production of trophies and hides. As far as hides are concerned it was found that a cow uses an area of about 5 hectares and 3 years of time to produce a hide that sells for about 4 dollars, while on the same surface one could produce 8 gazelle hides which were sold for 5 dollars each, so that in the same three years Gazelle hides had paid 120 dollars for 5 hectares against barely 4 of one cow skin. Thus, considering the overall gross income the game ranch had paid an income of about 200 units for every 100 paid by the cattle ranch; but if one considers running costs we find that the cattle ranch costs amounted to 66% of the gross income against 20% for the game ranch, so that the net profit was in favour of the game ranch by 160 to 33 .

The conclusion of a three years experiment was that breeding gazelles gives a net income that is about 5 times as great as to breed cattle under the best conditions of ranching, while habitat conditions were perfectly preserved or improved and running costs curtailed.

An aspect which was not quantified in this experiment, but which is certainly significant, is the sanitary one: Wild animals are naturally resistant to a number of diseases that are widespread in many areas, such as Nagana, so that game ranching avoids both the expenses of inoculations, spraying for parasites etc.,

which are usuall operations quite harmful to the ecologic balance of the environment. Moreover as most game animals practically do not drink, wells could easily be reserved for strict human usage thus controlling pollution of wells and sources, which is one of the most common sources of human diseases. From what we have said it appears that we have at last one way both to stop the desertification of Africa and to produce the meat necessary for its people. Indeed it is in principle an extremely simple solution to rebuild an ecological balance as near as possible to the natural one.

Unfortunately we must say that the international agencies, the industrialized countries and, also most African Governments are still going on, with a few exceptions, to spend enormous amounts of money on sanitary controls, facilities, and experts etc., just to push the traditional stock raising; a poor proposition on a short term basis, and certainly a very bad one in the long run as it will continue to deteriorate range and to endanger the future of the coming generations.

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or in armed convoys. In Mogadishu we were very grateful for the kind hospitality of Dr. Kazmi and his wife for several days whilst we negotiated permits to purchase petrol to fill our tank plus the auxiliary tank and seven jerry-cans. We were to be accompanied by a young Somali botanist and a Somali driver in a Land Rover. They would act as interpreters and liaise for us with the various offices of the National Range Agency situated throughout the country. They would also help us obtain fuel permits and find us places to sleep. Eventually we were able to leave Mogadishu on Sunday, February 1st, for the north. Because of our overloaded vehicle and the state of most of the tracks we were forced to travel slowly with the passengers hanging on tight to avoid hitting their heads on the roof as the vehicle swayed from side to side and bumped up and down on the deeply rutted tracks. Fortunately there is one tarmac road (built by the Chinese) running for several hundred miles from Belete Uen to Las Anod which speeded our progress. Usually we had to reach the next town before nightfall which sometimes meant getting up at dawn and driving all day. We took tents with us intending to camp, but we were not able to do so as it was not safe and stayed instead in a variety of places from good clean cheap hotels (with brand new sheets on one occasion) to the more frequent bare room, derelict police hut or typical African hut. On one occasion we had to put up our camp beds in the middle of a stockyard and slept beneath the stars to a noisy lullaby from the camels, sheep, cattle, goats and chickens.

On the first day, after a few hours travelling from Mogadishu, we made our first stop to see a large population of Aloe microdonta in full flower, and I was thrilled to see so many plants all flowering instead of the odd specimen in a pot in the greenhouse. Along the road we saw large clumps of Caralluma russelliana, up to 3 ft. high and occasionally in flower, growing in the Acacia scrub on bright red sand. There were also huge termite mounds sometimes 12 ft. or more high. Susan was very excited when she spotted several large specimen of Euphorbia carteriana which had been named after her by the late Dr. Peter Bally. At the same spot we also saw the beautiful pale green highly scented flowers of an Adenia species, probably A. globosa growing in a dense thorny bush.

Later that afternoon we found large populations of Aloe aff. trichosantha, some of the inflorescences over 8 ft. high with attractive hairy green flowers and mottled leaves.

The next day we went to the type locality, near Bulo Burti, of Monadenium stellatum, where the whole hillside was covered with plants. There were plenty of Euphorbias too, E. schizacantha and E. longispina, and further along the road E. inaequispina and E. glochidiata.

The following day we had our first sample of Somali tea. Some of the nomads manage to make a little money by selling refreshments to people in the occasional vehicle which stops along the road. The tea, sugar and spices are boiled for hours in a kettle on an open fire and the brew is usually drunk black or with camel's milk. It was always served in very dirty-looking glasses, but we found it very refreshing, and none of us seemed to be any the worse for drinking it. Our Somali friends often took the opportunity of a tea-stop to eat whatever was available and usually this was boiled goat which was very tough and tasteless. Sometimes there was rice or spaghetti or greasy sweet pancakes. We saw some Somalis drinking 'meat juice', the fatty liquid in which the goat had been boiled; it looked revolting. The camel's milk I found quite acceptable when fresh, but not so nice when it had been stored for a few days in dirty-looking wooden containers! It had a strong smoky taste reminiscent of kippers. We did all our own cooking on two small camping gas stoves and probably had a much more varied diet than the Somalis. However, it was very nice to supplement our tinned necessities with the occasional fresh tomatoes, cabbage (at vast expense) and delicious fresh bread. We were careful to boil every drop of drinking water and always carried jerry cans to last several days as sometimes water was either unavailable or, having come from the gypsum rocks and strongly alkaline, was unsuitable for drinking.

On February 5th, a few days after leaving Mogadishu, we arrived at our first really interesting area near the small town of Las Anod, the gypsum hills around the town being particularly rich botanically. Here we found many populations of Aloe inermis, one of the very few Aloes with spineless leaves, the inevitable Carallumas, and Dorstenia gypsophila and Euphorbia columnaris both in their type locality.

E. columnaris is a remarkable species which only grows in this small area. It has a single unbranched stem up to 4 inches in diameter growing up to 6 ft. high and looks more like a cactus than a Euphorbia. It was in full flower, the flowers being produced in clusters above each node, and although it was thought to be rare and on the verge of extinction, we saw plenty of plants of all ages and therefore do not think the species to be in any immediate danger. Nearby we also found what may be a new species of Aloe.

After two nights at the rest-house in Las Anod, we left for Burao, stopping on the way to look at some large specimens of Aloe rigens var. glabrescens on a particularly desolate plain and later A. megalacantha. A strong smell, which I at first mistook to be yet another rotting animal caracass, proved to be coming from a huge clump of Caralluma speciosa in full flower almost hidden in dense scrub. This was one of the few flowering specimens we saw and must have attracted the flies for miles around. Some close searching at this unlikely-looking spot revealed tiny plants of Euphorbia phillipsiae barely visible and very well camouflaged between the rocks. We also found another small Euphrobia, E. hadramautica, which has a fairly widespread distribution.

Moaquitoes were a real nuisance, but for some reason they didn't seem to bother me much. Before leaving Kew, as well as having practically every injection available, we had been supplied with all kinds of medical supllies including enough plaster of Paris to encase a whole body from top to toe. Fortunately we didn't need to use this, although we did find a number of things invaluable.

Our destination, after going to Burao for petrol, was the rest-house and so-called Forest Reserve at Gaan Libah on the edge of a steep mountain escarpment. In this area Peter Bally had discovered one of the most attractive small Aloes, Aloe jucunda, which readily reproduces vegetatively and is now common in cultivation. Several botanists had searched the area since 1953 when Peter Bally first collected the species, but with no success, and so the species had been feared extinct in the wild. We were therefore delighted, when, on February 10th, with the aid of a local Somali who spoke a little English, we found numerous plants

growing under Box scrub (Buxus hildebrandtii) along the edge of the escarpment.

The next day our Somali guide took us down a precipitous path to a lower plateau. Not having much of a head for heights I was thankful that it was so misty that I was unable to see where I could quite easily have fallen if I had slipped. As it was, my knees were shaking after the one hour's descent, and was very glad that at the end of the day we were able to ascend by a much easier route. We spent the day walking through the Box scrub and Euphorbia hararensis forest but never once saw any small seedlings of the Euphorbia, the goats having eaten every bit of ground-vegetation. We did find more plants of Aloe jucunda, however, including a triploid form which has a chromosome number of 2n=21 instead of the normal diploid number (2n=14). There were also several Kalanchoe speceis, Aloe hilderandtii and lots of Echidnopsis.

