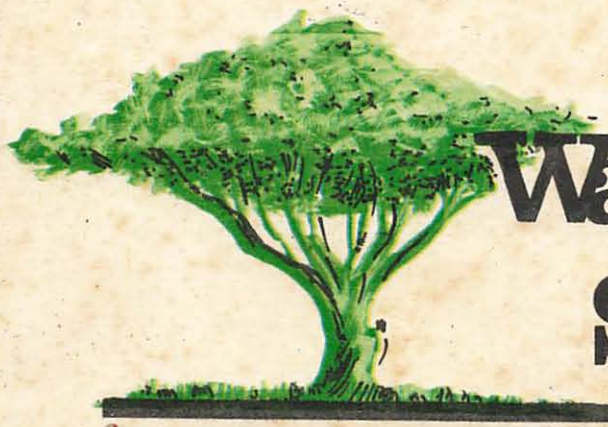
MICHAEL MADANY

Somali Range Bulletin

A Bulletin of Range Management, Forestry,
Wild Life and Related Subjects.



Warsidaha Daaqa Soomaaliyeed

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

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CONTENTS

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SOMALI RANGE BULLETIN is issued irregularly 2 - 4 times a year by the National Range Agency, P.O. Box 1759 Mogadishu, Somalia.

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.

The manuscript may be sent any time of the year to the Editor on the above address.

HORUMARINTA HABIS WARAABINEED*

Qore: Beter Wolff

Sannadadii dambe xeeladaha horumarinta waraabintu waxay gaadhay heer sare. Xeeladda Waraabinta cusubi waxay u fududeysay beer falatada - Khudrad iyo Canab beeratada iney gaadhaan isu-dheeli tirka dhulka iyo biyaha, dhulka ay wax beeristu ku habboon tahay. Wax soo saarku wuxuu aad u kordhey markii la kaalmeystey habis waraabinta. Arrintaa waxa caddeynayaa markii lama degaanka Bariga Dhexe laga hirgeliyey habis - waraabineeddo fara badan.

Habis waraabineedku waxa kaloo ay ka hirgashey Gobollada heer-kulka diiran. Meelaha kale ee waraabintaas ka hirgeshay waxa ka mid dhulka uu ka baxo "cherry" oo ah Mishigan (Michigan) oo cariga Mareykanka ah, Khudrad Xirmeedka Tasmania iyo Koonfurta Victoria ee Australia, beer khudradeedka Tottori ee Jaabaan iyo meelo fara badan oo ay isku ciid yihiin ciidduna la mid tahay gobolladaas, tusaale: Ciidaha iyo biyo keydintoodu yar-tahay markaana suulineysa midho-sannadeedka markuu biyuhu yaraadaan taas oon si buuxda waxba uga soo go'ayn iyo nooca oo liita, haddaba beeratada khudrada iyo Canab beerku waxay bilaabeen in ay ka sameeyaan biyo keyd habis waraabin gobollada waxa ka bixi karaan, se biyuhu qaali ku yihiin.

Aragtida guud ahaaneed, faa'iidada dhabta ah ee habis waraa-bintu gaarka ah kuwa dabeecadda iyo heerka dhaqaalaha u saamaxdo, waxay isticmaalaan xeeladda waraabinno kala gaddisan, sida Shuux-Waraabinta (Sprinkler Irrigation.).

Haddaba maanta Habis Waraabinta waxa loo isticmaalaa xaaladaha waraabinta iyadoo nafaqada xididdada iyo biyuhu ku jiraan si ay u soo jiiraan iyaga oo ka soo galayaa manbacyada u tuurayana dibedda, waxa la yiraahdaa Habis.

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* Reprinted and translated from "Applied Sciences & Development" Volume 10.

Noocyada badan ee habista biyo saarka waxay u dhexeeyaan 2-20 L/H. Taasoo loogu tala galay gudbinta gaaban. Waxaa suuro-gal ah in qoyaaan lagu arko xaddiga beeraha ee ay dhuumaha hubintu marayaan, taasoo ay dhuumuhu meel joogto ah yaalaan, qalabka dhuumaha laga beddeli karo iyadoon wax shaqaale ah lagu kordhin qorshaha cusub ee xaaladda waraabinta kordhineysana wax-soo-saarka, tashiilka biyaha iyo shaqaalaha sida lagu arkay Australia, Israel, U.S.A. iyo dhulal kale.