Hargeisa was our next stop, primarily for petrol which was becoming increasingly difficult to obtain, always requiring a permit from the District Commissioner. This often took hours and there was never any certainty that there would actually be any petrol in the pump, or at the next town, so we always kept our tanks topped up at every opportunity.

Between Hargeisa and the port of Berbera we drove through huge populations of Aloe megalacantha stretching as far as one could see either side of the road for several miles. We also found another very different Aloe species of which the cut leaves produce a very unpleasant smell. This probable new species has tall, slender and graceful inflorescences with red flowers which make an attractive sight. We reached Berbera in time to enjoy a swim in the warm Gulf of Aden and it was nice to feel cool and clean again.

The following morning (February 14th) we were off for the Sheikh Pass. The notorious old road was so narrow it was normally one-way traffic only for vehicles, 'up' in the morning and 'down' in the afternoon. But when we arrived, a lorry had broken down on the pass and by special dispensation the new road which was still in the process of construction had been opened for traffic. This new road carves a completely different

route through the mountains and we quickly realised the interesting botanical implication of this, since the area would not have been explored botanically. The construction engineers gave us permission to stop at intervals along the road and we had one of our best collecting days of the trip.

The first exciting find was Euphorbia golisana, previously thought to be extinct, growing between rocky clefts. Nearby we also found Aloe hemmingii, Echidnopsi aff. bihendullensis and Edithcolea grandis, one plant of which was in flower. Further down the pass we found a different species of Echidnopsis, and Adenia, a Kleinia, two different species pf Dorstenia, and, in deep shade of the rocks, Selaginella phillipsiana. On reaching the base of the pass we managed to retrace the route of the old road to look for Euphorbia inculta (type locality) which we found along with some Carallumas and another Stapeliad, as yet unidentified. Further on we reached the type locality of the attractive Monadenium ellenbeckii, a branched species up to 3 ft. high resembling in its leafless condition a miniature Carnegiea gigantea.

That evening the engineers invited us for a drink at their 'village' an oasis of beautifully equipped prefabricated houses a mile from the Somali village of Sheikh. It was hard to believe their fitted kitchens and spotless bathrooms with runnig water and flush-toilets were not a mirage, and we were suddenly aware of our scruffy appearance and heavy boots!

Not far from Sheikh is a barren stony hillside which is assumed to be the type locality of the remarkable stapeliad Whitesloanea crassa, discovered in 1914, not rediscovered until 1957(see Cactus & Succulent Journal of America 31:107.1959), and subsequently thought to be possibly extinct (Nat. Cact. Succ. J. 30: 34. 1975). We spent a whole morning searching for the plant, without success, but left a description of the plant with the engineers, who promised to pass the information on to the botanically-minded wife of a collegue who would be joining their team in a few weeks' time. We were delighted when, after we had returned to Kew and the rains had come to Somalia, a small parcel arrived

containing one plant. For some time we nursed the belief that it was Whitesloanea, but later this gave way to doubts, based on the surface-appearance and rather indistinct ribs, and we realised that it must be Pseudolithos cubiformis! It is now safely re-rooted and we await flowers for final confirmation.

Near the rest-house at Sheikh we also sampled populations fo Aloe somaliensis. We found to our surprise that this species varied enormously both in its colouring, the makings on the leaves and the spines on the leaf margins. Previously only one form of A. somaliensis had been introduced into cultivation. We also foudn Kleinia gunnisii at its type locality and Echidnopsis ciliata.

The highlight of our trip was to go to Erigavo, a small village in the mountainous northern region and the type locality of many species. Everyone had talked about the terrible road to Erigavo and the awful dust. It took us twelve gruelling hours to drive there from Sheikh at an average speed of only 18 m.p.h. At times it was almost impossible to breathe for dust which seemed to get everywhere and when we arrived we were covered from head to toe. For once we all looked the same colour, British and Somali, all reduced to the same monotonous shade of brown! Luckily the rest-house at Erigavo had a shower which worked after a fashion, so we were able to clean up before rolling into our camp beds after a very tring day. The dust had even got into our boxes of food, but after cleaning up as best we could, we set off the next day (February 19th) for the edge of the mountain escarpment to look for Aloe cremnophila which was growing right on the edge of the precipice. Nearby on the flat plains we saw numerous large clumps of Euphorbia ballyi both in flower and fruit growing with Aloe scobinifolia. We also found Aloe peckii, an attractively marked small Aloe, another Huernia species and more Echidnopsis.

We were off again at 8 a.m. the next day to go down the Tabah Pass for the type localities of Aloe eminens, A. hildebrandtii, A. gracilicaulis and an as yet undescribed new Euphorbia species which had been collected by Peter Bally. Aloe eminens is one of the least

known of the tree Aloes, and when we found it growing 20 ft. or more tall in full flower with large black seed pods glistening in the sunshine it made a marvellous sight. All the other large, branched tree-Aloes such as Aloe pillansii, A. dichotoma and A. bainesii occur in southern Africa.

The scenery as we drove down the pass was aweinspiring, the sheer escarpment rising vertically on one side of the track and a magnificent view down across the flat plain on the other. There was not enough time to go right down the pass, but at the last place we stopped at the end of an exciting and rewarding day we found Bally's new Euphorbia, and a second new species of Euphorbia with forked spines.

After three nights in Erigavo we had to leave for El Afwein and began our return journey to Mogadishu. Soon after leaving we stopped to look for Euphorbia multiclava which Peter especially wanted to find, having long admired a plant of this small species growing at Kew. Its regular dichotomous nature makes it an attractive species. One plant which we found had sixty-four heads, indicating its considerable age. After some searching at the type locality we first walked over plants of Euphorbia mosaica, the plants being so well camouflaged and growing flush with the ground. Further along the track we found Aloe tomentosa, not in flower but with hairy dried corollas clearly visible on the dead inflorescences. Growing nearby was Euphorbia balsamifera ssp. adenensis. This species is a much branched spineless succulent bush with grey stems and when we found it, the tips of some branches had small clusters of green leaves surrounding the yellow flower. Euphorbia balsamifera is of interest botanically in being very disjunct in its distribution. The subspecies adenensis occurs in Somalia and the southern Arabian peninsula but the subspecies balsamifera is found thousands of miles away in the Canary Islands. On the Daloh escarpment near Erigavo we had found another example of disjunction. Aeonium leucoblepharum, a member of a genus which mostly occurs in the Canaries.

Our last stop was at an unlikely small gypsum hill where we found Pelargonium christopheranum and as yet unidentified succulent

member of the Compositae. After this we drove for mile after mile across what even the map described as 'desolate plain'. There was virtually no vegetation at all, not even a termite mound to break the monotony of the flat landscape.

This was to be our last day searching for plants as we had to drive the rest of the way back to Mogadishu practically non-stop, taking three days. We stayed again with Dr. Kazmi and his family in Mogadishu, carefully repacking the boxes of plants and checking our herbarium specimens ready for the difficult drive we still had to make to Kenya. Eventually we returned to the civilization of Nairobi. We had found all the plants we hoped to find plus many others, including some new species,, and in spite of all the hardship and discomfort from the intense heat, dust, insects and the terrible rutted roads it was the experience of a lifetime. I can't wait to return!

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THE CULTIVATION OF NEEM AND PROCESSING IT * IN A SMALL VILLAGE PLANT

By H. Michel-Kim & A Barandt
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The spread and development of neem cultivation and processing is intended to enable a complete, balanced, and locally integrated use of this tree. A one-side orientation based on using neem extracts for pest control would be too risky for farmers and also hinder the spread of neem cultivation on a wide basis. Ecological potentials and and problems must be taken into consideration to a great degree in neem research; only then can appropriate cultivation methods be developed. About 5 to 10% (in some cases 20%) of village areas can be planted with neem. If this is done, there will probably be a need to process about one to ten tons (dry matter) daily. A small-scale neem processing plant is described consisting of three units: for pyrolysis, power, and extraction. A rough estimate shows that very large benefits can be derived from an integrated processing scheme.