Aqoonyahannada sayniska iyo farsamo-yaqannadu xal umey helin in ay beeratadu horumar dhakhso ah u sameeyaan dhanka xaaladaha waraabinta ee Yuhuuda, Australiya, iyo Koonfurta Kaliforniya, halkaan waxaan ka fahmaynaa iney jiraan cilado dhanka farsamada iyo qalabka ee habis waraabineedka. Saynisyahannada iyo farsamo-yaqaannadu waxay isku taxalujinayaan, sidii dunida 'Xal-Faa'idadeed' loogu heli lahaa dhibaatooyinka aan weli la xallin.

Horumarka shaandhada (filter) iyo habista waxay yareeyeen khatartii ka iman lahayd dhuun-xidhanka, taasoo curyaamin lahayd habis-waraabinta. Xeeldheerayaashu waxa ay rumeysan yihiin, ineyna shaandhada oo qudha sifeyneyn biyo aad u wisieysan, Kaliforniya oo kale shaandhadhu iyo Daah-Shaandhadu (Screen Filter) ayaa la isugu daraa. Habka cusub ee loo sameeyey shaandhaooyinka Horumarka lagu gaadhay waxaa ka mid ah, Dib-u-taleejinta (Back Flushing) biyaha ama iskeed u nadiifinta shaandhooyinka ciidda ku dhex sameysanta waqtiyada hadda ah. Waxa la tijaabiyey shaandhooyin (Vortex Filters) waddamada Australiya iyo Hawaay, taasoo muujineysa horumarinta sahlan ee aan qaaliga ahayn, ee lagu isticmaali karo biyaha Kalarinta Khafiifka ah (0.5-1.0 ppm) ama biyaha Kalarinta culus (10 ppm) 10 ilbidhiqsi maalintiiba, iyadoo ka hortageysa Usurka xidhaaya dhuunta iyo ku noolaanta Baakteriyada (Bacteria).

Awoodda qalabka habista la saarey waxay suurto galisey, haddii xiitaa wisiq yari raacdo biyaha ayna wax dhibaato ah keeneyn, Isa-sifeyntu waxay dhalisey in habisyada cusubi noqdaan mid aad u heer sareysa qaalina ah. Beeraleydu waxay tix-gelinayaan ineyna dhisan, tan qaaliga ah kol haddii midhihii yihiin joogto, iyadoo uga kharash yar, xagga xeel-

dheerayaasha qalabka beddelidda inkastoo aan la hubin in uu qorshahaasi noqon doono mid hirgala. Horumarinta Naf-habista dib-u-taleejinta waxay runtii hoos u dhigtey khatarta habka ciijineed. Habista Taleejintu waxay joojineysaa qeybaha dhaqdhaqaaqa iyadoo ilaalineysa iney tallejintu ahaato mid caadi ah, haddaba shaqaalaha waxay awood ku hordhinayaan baarista waraabinta habista badan ee Qoodigiiba (hectare) waxay kor ku qaadeysa qiimaha. Dhibaato la'aanta qiimaha dhuumaha soo saarka Kaliforniya, sano-midheedka sida Tamaandhada, Khudradda Macaan, Cayada Hawii iyo Qasanka. Isku xidhnaanta dhuumaha ee ah laba-labada waxay hagaajinayaan xumaantii dhuumahaasi ku iman lahayd, cadaadiskooduna laga heli lahaa marinno dhuumeed oo leh dhowr dalool oo biyaha u gudbiyaha ciidda.