Cultivation and processing of the neem tree has a long history in India. Its special importance relates to the use of neem in native medicine, especially in Ayurveda medicine. Every part of the plant is utilized: the root bark, the stem bark, the blossoms, the young fruits, the seeds, the oil, the leaves, and the gum.

Because of their high protein content (15%) and low fiber content, the leaves could be an excellent cattle fodder, but due to bitter ingredients, only goats accept it.

Neem oil is mainly used for soap-making. Neem oil used to treat seed or grain keeps storage pests under control.

The wood can be used to make agricultural implements but is less suited for furniture. The pole wood is excellent for the construction of huts and fences since it is almost termite-resistant. Because of

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* Reprinted from " PROCEEDINGS OF THE FIRST INTERNATIONAL NEEM CONFERENCE, 16-18 JUNE, 1980."

the wood's high calorific value and high annual growth rate, it is excellent for generating energy. However, the fumes can cause problems since they are very offensive and can barely be tolerated indoors.

The use of the oil and especially of alcoholic extracts as antifeedants and insect growth regulators in integrated pest control system, promises a bright future for the tree. This might be extremely important for many of the least developed countries because their geographic location very often coincides with the areas where neem can be cultivated (india, Bangladesh, Sri Lanka, Sahel countreis, Somalia, Botswana, Burundi, Angola, Haiti, northeastern Brazil, etc.).

Although the use of neem extracts offers great potential for pest control it will take a long time before its application becomes widespread and assumes a significant role in pest control. First, the following steps are necessary: Further research on the properties of neem extracts; standardization of the properties and application; selection and breeding of neem; developing appropriate cultivation and harvesting methods, and storage and local processing systems; dissemination of neem cultivation; construction of local processing plants; developing a collection and distribution system for neem extracts; and building up an advisory service for the use of neem in pest control.

Many difficulties must be overcome. The competition with conventional chemical pesticides and the change to new fields of application and ultimately the change to a decentralized system will create problems which are very complex indeed.

It will take approximately 5 to 10 years untill standardization of properties and means of application is achieved. It will take another 10 years until seeds are selected and cultivation methods are proven in expermentation. It will take still another 10 years before the cultivation of neem is disseminated widely. By that time the chemical industry may find new compounds with an equivalent antifeeding effect, capable of being produced in large quantities.

Building up a 'neem system' solely on the basis of a standardized neem extract and its application would probably take too long. Furthermore, the required long-term investiments for producing neem extract could be too risky for the farmers, because the market for neem extracts might change rapidly if new compounds were discovered.

Although the use of neem extracts for pest control has a very promising future and should be reason enought to spread the cultivation of neem, it should be considered as only one goal. The dissemination of neem should primarily be based on integrated cultivation methods and a complete, balanced, and locally integrated utilization for local and regional subsistence. This will be faster, more efficient, safer for the farmer, and also the best foundation for the widespread use of neem in the future. The complete and balanced use of neem might hinder its distribution in some instances, but on the other hand it offers a great opportunity for an ecologically orientated development.

NEEM IN MICRO-ECOSYSTEMS

Neem grows in areas of 250 to 2000 mm annual rainfall even on very poor soils. However, the tree is not frost-resistant, and does not endure high soil moisture. The properties of the neem tree are as follows:

- high drought resistance
- a large area of distribution
- few demands on the soil
- enriches the soil
- regulates the soil humidity
- improves the microclimate
- suitable for use as shelter belts and as a shade tree
- serves as fire protection (retains its leaves for long periods; in Africa no vegetation grows under the tree)
- insect repellent and growth-regulating effects
- high biomass production
- easy cultivation

These properties of the neem tree should have promoted its high natural distribution, yet it is rarely found in natural stands. It can be considered as a cultivated tree which usually rejuvenates itself under its crown but does not spread or develop into wild forms easily.

The compatibility of the neem tree with other plants has positive aspects as well as problems. This was observed in plant communities and when using neem leaves as mulch. Some vegetables are compatible with neem mulch, others are not.

So far very little is known about the behaviour of neem in plant communities and its ecological potential and limitations. One can only make suggestions which might stimulate further reasearch and provide ideas as to a special ecological potential of neem.

It is known that the insecticidal compounds made from neem material keep at a distance most insects, worms and even some bacteria during the composting process, so that the plant material is reduced mostly by certain bacteria and funge. Thus, the tree must have a significant influence on the balance within the microfauna, fungi, and bacteria communities.

Because plants depend on a certain microfauna and a special complex of bacteria and fungi, it is probable that in all cases where neem changes the composition significantly, problems may arise. Thus, the effect of neem may be both positive and negative, but only if more research is carried out can this effect be used in plant communities with great success.

Observations on the positive effects of neem compost and the restriction of the denitrification process by neem cake, point toward the possibility of neem for compost production. It may be that neem material can be used to regulate the composting process, which in warm and humid areas is problematic because of rapid decompostion. Experiments are necessary to determine whether it is possible to direct the composting process with neem. If so, it could become an important factor in tropical horticulture.

It may be assumed that neem can be used in many microbiological processes. In summarizing the importance of neem, it should be remembered that the neem tree represents a treasure not only for human medicine, but also in 'eco-medicine', for which it must be used with great caution.

NEEM CULTIVATION

There are eight possibilities for the cultivation of neem.

Neem in mixed forests: In Africa (e.g. Upper Volta), neem is planted as part of reforestation campaigns. A mixture of neem trees with the following is recommended (Costin et al., 1976; Howaldt, 1980): Tamarix acaphylla, Casuarina equisetifolia, Tespesia sp., Bovelia papyrifera, and Eucalyptus camaldulensis.

Neem in 'agroforest' cultivation with perennial crops: Neem can be planted in combination with fruit cultures and crops for feeding cattle (e.g. Pennisetum pedicellatum, as suggested by Misra, 1960).

Neem in 'agroforest' cultivations with annual crops: There is only little information available, but recommendations have been made for combinations of: neem with sesame, cotton, hemp (Howaldt, 1980); with peanuts, beans, sorghum (Radwanski, 1968, 1970, 1977); with Acacia arabica, cotton (Troup, 1921); and with Khaya senegalensis (Giffard, 1979).

Neem in horticulture-forest systems: No specific recommendations can be made at this point. The insect-repellent effect, the nematode-repellent effect and the potential for use in compost systems, should be stressed. There might be some special interest also in the use of neem branches for hill bed cultures (mound cultures).

Neem in shelter belts: The trees are used widely as windbreaks against soil erosion and also in fire-protection belts.

Neem for beautifying and making safe roads and paths: The trees are often used in Africa for their shade and because their shallow roots hold the soil; thus, the roads can be traversed even after a heavy rainfall.

Neem for the greening & beautification of villages and urban areas: It is an excellent shade tree and has an excellent capacity to clean polluted air.

If neem is planted in mixed forests in combination with pasture, up to 20% of the area could be planted with neem. In most other cases, neem plantings could constitutes 5 to 10 or even 15% of the village area.

Depending on local conditions, the yield of neem varies between 10 and 100 tons biomass (dried material) per hectare per year; 40 tons can be achieved easily under the proper conditions. About 50% of the biomass is contained in the leaves, about 25% in the fruit, and 25% in the wood.

TABLE 1

Estimates of the area to be planted with neem for a biomas yield per hectare of 10 and 100 tons (dry matter) per year.

% of total area	Area of neem plantings (ha)	Total village area (ha)	Dried material annual (t)	Dried material daily (t)	Biomass yield/ha (t)
5	30	600	400	1	10
	3	60	300	1	100
	300	6000	3000	10	10
	30	600	3000	10	100
20	30	150	300	1	10
	3	15	300	1	100
	300	1500	3000	10	10
	30	150	3000	10	100
Probable conditions:					
8	25	300	1000	33	40

Table 1 gives an estimate of the area required for neem plantings if a small village plant is to be supplied with a daily capacity of between 1 and 10 tons dried material.

PROCESSING NEEM

The medical uses of neem are not considered in this short paper because they are too manifold, and only a few trees are needed for use in each village.

Neem Wood

Although neem wood is useful for agricultural implements, and the pile wood is suitable for the construction of huts and fences, it has no special value as construction material or for furniture making because the logs are too short and the wood has an offensive odor. Neem can be chipped and used for boards and paper but in most cases the transport of the chips is too costly.

The best means of local processing of neem wood is by destructive distilation. The yield of charcoal and tar oils is assumed to be very high, whereas the yield of acetic acid and methanol should be average. Since the smoke of burning neem has a highly insect-repellent effect, the tar oils should have good insecticidal properties too; they should also be excellent for wood conservation.

Very interesting at the local level is the use of wood alcohol for the extraction of neem leaves and seeds. The alcohol produced will be sufficient if the recycling of the solvent is done with care. Acetic acid can be sold in the form of its calcium salt. Another possibility is to heat the salt and obtain acetone. The tar can be used for many local products.

With a small pyrolysis plant, a local energy center can be erected. The gas produced can be used for a power unit. The tar, tar oils and charcoal could be gasified as well.

Neem Leaves

As already mentioned, the leaves have a high protein content (about 15%) and a low fiber content. Apart from this, they contain many insecticidal compounds. The extraction of these compounds is important when utilizing the leaves as high-quality animal fodder.

Experiments will reveal whether methanolic extraction will enable the use of the cake as cattle feed, but ethanolic extractions might be necessary.

Local processing of the cake for the production of pure proteins for nutritional or technical uses might be of benefit. A review of the traditional methods of producing soybean cheese might provide suggestions.

Another very interesting but not yet tested possibility is the use of neem leaves as a substrate for mushroom production. The high protein content and nematode-repellent effect might provide excellent substrates in combination with straw and wood chips.

Neem Fruit

With various solvents, different compounds and oils can be extracted. The alcoholic extract has a high antifeeding character. The cake can be used as mentioned above.

A Small-Scale Neem Processing Plant

The local processing plants for neem would probably have a daily capacity of between 1 and 10 tons. Figure 1 presents a sketch of a unit which can be adjusted to different capacities. (More detailed information about the unit can be obtained from the authors.)

To process 1000 tons of neem (dry matter) annually, or about 3.3 tons daily (i.e., about 800 kg neem wood), a pyrolysis unit with a capacity of 400 kg would be sufficient. Because the unit could be used for other agricultural and forest waste as well, its capacity should be 1 ton (diameter of the reactor: about +.50 m). Depending on the size of the material, such a unit can process up to 6 tons when operated 24 hours a day.

The unit is combined with a condenser for fractional condensation. The different fractions are stored in tanks. The gas is cleaned in a sawdust filter and stored in a gas tank; it can be used for a power unit.

I 1 ton of dried wood or agricultural waste is processed daily, about 300 to 500 kWh can be produced by the normal pyralysis process. Additional gas can be produced if the tar oil is injected into the hot pyralysis unit which is partly filled with charcoal. In this manner up to 1250 kWh gas can be produced from 1 ton of dried matter.

To process 1000 tons (dry matter) of neem annually, the extraction unit should have a capactiy of about 200 kg per hour. The proposed unit consists of an extraction pipe with bolts (lengths 5 m, diameter 40 cm), a centrifugal evaporator (capacity 400 kg/h), a continuous centrigue, several discontinuous centrifuge with vacuum joints, solvent tanks and pumps, a grinder, and a special container for drying the cake. A sketch of the proposed pyrolysis and extraction units is presented in Fig. 2.

Only very rough estimates of the cost (German marks) of constructing these units can be given (wage costs are not included):

- Pyrolysis unit	20,000
- power unit	30,000
- extraction unit	50,000
- building and installations	70,000
- others	30,000
Total	200,000 DM

A rough calculation of the annual benefits to be derived from local processing of neem is shown in Table 2.

T A B L E 2.

Products of the neem tree and their estimated value (German marks)

Product	Tons	Estimated price per ton	Value
Wood (600 tons)			
Charcoal	200	200 - 600	40,000 - 120,000
tar and oil	70	400 - 1000	28,000 - 70,000
acetic acid	45	800 - 1500	36,000 - 67,500
aethanol	10	1500 - 2000	15,000 - 30,000
gas (50,000 m^3)	50	400 - 600	20,000 - 30,000
total			139,000 - 317,500
quota neem-wood			60,000 - 133,000
quota wood from other plants			79,000 - 184,000
value/ton			240 - 532
Leaves (500 tons dry matter)			
extract	30	2000 - 4000	60,000 - 120,000
cake (15% protein)	470	300 - 6600	141,000 - 282,000
total			201,000 - 402,000
value/ton			402 - 804
Fruit (250 tons dry matter)			
extract	50	3000 - 6000	150,000 - 300,000
cake	200	400 - 700	80,000 - 140,000
total			230,000 - 440,000
value/ton			920 - 1,760
Honey from bees	0,5	3000 - 7000	1,500 - 3,500
Total value			492,500 - 978,500
Value/ton			492 - 978
Generation of value per hectare (40 t/ha)			19,700 - 39,140

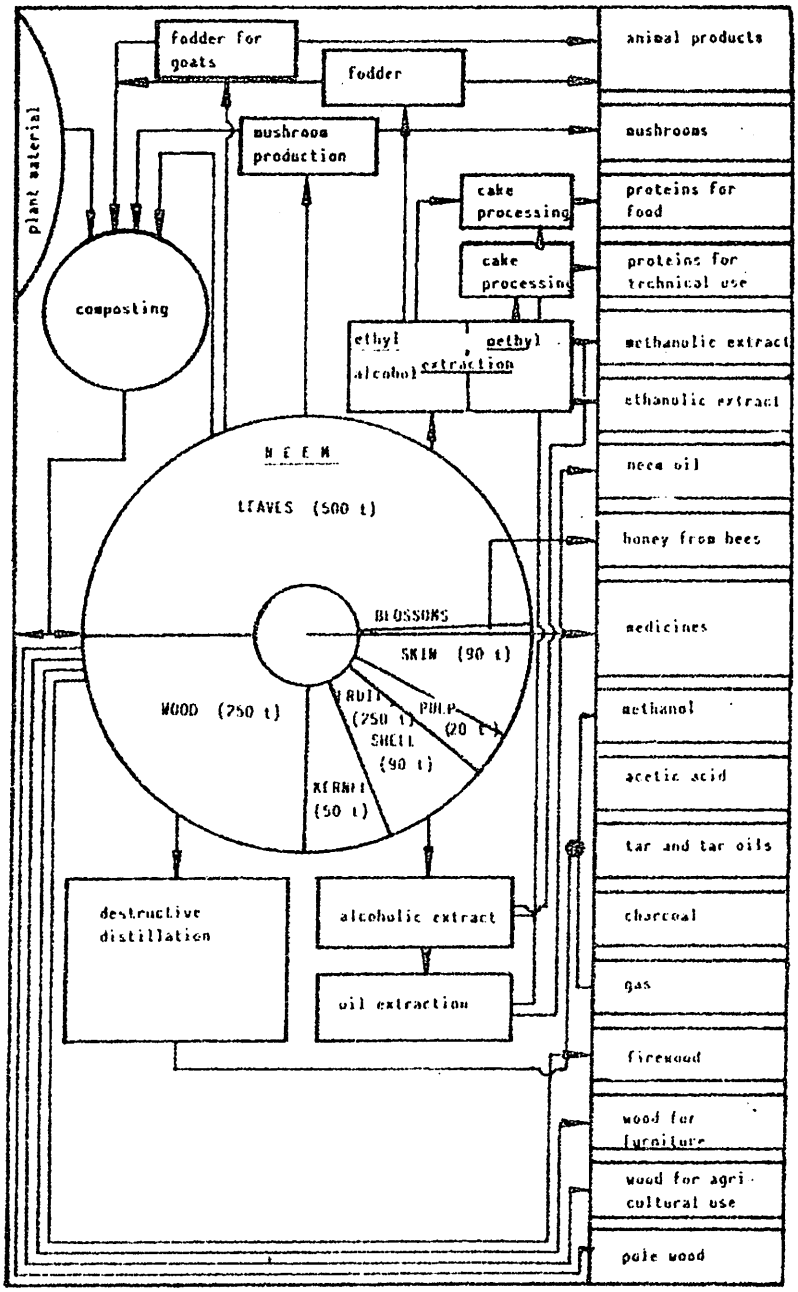

Fig. 1. A sketch of the possible uses for a small-scale local neem processing plant