Horumarinta aabudhaha Naf-Taleejinta ku xidhan dhammaadyada cidhifyada habuseed, iyada oo suurta gelisa isku dhaqaajinta ciidda iyo waxyaalaha wisiqda ah ee ku urura cidhifyada dhuumaha - shaqada cabudhayaasha ilaa iminka ma aha mid raali-gelisey adduunka. Marka la hormariyo Farsamada Cabudhayaasha waxay kordhineysa waraabinta iyada oo iskeed u dhaqaajineysa walax-wisiqeedka ee ku ururta dhuunta dhexdeed iyada oo ay burburinayaan biyaha dhakhsaha ku socda wixii adag, burburineysana dhuunta waraabinta u dhidhan gobollada qaarkood. Meelha habistu waa baaba'aan marka midhaha la goynaayo sida qasabka oo kale marka la goynaayo waa la gubaa. Qiimaha qaadista, keydka iyo bixinta waxay ku dhowaaneysa qiimaha iibsiga. Dalalka qaarkood ee ay Mushaharadoodu sarreyso, waxa jira dariiqo guud oo lagu tuuro xariijin waraabinta midho-sannadeedka. Rajada Farsamada laga qabo, sida habwaraabin beereedka iyadoo la yareeyey cadaadiska Kanaalada dheer ee badkoodu la'eg yahay gudaarka dhuunta, ee xariiq-waraabinta, taasoo si habboon u yareysay fureynta dhuumaha biyaha.

Maadaama uu jiro xiriir aragtiyaad oo ka dhaxeeya qoyaanka ciidda biyaha ay dhirtu ka qaadaneyso nafaqada ay u baahan tahay iyo wax-soo-saarka, horraantii waxa laga cabsanayey iney beddesho bedka lagu isticmaaley (Dul Waraabinta, Shuux-Waraabinta) habis waraabinta loo doortey in ay disho dhirta haddii qoyaanku ku bato. Tijaabooyinka Australia, Yufuudda iyo dhulal kale waxay muujiyeen inaan baqashadaa

waxba ka jirin, xitaa dhirta khudrad ah ee waaweyn waxay la qabsadaan ciidda qoyan iyagoo bixinaaya xidido cusub oo u qiyaasan mugga ciidda qoyan ee habis waraabineed. Haddii dhirta xididadoodu ay waayaan nafaqo ku filan oo ay ka helaan mugga ciidda ay ka baxeen, waxa dhacayaa in ay xididadu dhadhaan. Fa'iidada laga helay habis waraabinta ma aha oo qudha nafaqo kordhinta biyaha lagu daraayo. Tijaabo lagu sameeyey Australia waxaalaga helay iney dhirta khudraddu ay soo qabsanayso nafaqada ay u baahan tahay, taasoo la xadidey xidido bed go'an inkastoo keyd nafaqeed loogu tala galay.

Israel habis-waraabinteedu waxay keentay waxyaabo tabane ah, sida Qaabyada Xabaal ciideedka sida ahaanteed mugga ciidda qoyani kuma filaa - ka maqnaanshaha shaqada tafidda ee ciidda iyo go'aanka (Heemis) Humaagga biyo-fidineyd ee dhirta loogu fidinaayo biyaha tijaabooyin go'aanneed oo ilaa hadda la sameeyey waxay inna tuseen si midho manaafacaad leh loo heli lahaa.

Ilaa markii la bilaabey, faa'iidooyinka gaarka ah ee laga helay, habis-waraabinta marka loo eego qeybaha kale ee waraabinta waxaa la arkay in habistu loo aqoonsan yahay sida ugu fiican ee biyaha loo keydsho. Tijaabooyin laga qaadey Israel, Australia iyo Kalifoorniya oo dhab ahaan loo xisaabiyey, waxay inna tuseysaa in biyaha la keydiyey ay yihiin 30-50 boqolkiiba, taas waxa lagu gaarayaa haddii la baadho biyaha dhabta ah eelloo baahan yahay iyo kuwa la filaayo waxay ku xiran tahay hadba sida loo isticmaalo. Uumi qiyaasaha iyo qalabka kale ee tijaabada waxay u kaadinayaan biyaha si caqli gal ah, keydinta oo muhiimadda gaar ah u leh dhulalka biyuhu ku filan aan lahayn aad iyo aadna ugu qaaliga ah, hababka faraha badan ee ilaa hadda la sameeyey haddana waxa jira arrimo badan oo u baahan iney baadhaan farsamayaqaannadu, iyo xeeldheerayaashu, khaasatan in lagaga shaqeeyo ficil iyo fa'yiba si la isug dheeli tiro Bukhaar Neefsiga huubada biyaha iyo biyaha la isticmaaley. Isku-darka habis waraabinta iyo ilaalinta bedka ku wareegsan xididdada dhirta iyada oo la dhl-saarayo, go' cinjir ah, taasoo yareyneysa biyaha uumiga ku lumaaya.