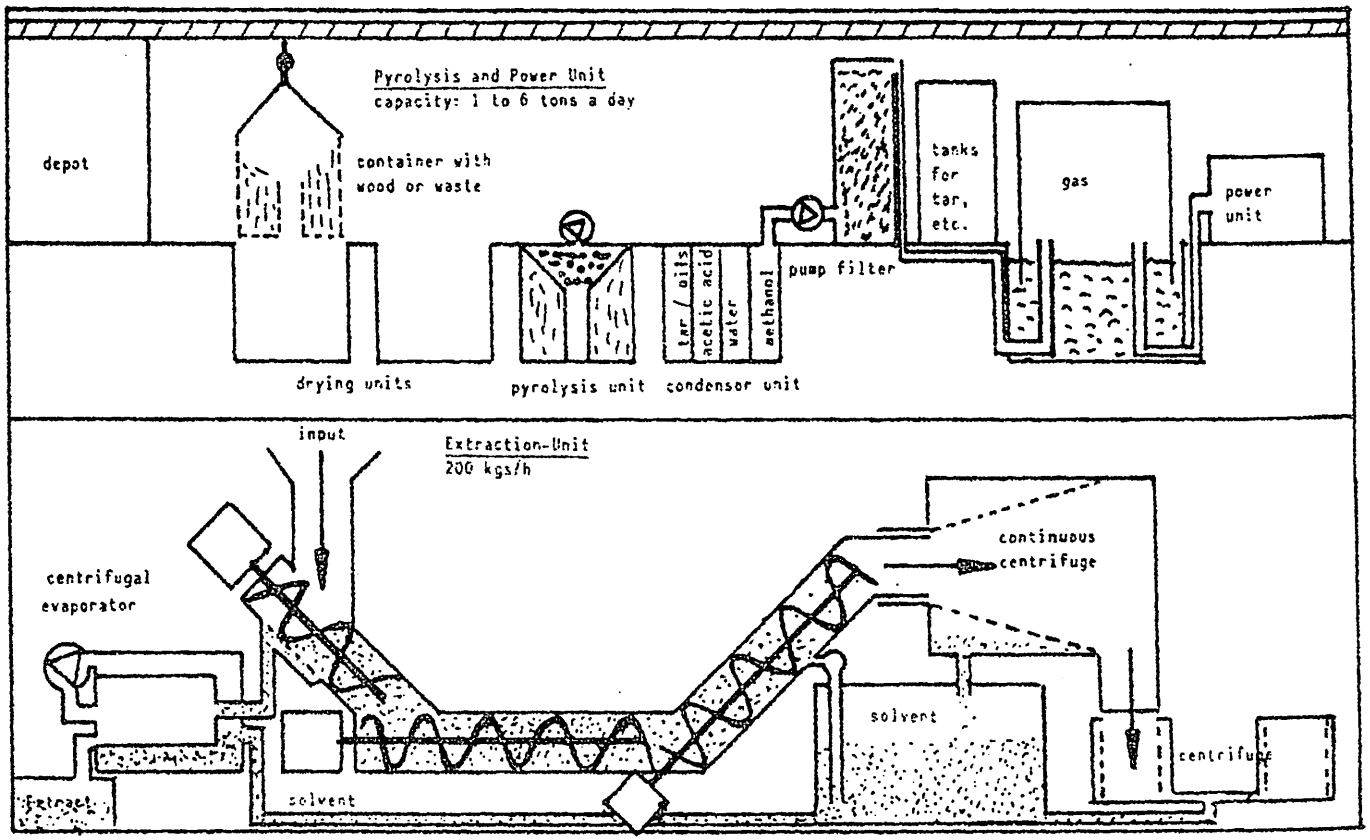

Fig. 2. Diagram of a proposed pyrolysis and power unit (top) and an extraction unit (bottom)

R E F E R E N C E S

COSTIN, E., DRAGSTED, J. & BALLIDI, M. (1976). Shelterbelt plantations in ardi and extreme arid areas of the Peoples Dem. of Yemen. F.A.O. Rep. No. RDY/71.

GIGGARD, P.L. (1979). L'arbres de Senegal. Dakar.

HOWALDT, TH. (1980). Azadirachta indica A. Juss. - Tamarindus indica L. Diploma thesis, Univ. of Hamburg.

MISRA, B.R. (1960). Creation of fuel-cum-fodder reserves in the plains of Chhattisgarh (Madhya Pradesh). Proc. Farm Forestry Symposium, New-Delhi.

RADWANSKY, S.A. (1969). Improvement of red acid sands by neem tree (Azadirachta indica) in Sokoto, north western state of Nigeria. J. appl. Ecol., Oxford 6: 507 - 511.

-, (1970). Trees to imporve soil. Nature, Lond. 225: 132.

-, (1977). Neem Tree. Parts 1,2,3, & 4. Wld Crops Live Stk 29: 61 -66; 111 - 113; 167 - 168; 222 - 224.

TROUP, R.S. (1921). The Silviculture of Indian Trees. Vol. 1, Clarendon Press, Oxford.

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L E T T E R S T O E D I T O R

Dear Sir,

A new term "Agro-forestry" is becoming very popular nowadays. Will you please tell us what it means and how it differs from Agriculture and forestry and what is its importance.

Osman Haji Ahmed
Faculty of Veterinary
National University;
Mogadishu.

Dear Mr. Osman,

I requested Mr. Saleem to reply your letter and his reply is reporduced below.

E d i t o r.

Difinition:

Agro-forestry is an age-old practice in all parts of the world. The meaning of agro-forestry can be stated in a number of ways. In a simple statement, Agro-forestry is a system of land use, that successfully satisfies the needs of a crop farmer, forester and/or stock farmer. It involves the combination of trees along with the production of food crops or animals to achieve a stable production-system.

Different experts differ on the difinition of Agro-forestry. According to R.B. Contant, ICRAF, "Agro-forestry is a socially, culturally, and ecologically acceptable, integrated

from of land use, involving trees that improves or does not degrade the soil and permits increased and sustained production of plant and animal produce including wood".

P.K.R. Nair of ICRAF has the following view: "Agro-forestry is a sound land-use system that integrates trees with crops and/or animals so as to get higher productivity, more economic returns and better social benefits on a sustained basis, than are obtainable from monoculture on the same unit of land, even for marginal areas and under conditions of low levels of technological inputs".

C.F. Bentley says, "Agro-forestry is any type of multiple cropping land use that :-

"(a) - entails complementary relations between tree and agriculture crops and produces some combination of food, fruit, fodder, fuel, wood mulches and so forth.

(b) - is usually, but not necessarily, low input.

(c) - achieves a more efficient use of radiant energy, moisture and plant nutrients, and reduces soil and land deterioration process such as erosion, floods, and leaching etc."

The idea of P.A. Huxlay of ICRAF is that, "Agro-forestry is any land-use system which provides, fuel as well as tree/shrub products. It involves multiple mixed or zonal cropping with or without animal production, in which woody perennials are grown for more than one purpose together with herbaceous crops or grasses."

The International Council for Research in Agro-Forestry amplifies the concept of Agro-forestry as follows :-

"Agro-forestry is a sustainable land management system which increases the overall yield of the land, combines the production of crops (including tree crops) and forest plants and/or animals simultaneously or subsequently, on the same unit of land, and applies management practices that are compatible with the cultural practices of the local population."

However, it is still considered that the definition is in-adequate because they do not distinguish the many types of systems that may possibly fall within their ambit. So for a detailed concept of Agro-forestry, K.F.S. King gives the following ideas :-

"Agro-forestry should be considered to be a generic term that embraces the following specific components :-

i) Agri-silviculture : The concious and deliberate use of land for the concurrent production of agricultural crops (including tree crops) and forest crops.

ii) Silvo-pastoral systems: The land management systems, in which forests are managed for the production of wood as well as for the rearing of the domesticated animals.

iii) Agro-Silvo-Pastoral Systems : In which land is managed for the concurrent production of agricultural and forest crops and for the rearing of the domesticated animals. This system is, in effect, a combination of agri-silviculture and the silvi-pastoral systems.

iv) Multi-purpose forest tree production systems : Here the forest tree species are regenerated and managed for their ability to produce not only wood, but leaves and/or fruit suitable for food and/or fodder".