Bilowyadii hore ee habis waraabinta waxa go'aamo fiican laga helay Israel tijaabooyin gaar ahaaneed oo laga qaadey, tijaabooyin badan oo laga soo ururiyey dalal badan iyo aragtiyo gaar ahaaneed oo kala geddisan tijaabooyinkaas oo keeney midho fara badan markii la isticmaaley xeeladda waraabinta. Haddaba waxaan oran karnaa habis waa lagu isticmaali karaa aragti kasta iyo dhidho walba. Waa in talo ahaan loo qaataa tijaaboyinka dhul yar mar hore, intaan lagu tijaabin dhul weyn. Dhibaatooyinka faraha badan ee la xidhiidha habis waraabinta, marka midho gadka iyana waa la hagaajinaayaa iyo in hab dhaqaale looga fikaro in lagu waraabin karo habis midhaha noocaas ah. Markii la isticmaaley waraabinnada kala geddisan waxa la arkey in shuux-waraabinta ayna caleentu qoyaan qoqoneyn, kor-ka-waraabintana ayan keeneyn wax cayayaan ah, yareysana ciid guurkii biyuhu dhalinayeen, iyadoo ayna wax-cayayaan ah cudur dhaliye midina ka imaneyn.

Intii la adeegsaday habis-waraabinta waxa laga helo midho badan, ciid-nafaqeyntii oo keyd noqotey iyo xooggii shaqaalaha ee ciid nafaqeynta, oo baaqdey, waayo markii ugu horreeyseyba habis waraabinta iyo nafaqada ayaa lagu wada isticmaaley, taas oo aad u howl yaraatey isticmaalka dareeraha Niterginka, iyadoo dhibaatooyin macdaneed, iyo mid fal-kemika la yeelatay habis waraabinta, iyadoo u horseedaysa wisiq iyo oodista dhuumaha biyaha. Waxa lagu xallin karaa dhibaatada hab farsamo ama kimiko, se wax muhiim ah in la ogaado curiska dhibaatada.

Isticmaal nafaqo macdaneed laguna waraabinaayo may xallinin dhulamaha iyo marinnada haddii aan eegno nafaqo macdaneedka (P) waxaan arkeynaa in urur suyuc ah kaga tageyso marinnada xalinta arrintaasina waa in aan isticmaalno (Phsphet compound). Madaama ay jirto milan xoog ah oo ku dhalinayaa habista khatarna u ah nafaqo shaandheenta bedka xididda ee ka hooseeya habista. Khatartaas oo ilala kulmey markii si habboon loo qiyaasey biyaha iyo nafaqada lagu isticmaaley.

Si loo helo keydka nafaqo ee Nitrogenta waxa loo baahan yahay in la ogaado aminta iyo qiyaasta loo isticmaaley.

Faa'iidada isticmaalka habis waraabinta waa marka lagu isticmaalo biyo salin ku jirto dhul lama degaan ah ee milixdu aad ugu badan tahay, dhulka qaarkood ee ay biyuhu jiraan. Taasoo milixdu ka suulineyso, dhulka xidida u dhexeeya tijaabo lagu sameeyye milixaynta shax-baarka Kaliforniya ee cariga Mareykanka waxay caddeeyeen in biyaha salinta leh 3mmho/cum leh lagu waraabin karo lusina (Lucerne) iyadoo oo la eegayn wax ka soo go'aya. Waxa ay dhibaato imaneysaa marka roob ka da'o meesha ay ku ururtsan tahay milixdu, dabadeedna milmeysa iyadoo oo u gudbineysa bedka xididka ku yaal. Waxana laga hortegi karaa iyadoo la dado intaan roobku di'in taasoo bedka xididka biyo badan helaayo, iyo milan yar.