Importance of Agro-Forestry :-

The concept of Agro-forestry is based partly on biological and partly on socio-economic premises. The forests generally have a beneficient effect on Soil. The roots of forest trees take up nutrients from the soil, convert and utilize them for the production of plant material and then return them to the forest floor in the form of leaves, twigs, branches and fruits. This litter is transformed into humus and later incorporated into the soil.

The people who clear the forests for the production of food, are un-aware of the violent disturbing effects of their practices upon the eco-system, in terms of erosion hazards, the possibility of droughts and floods as well as the possibility of soil fertility decline. But they persist to do so because to them there is no course of action. They say that to survive, they must destroy and degrade.

Agro-forestry aims to maximize the use of radiant energy, and minimize the losses of plant nutrients in the system. It aims to optimize water-use efficiency and to minimize run-off and soil loss. The object of this system is also to improve the nutritional, economic and social well-being of the people through better land use with out detrimental to the environment.

A legume tree is able to fix atmospheric nitrogen into a form that can be easily used by other crops. Millet when planted under this tree may yield several times as much grain as in the open. Domestic cattle grazing under the Acacia benefit not only from its shade but from its nutritive seed pods and also from its leaves when grass is in short supply due to drought.

By growing food crops and trees together, and raising livestock on the same piece of land, we can achieve much more greater over all production. This system provides the farmers, with a much wider range of products, than they could obtain, otherwise, from their land. In Indonesia, the cultivation of paddy and other food crops between young trees has raised the paddy production from 0.7 tons per hectare to 1.8 tons per hectare with in two years.

Leucaena tree can increase the fertility of soil by fixing atmospheric nitrogen, thus reducing the need of chemical fertilizer. Acacia albida which is called the "miracle tree" of the Sahel, forms an ideal perennial crop component of an integrated farming system for the semi-arid tropics. Its long tap root does not compete with surface crops for moisture or nutrients, but pumps nutrients up to the root zone of agricultural crops and grasses.

In Malaysia, the rubber trees when inter-planted with leguminous crops have become tappable, four years after planting, as compared to six years when planted without agricultural crops.

In Senegal, the yield of Millet grain has increased to 250 percent, containing 350 percent more protein, when grown under the Acacia albida trees.

Inspite of the clear advantages of combining Agricultural and Forestry techniques, untill now the foresters and the agriculturists have acted quite independently and even rivals for the same resource: "The land". The foresters have tried to keep people out of their Forests and the agriculturists have tried to keep trees off their land. The two groups are taught and trained completely separately and till today no fromal Agroforestry degree programmes exist even in the institutions of higher learning. In this advanced age, there is an urgent need of combining the two disciplines in an integrated land-use system.

Mr. Choudhry M. Saleem
Forest Officer,
Forestry & Wildlife
School, Afgoi.

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N O T E S

MEASURE TAKEN AGAINST POACHING AND WILD-LIFE PRODUCTS DEALERS BY THE WILDLIFE DEPARTMENT NRA

By: Yussuf Mohamed Ahmed
Director Wildlife Dept.
National Range Agency.

Somalia has a rich heritage of wildlife which abound in number as well as variety. But it was not until recently that the importance and value of wildlife as a natural resource was recognized. In pre-revolutionary era even though laws enacted for the conservation of wildlife; real concerted effort to this effect has been made only after the revolution. The Revolutionary Government realised the importance of wildlife and took some right steps in safeguarding the existing laws; and since then stringent regulation have been in force for effective conservation of Fauna. To achieve this goal further, on 13th June 1982, we have entirely closed and took the license from the local ornamental ivory shop owners and other two special hunting permits, in order to control and inspect them. After obtaining these documents we will forward them to the council of ministers for taking proper steps. Our objective is to stop poaching and trading of the indigenous fauna, and to manage and utilize it in a right way, the confiscated and contraband animal products, instead of wasting them in stores.

Somalia being rich in wildlife considered it, necessary to join the World Wildlife Conservation Organisation, and become a member of the (Convention on International Trade of Endangered Species) CITES. This step was taken in order to conserve and completely protect the species feared to be extinct as well as exporting and illegal trading. For ratification to the CITES

we got the confirmation the Consul of Ministers and now it has been submitted for the final approval of the National parliament. The important objectives of this document will be as follows:

1) To protect and conserve the international trade of endangered species of Fauna and Flora.

2) To stop totally the hunting, poaching and exporting of the feared extinct animals.

3) To make a list of scientific and common names of the animals and plants to be included in the Convention.

4) Any country which is member of CITES should issue the export and import permits according to the lists.

5) Any country which is member of CITES has a right to capture any animals or plants listed with this convention, if exported by a country which is not a member of CITES.

PRESERVATION OF MIGRATORY WILD BIRD

Somalia has about 2000 miles long coast along the Indian Ocean and Gulf of Aden. Recenlty some rare species of the following migratory birds were found in Gazeera, 50 Km from Mogadishu which provides facilities for the breeding of these birds.

1) Roseate Term
2) Socty gull
3) Noddy
4) Lesser noddy
5) Bridle Term.

The migratory and breeding habits of these birds are now being closely studied for necessary record and publication.

RANGELAND RESEARCH PROGRAM

Central Rangelands Development Project

By: David Prye &
Floyd E. Kinsinger
Department of Range Management, Faculty of Agriculture,
A f g o i.

Quantitative information about rangelands of Somalia is essential in order to develop a management program which will lead to greater productivity from rangelands, such information is almost totally lacking for Somali rangelands despite the fact that rangeland is the largest category of land (almost 50 percent) compared to crop land, forest land, etc.; almost 15 million head of domestic livestock, in addition to countless wildlife animals, graze rangelands in Somalia; livestock is one of the biggest export commodities from Somali rangelands; and approximately 75 per cent of the population derive income from livestocks grazing from Somali rangelands.

Somali rangelands are extremely valuable for resource production and have remarkable potential for enhancing productivity through better management. In order to overcome the lack of basic data on rangeland resources of Somalia and build a research program, the Central Rangelands Development Project provides professional services, establishes a forage analysis laboratory, and will conduct a series of field investigations on grazing, range improvements, diet of grazing animals, nutritive quality of forage, carrying capacity of different range sites, and many other measured questions.

Steps in initiating a research program are (1) review published literature for information applicable to Somalia, (2) inventory research needs, (3) establish priorities for essential research projects, and (4) provide an organization structure and staff for carrying out research.

The staff of the Department of Range Management, faculty of Agriculture, National University of Somalia, has been assigned the responsibility to carry out field research. Included on the research staff are Dr. Floyd E. Kinsinger, Ahmed Elmi, David Frye, Michael Madany (Instructor at the Agricultureal Secondary School), and Omar Mohamed Abdi (Chemist, who will be conducting forage analyses).

This staff will essentially be the "research arm" of the National Range Agency to carry out research projects which are identified and given high priority by N.R.A. officials.

The proposed organization for the research program includes a Range Research Committee chaired by the General Manager, N.R.A., and including Directors of Range and Environment, Training and Research, Wildlife, and Forestry. The Range Research Committee will identify research needs, establish priorities, review research proposals, secure funds for approved projects as directed by the NRA Range Research Committee.

The research program is still in the very early stages of planning and development. Proposed ideas presented above may be changed as further discussions explore additional ideas.

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FORMAL TRAINING PROGRAM

Central Rangelands Development Project

By: Michael Madany &
Floyd E. Kinsinger
Department of Range Management, Faculty of Agriculture,
A f g o i.

One of the components of the Central Rangelands Development Project is the development of formal training programs both at the Livestock, Forestry and Range Secondary School in Afgoi; and in the Faculty of Agriculture, National University of Somalia, in Afgoi.

The University curriculum will provide an option for students to specialize in Range management during the final two years of the four-year college program. Students will graduate with a degree in Range management and will be able to assume responsible positions in the National Range Agency and other government ministries and departments. Promising and ambitious young students may be selected for advanced academic training, either in U.S.A. or in the Faculty of Agriculture when and if a degree for Master of Science in Range management is implemented in the faculty of agriculture.

The curriculum for the Range management option consists of courses in principles of Range management, Plant Ecology, Range plant Taxonomy, rangeland improvement practises, plant physiology, watershed management, wildlife management, developing management plans, organization and function of governmental management agencies (NRA), and other topics. The curriculum will stress practical application of theoretical knowledge

through lectures, field trips, and laboratory exercises. Students will graduate with a comprehensive knowledge of rangeland management and improvement with special emphasis on rangelands of Somalia.

It is hoped that, during the vacation period between semesters, students can be assigned to work with field ecologists in the Central Rangelands to gain more practical experience while at the same time, assisting field ecologists in the collection of data.

The new Department of Range management has been established in the Faculty of Agriculture and the Range management curriculum has been approved by University officials. The present staff in the new Department of Range management consists of Ahmed Elmi, a recent graduate from the University of Arizona with a master of science degree in Range management. Mr. Elmi is the Somali counterpart to Dr. Floyd E. Kinsinger, U.S.A. expatriate Professor of Range management with extensive experience in teaching, research, and resource management; and David Frye, Research Technician, who will assist primarily with the research program.

Responsibility for research (see accompanying article) in the Central Rangelands Project has also been assigned to the staff of the Department of Range management. Discussions are continuing about expansion of the teaching curriculum some time in the future to eventually offer a master of science degree in Range management. When this occurs, promising students who are accepted for advanced training will be conducting research projects to solve Somali rangeland problems.

The past few months have been devoted to developing the new curriculum and research program for range management. Teaching of classes will begin in January, 1983, with fifth semester students who chose the option in Range management education.

The instructor in range science for the Livestock, Forestry and Range Secondary School arrived six weeks ago. Michael Madany is a recent graduate of Utah State University with an M.S. in Range Ecology. For the last year he was employed as an International curriculum technician at USU for their Dept. of Range Science. He will be starting a range science program at the soon-to-be expanded Secondary School in Afgoi. A curriculum is currently being developed that should cover all aspects of range science with an emphasis on practical concepts. Every effort will be made to present material that is relevant to the problems of range management and development in Somalia. Tentative topics for classes include: Introduction to range management; Range ecology (emphasizing the relationship between grazing animals and the forage/browse resource); Pastoral culture (the human dimension of range science); Range development and improvement; Range research methods (basic principles of vegetation sampling and gavying animal use); and Rangeland Wildlife (especially pertaining to interactions with livestock). After the curriculum is prepared, presented and approved by the necessary agencies, readers will be informed in a forthcoming article about its details.

The Agricultural, Livestock, Forestry and Range Secondary School will produce middle-level technician for employment, in our case, by the National Range Agency. Certain students will wish to pursue advanced studies in range management at the Faculty of Agriculture.

It is our hope that, through the development of departments of range management at the university and secondary School levels, qualified personnel will be soon working the crucial fiedl of range management.

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N E W S

Dr. Mohamed Ali Noor, Minister of Livestock, Forestry and Range, Dr. Abdullahi Ahmed Karani, General Manager National Range Ageyncy, accompanied by Mr. Mohamed Musa Awale, Project Director Northern Rangeland Development Project (NRDP) and Mr. Mustafa Mohamed Ahmed, Director Finance NRDP, visited Kuwait to discuss the progress, continuation and other matters related to the Northern Rangeland Development Project in Somalia, financed by Kuwait Fund for Arab Economic and Development. On their return the Minister visited Saudi Arabia and Qatar and General Manager visited FAO Headquarters at Rome to discuss the matters related to FAO Projects at the NRA.

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A REVIEW MISSION TO CENTRAL RANGELANDS

A team headed by Dr. Abdullahi Ahmed Karani General Manager National Range Agency and composed of the staff members of Central Rangeland Development Project Mr. Yusuf Baha-el-Din, Coordinator, Mr. Kay W. Wilkes, Technical Director, Mr. Mohamed A. Ayan, Director Range Dept. NRA, Mr. Mohamed Ashkir Abdi, Director Administration, Mr. Ibrahim Ahmed Ismail, Director WFP aid and Mr. Abshir Osman Hassan, Co-manager, visited Beletweyn, Dhusamareb, and Galkayo the headquarter of three regions from April 4 to April 8, 1982.

The mission met the Governers, other administrative staff of the three regions, and the staff of the project and discussed various administrative, technical and social problem.

The mission was impressed by the cooperation of the Regional administrative and project staff and satisfied with the progress so far made.

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I N S P E C T I O N T O U R S

Dr. Abdullahi Ahmed Karani, General Manager NRA and Mr. Ahmed Salim Awad, Director Range Department, NRA, inspected the rural areas in Lower Shabelle area and aquanted themselves with the forestation activities carried on by Save the Children Programme at Koriole.

Mr. Mohammed Mohamoud Jumale, Director of Forest Dept. accompanied Mr. Wood of the WFP on tour of Sand-dune fixation and other reforestation areas in Merka area. They inspected the sites where the WFP manpower is employed. They discussed the problems of mutual interest with the Governor of the area.

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PARTICIPATION OF NRA STAFF IN INTERNATIONAL SEMINARS

- Mr. Mohiddin Haji Hussein and Mr. Ismail Omer Mohamed, Forest officers, N.R.A. proceeded on a 20 days Arab League fellowship to Syria to participate in a Seminar on Forestry in Arid areas to be held at the Institute of Forestry Latakia.

- Miss Madina Omer Abo, Head of Range Cooperative, NRA and Mr. Suleiman Abukar Ali, Principle of Forestry and Wildlife School Afgoi, visited Moskow, Ashkabad, Samarkand and Chimkin

on a study tour while participating in a Seminar on desertification and a training course on Rangeland productivity held in Moscow from 18.5.82 to 6.7.82 sponsored by UNEP and the Government of U.S.S.R.

- Mr. Ali Ahmed Elmi, Head of Training Service, Mr. Abdi Ali Negeye, Regional Director Gedo Region, Mr. Jabir Mohamed Ali, Head of Extension Services and Mr. Salad Ahmed Omar, Acting Regional Director Middle Shabelle Region participated in a 3 months training course offered by the Government of Egypt. They studied Range Management and Animal Husbandry at the Desert Institute, Cairo.

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FOREIGN STUDY TOUR ABROAD

Mr. Omar Addo Warsame, Head of Forest Service, NRA, visited Tunisia on a study tour of arid zones and community forests from May 7 to 30th May 1982. He visited National Forest Nursery Tunis, State Park, Bizerta, Nurseries in Nebuil Region and studied the mobile sand dune and water conservation project at Siliana and the grazing system developed in Keiruwan region. In his report Mr. Warsame concludes "It was an interesting and fruitful programme, that is worth continuing every year to increase the know-how of the participating technicians, to be transmitted and be adapted to their local environments".

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NOMINATION FOR TRAINING ABROAD

Mr. Sheikh Maye Haji Ahmed Omar, Assistant Range Officer, National Herbarium, Mr. Jaburi Mohamed Ali, Head of Extension Services, Mr. Abdulkadir Abdullahi Mohamed, Head of Land Conservation and Mohamed Ahmed Garad, Principal, Range School, Burao and Mr. Abdulkarim Mohamed Ali, Range officer, Bakol Region have been nominated for 4-years course in Range Management. The fellowships were offered by UNSO, under the Project Strengthening of Forest Department and Range Institute Burao.

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NRA STAFF LEFT FOR TRAINING ABROAD

- Mr. Rasheed Abdi, Senior Range Assistant, left Mogadishu on 1.1.82 for U.S.A. under the Central Rangeland Development Programme, to undertake a 5-years course in Wildlife at University of Arizona.

- Mr. Basheer Ahmed Mohamed, Senior Range Assistant, NRDP Project, Burao, and Mr. Ali Sheekhdon Warsame, Senior Range Assistant; left in Dec. 1981 for Syria to join 2-years Range Management Course at the Arid Zone Institute. The training is financed by Arab League.