Waxaa jira tijaabooyin ka socda Cariga Mareykanka oo lagu baaraayo, sidii milixda looga saari lahaa habis waraabinta iyadoo aan waxba looga geysan dhulka. Qasdiyada kale ee laga leeyahay baaristaas waan in xitaa wabiyada laga tiro milixda.

Ilaa iminka dhanka qalabka iskood u shaqeeya sannaddada dambe hore ayaa loo mariyey, si looga helo habis waraabinta faa'iido wanaagsan. Ilaa iminka qalabka la hayaa waá laba nooc oo kala ah: Mid waqtiga mugga iyo mid walaaqa ciidda qoyan oo dareeme ah. Qalabka hore ee la isticmaalaayey wuxuu ahaa mid iskii waqtiga la shaqeeya iyo mid waqtiga biyuhu dhaafayaan la shaqeeya, isagoo sina xiri kara, isna furaaya qeybaha kale ee waraabinta. Qalabka Simi-Otomatigga ah wuxuu u shaqeeya isago, leh cabudhiye gacanta lagu furo, iyadoo iskeedna u xiranta marka biyaha loo baahan yahay dhaafaan amin go'an. Marka dareemaha ciidda qoyan la isticmaalaya, waraabintu waxay bilaabantaa marka dareeme qorohu ka hooseeyo inta qoyaan ah ee ku jirta ciidda.

Haddaba isbedlka qoyaanka ciidda oo ka dhici waxaa meelo isudhow-dhow lagama isticmaali karo habkan aan soo sheegney, taasoo dheereyn karta muddada abuurka. Waxaase loo baahan yahay iney jiraan Falfiyo (valves) ku shaqeeya socodka biyaha ama xoogga korantada (Electiricaly operated).

Waqtigan hadda waxa lagu tijaabiyey qodaallada (Farms) waddanka Australia, hab-farsamo ah hab hawo lagu buuxiyey u shaqeysa si automatik ah (USWB Class A Pan)

Guud ka gaadhista, ama guul la'aanta habista biyaha ee qodaal-ladu waxay inta badan tahay qorsheynta iyo habka iyo nooca farsamo ee la qaato, taasoo waliba ay sii dheer tahay dayaactirka gaar ahaaneed ee la siinaayo.

Marka la qorsheeynaayo waxa marka horeba tixgelin mudan habka uu u shaqeynayo naqaska hawada iyo sida dhulku kala yahay, inuu qal-qalooc ku jiro iyo in uu siman yahay, waxa guul weyn laga gaadhey firyeynta qodaallada Konfurta Kaliforniya ee San Diego oo dhulku kala sarreyn iyo qalqalooc dhaadheeri ku jiro.

Waxay dhowaan si aada looga shaqeeye iyadoo dadka warshadaha lihii ka faa'iideysanayaa waayo aragnimadii ay dhaleen habka cusub ee firyeynta qodaalada.

Haddaba su'aashu ilaa hadda aan laga jawaabini waxay tahay dhinaca sayniska waa firi-beerista qodaallada. Waxa kaloo ninna ka qarsooneyn in firiyeynta qodaalladu waddamada shaqaalihhu iyo biyo-siinta beeruhu ay ku qaali yihiin, isla markaana haysta qiimo aad u sareeya badeecadda beeraha ka soo baxa, waxaan mitaal ahaan u soo qaadanaynaa Gobollada Buuroleyda San Diego ee Kaliforniya. Gobolkaas ku caan ah soo saarista midhaha badeecadda beeraha oo biyo siinta geed-gaabka qiimahoodu yahay 70-135 doolars akerkiiba (1,133 ml) ayadoo qiimaha ku baxa ee ugu jabani yahay 1.6 dollars Gobollada ugu hooseeya waddammada shaqaaluhu qiimo xoog leh ku fadhiyo. Waxaa laga fursan karaa ku isticmaalidda makiinadaha firiyeynta qodaallada sida:

Qodaalka Sonkorta ee Hawaai
Qodaalka Miraha ee Israel
Qodaalka miraha ee Australia
Qodaalka cawska ee Koonfurta Kaliforniya.

Haddii laga eego dhinaca kharashyada ama dhinaca shaqaalaha waxa lagama maarmaan ah joogteynta ku isticmaalka habka makiinadaha firiyeynta beerah. Wakhtiyada dambe habis waraabintu haddii ay hore u sii marto dhanka qalabka iyo habkaba, su'aalaha ku saabsan dhanka dhaqaaluhu, iyagu waxay ahaanayaan qaar taagan, taasoo ay ku fidi doonaan gobollada dhaqaala darradu haysto.

Haddaba waxa haboonaan lahayd haddii clmiga Saynisku soo saaro go'aamo dhaqaale, oo lagu isticmaalo Habis, waraaminta, Khaasatan dhulalka horey u marey haddii la doonaayo, in laga gaaro natiijo fiican.

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S U M M A R Y

Hardly any other new development in irrigation techniques has met, in the last few years, with as much interest as drip irrigation. In this system the water is discharged in small quantities per unit of time. i.e. the water outlets also known drippers, are so constructed that they discharge the water into the soil "a drop at a time". The rate of flow of water can also be controlled. As the water reaching the roots of the plants directly through tubes, being impure, salty or sometimes carrying fertilizers, created in the bigening problems of clogging which proved to be the greatest handicap to drip irrigation. But the modern technology has solved the problem by developing different types of filters and self-flushing drippers. Different types of systems adopted in Australia, America and Israel have been discussed and compared.

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RANGELAND RESOURCES AND THEIR MANAGEMENT AND DEVELOPMENT IN SOMALIA

By: Mohamed Musa Awaleh,
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I N T R O D U C T I O N

Range Management is relatively a recent science and has been introduced in Somalia for the last 10-15 years. This is defined as land management skillfully applied with organized body of knowledge (Range Science) to renewable natural resources. It aims at protecting, improving and continued maintainance of range resources which include soil, vegetation and animals concurrently with the optimum production of goods as needed by mankind.

The major products of the rangeland are the livestock and their various bi-products, i.e. meat, milk, hides and skins on one hand and building material, fuel, gums and resins etc. on the other hand. In order to keep the supply of these and many other products, the rangelands and its inhabitants, the nomads, need special attention and consideration. How the Somali nomads and their animals have adjusted themselves to the meagre available range resources in harsh and difficult environment has a long history. Through out generations they have accomulated a wealth of experience on the availability of fodder for their livestock and livestock rearing. However, they have not had the grip of interrelating their experience with conservation and management of this meagre resource to provide continuous and sustained production of feed for their animal all year round. The falacy that grass is the gift of god and could be used as any body feels is still existing in the minds of the nomads in most parts of the country. This attitude of the nomads along with low fertility of soil, and unpredictable eratic & scarce rainfall, has lead to the desertification process that is seen in nearly all over the places in Somalia.

The Somali Democratic Republic is located between 41° & 52° and between 2°S. and 12°N. The climate could be divided into 2 rainy season. The first (Gu) from 15 March to end of June, and the other (Dayr) from September to December followed by 2 dry seasons "Hagga and Jilaal" respectively. The effect of altitude is most distinct in the North where it range from 0-50 m in the planes to 2000 mm above latitude 5°N. Temperature also varies. This variation is mostly marked in the North as compared to the south where it does not vary much. On the whole the temperature ranges from 20°C to 40°C in the northern coastal areas. Relative humidity is generally high along the coastal and reaches about 78-80%.

V E G E T A T I O N

Main vegetation could be divided into five main zones, i.e. a) The North Coastal Zone (b) Highland Zone (c) Mid and South Eastern Zone (d) Central Zone and (e) Inter Reverine Zone.

a) North Coastal Zone: runs from Zeila up to North tip of Horn of Africa it composes of coral beaches, sand dunes, deltas and estuaries and inland coastal plains.