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NRA STAFF SENT FOR TRAINING WITHIN COUNTRY

Mr. Mohamed Hussein, Range Technician, Garoe, Mr. Said Farah, Deputy Range Officer, Galkayo and Mr. Mohamed Ali Abdi, Regional Range Officer, Lower Jubba joined one year course on Rural Development sponsored by SIDAM at Mogadishu.

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NRA STAFF RETURNED FROM TRAINING ABROAD

Mr. Mohamed Mahmoud Mirre and Mr. Ahmed Mohamed Ayan who were sent to Arizona University under the Central Rangeland Develoment Project Training programme in 1979 have returned home after completing successfully their MS degree courses in Range Management. Mr. Mirre joined the N.R.D.P. Project Headquarters, Burao and Mr. Ayan as Director Range Management at NRA, Mogadishu.

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FOREST AND WILDLIFE SCHOOL AT JAMAMA CLOSED

In view of the establishment of a Forest and Wildlife School at Afgoi and the poor conditions of the buildings which were away from the main road and were not approachable in the rainy season, the Forest and Wildlife school at Jamama which has been training technicians and skilled manpower for the National Range Agency for the last many years have been closed after the final examinations of the last group of students.

All equipments and furniture has been transfered under the supervision of a committe headed by Mr. Mohamed Muse Haji Adan, Director of Training & Palnning Department, to the newly established Afgoi School.

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TRAINING COURSE ON SAND DUNE STABLIZATION

A 3 week course organised by FAO and DANIDA between 16 May and 6 June 1982 on Sand Dune stabilization at Shalambot-Merca (Somalia) was attended by 21 officers of the Forest Dept., NRA. The modern techniques and development in Sand Dune Methods and aforestation in arid areas were discussed and demonstrated.

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RANGE SCIENCE AT SECONDARY SCHOOL LEVEL

A range science program will be introduced at the Agricultural, Livestock, Forestry and Range Secondary School in Afgoi. The instructor in range science for the Livestock, Forestry and Range, Mr. Michael Madany arrived Mogadishu on 6 June 1982 and started working on the development of a curriculum for the courses. He will start instructing students from November 1982. The soon-to-be expanded secondary school will produce middle level technicians.

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DEPARTMENT OF RANGE MANAGEMENT FACULTY OF AGRICULTURE, NATIONAL UNIVERSITY

The new department of Range Management has been established under the CRDP at the Faculty of Agriculture will provide an option for students to specialize in Range Management during the final two years of the 4 year college program.

Prof. Floyd Kinsinger arrived Mogadishu on 20th March 1982 and prepared curriculum for Range Management degree, which was approved on 22 May, 1982 by Dean and Faculty of Agriculture. Lectures on the first course in 5th Semester are scheduled from 1. Jan. 1983.

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RANGELAND RESEARCH PROGRAMME

Somali rangelands are extremely valuable for resource production and have remarkable potential for enhancing productivity through better arrangement. In order to overcome the lack of basic data on rangeland resources of Somalia and build a research program, the staff of the Department of Range Management, Faculty of Agriculture the members of Agriculture Secondary School Afgoi in collaboration with Mr. David Frye, recently appointed Technician, has been assigned the responsibility to carry out field research on the recommendations of a Research Committe under the chairmanship of General Manager National Range Agency.

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SEMINAR ON MONITORING OF LIVESTOCK DEVELOPMENT AND PASTORAL SYSTEM

Dr. P. Sihm, Research co-ordinator of the International Livestock Center for Africa visited Mogadishu from Feb. 28 to March 1982.

Dr. Sihm was invited by the National Range Agency to give a seminar, "the ILLA experience in Monitoring of livestock development and Pastoral Systems."

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C.R.D.P. PROJECT INCEPTION PLAN

The Louis Berger Team Leader, Mr. K.W. Wilkes submitted Final Project Inception Plan on June 1, 1982 which was accepted. It is expected that the achievements under this plan will exceed those mentioned in previous documents. An annual work plan was developed from inception plan for the members of LBII Staff.

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N A T I O N A L H E R B A R I U M

National Herbarium was facing the problems of damage of plant specimens by insects due to the uncontrolable humidity and shortage of space in the old building which was very close to the sea, for the last few years. It was, therefore, shifted in a larger, climatically more suitable and spaceous building at 1/75, Via Lennin, close to Km. 4.

Dr. S.M.A. Kazmi, Taxonomist accompanied by Prof. Floyd Kinsinger, Mr. Mikhael Madany, Mr. David Frye and Mr. Elmi visited the part of Lower Juba region for plant collection. About 250 plant specimens were collected from Brava, Kismayo, Bulo Haji, Badhadhe, Kolbiyo and Yamani areas.

About 450 plant specimens were recived in exchange from the different European and American Herbaria. The same number of duplicates collected from Somalia were sent to the foreign Herbaria in exchange.

Miss Maddelena, a botanical artist from Florence Herbarium, joined the National Herbarium on 1. August, 1982, for a period of four months under an Italian--Somali Assistance programme. She will draw iluustrations of common herbs of Somalia for the proposed publications from the National Herbarium.

Mr. Abdullahi Ahmed Ali, Mr. Mohamed Musa Ismail and Mr. Hussain Hassan Abdi, Range Assitants, joined the Herbarium as Herbarium Technician and it is hoped the processing and mounting of specimens will be accelerated.

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N.R.A. DOCUMENTATION CENTRE

The following books have been recieved gratis from the different institutions and individual to whom we are thankfull:

1. Studies of Range, Livestock Production System under Induced Change. ILKA.

2. Spices, Condiments and Medicinal Plants in Ethiopia, their taxonomy and agricultural significance. By: P.C.M. Jansen.

3. Key to the Families of Flowering Plants. By: J. Hutchinson.

4. The Aloes of Tropical Africa and Madagascar. By: B.W. Reynalds.

5. Trypanataluant Livestock in West Africa and Central Africa. By: ILKA.

6. Small Ruminat Production in the Humid Tropics. By: ILKA

7. Sahiwal Cattle: An Evolution of Their Potential Contribution to Milk and beef Production in Africa. By: ILKA.

8. Livestock Production in the Sub-Humid Zone of West Africa. By: ILKA.

9. Plant Research and Development. Edited by Institute for Scientific Co-operation.

10. Webbia: Raccolta di Scritti Botanici Vol. 22-35. Edita dall'-istituto Botanico della Universita di Firenze.

11. Microtechinque Cyto Chemistry. Edited by: Grame P. Berlyn, Jerame P.

12. Flora de Moçambique. No. 72-88. Edited by: E.J. Mendis.

13. Traditional Water Purification in Tropical Developing Countries. By: Samia Al Azharia Jahn.

14. Firewood Crops, Shrubs and the Species for Energy Production. By: National Academy of Science.

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IMPROVEMENT OF CHARCOAL INDUSTRY

Dr. Walter Emrich UNIDO Charcoal expert visited Mogadishu from 4.3.82 to 2.6.82 and prepared a brief physibility study on the developent of charcoal industry in Somalia. He was also concentrating on preparation for construction of kiln, kiln-site selection and compiling list of construction materials. Besides the preparation of the kiln construction in Afgoye basic information of status of charcoal production and marketing for the areas in Mogadishu, Afgoye and Baidoa was gathered.

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VILLAGE LEVEL REFORESTATION IN RURAL AREAS

Mr. D. Crabtree, reforestation consultant arrived Mogadishu Jan. 1982. for a period of six months under the above project supported by the Swedish Government (SIDA) within the framework of the FAO/SIDA cooperative programme.

The broad objective of the project was to investigate and help develop for long term the potential for village and community level reforestation, involving participation of the local people, in order to help prevent the spread of desertification and to meet a high proportion of the peoples' needs for fuelwood.

The Reforestation consultant, on the bases of his experimentation experience at Bur Acaba, Gezira, Bulalow and Balad, recommended a number of trees which can successfully be planted for firewood in Somalia.

In addition to the establishment of community plantations, the six-month project acted as a pilot project to study and develop, through practical application the potential for community forestry in Somalia.

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