The main vegetation on the coral beaches is represented by salt loving species of Sueada fruticosa (Harun), Tamarix nilotica (Dhur), the sand shores are covered by Maerua spp., Indigofera oblongifolia (Jilab), Zyzyphus hamur (Gob), Halopyrum mucronatum, Panicum turgidum, Pensisetam divisum and a good sand building plant Lasiurus hirsutus. Inland plains are generally covered with Tribulus terrestris (Gocondho), Zygophyllum simplex and the grasses like Panicum, Aristida, Eremopogon, Eragrostis species. On flooded deltas with alluvial soils Enneapogon spp. and Cyprus spp. (Sedge) are common. The Western portion of this zone from Berbera to Zeila could be regarded as grass steppe while towards the east 70-80% of vegetation is dwarf shruby.

b) High-land Zone: occupies an area from 500 m below the escarpment up to 2000 m of Golis mountain range and beyond as far as the plateau of Haud, Soll and Nugal. The soil is gypsiferus in Nugal, red sandy in the Haud, and dark and more fertile on the high elevetion. This area is generally bush/brush covered country with scattered trees of acacias. The vegetation varies from the Haud type to Boswellia, Buxus and Juniper association, while the areas of Haded and Nugal are the grass plains. The Haud type of vegetation is predominately composed of Acacia mellifera, Acacia nilotica, Acacia tortilis, Acacia misera, Acacia horrida, etc., Commiphora spp., Boscia minimifolia, Grewia spp., and occassional grassy plain composing of Chrysopogon spp., Aristida spp., Pennisetum orientale intermixed with Indigofera and Belpharis spp.

Boswellia association composes of Boswellia spp., Commiphora spp., Cadaba glandulosa with various grasses like Cenchrus, Tetrapogon villosus, Chrysopogon and Buxus association is represented predominately by Buxus hildebrandtii, Dodonaea spp., Acokanthera schimperi, Rhus natalensis, Dracaena schizantha with some Cadia purpurea, Euphorbia spp., Lannea malifolia, Olea chrysaphylla and Combretum species. The climax association is predominately Juniperus procera.

The vegetation of Haded and Nugal with its extensive grass plain composes chiefly of Sprobolus senegalensis, Sprobolus ruspolianus, with salt loving type of plants i.e. Salsola spp., Sueada spp., and with patches of Andropogon and other salt tolerant grass spp., and scattered Cadaba spp., and Boscia minimifolia. At higher elevation and below the escarpment, the vegetation can be divided into Boswellia association higher up Buxus and Dodonaea association and the climax vegetation of Juniperus procera association. Acacia etbaica also grows on specific areas.

c) Central Range Zone: is actually composed of two main sub-zones, i.e. the Haud area and Hiran plateau. The soil composes of gypsiferous type, i.e. sandy soil overlying limestone. The soil in the Haud area

is generally of red sand. The vegetation is a bushy type predominately with Acacia species, Commiphora spp., Boscia minimifolia and Grewia spp., with Cenchrus spp., Aristida spp., and Blepharis on the grassy plains.

Hiran plateau is a raised hilly area about 100-200 m above the surrounding areas. It is undulating country predominately vegetated with Acacia spp., (A. millifera, A. senegal, A. tortilis etc.) Commiphora spp., and Grewia spp., with grass species commonly of Aristida species and Tetrapogon species.

d) Inter Reverine Zone: is most potential and at the sametime an area of conflict within the nomads, farmers, and wildlife conservationists.

The main vegetation is composed of grasses e.g. Cenchrus spp., Cynodon dactylon, Panicum spp., Tetrapogon and Dactyloctenum spp., with various types of herbs and bushy type commonly of Combertum spp., the woody vegetation is represented by Terminalia praecox with Acacia seyal thicket, where shifting cultivation is also practiced in many parts.

The reverine Forests are dominated by Ficus spp., Mimusops degan, Afzelia quarzensis, Hyphaene bena, Albizzia anthelmintica and Delonix elata. In these areas various types of climbers and bushes of Grewia spp., are also commonly found in the forests. Adonsonia digitata and Dobera macalusoi are common in the areas with abundant water supply. At the mouth of Shabelle River where it forms swampy deltas such plants as Sorghum virgatum, Andropogon pertusus, Panicum maximum and Sprobolus robustus predominate.

CARRYING CAPACITY

a) The carrying capacity of the North Coastal Zone varies from 5-6 to 20-85 tons/sq. Km. and gets lesser from Ras Hafun little bit below Bander Beyla. The area is grazed more heavily during the dry season, when the weather gets cooler and during the summer the herder move to up land country or beyond as far as the Haud. Inspite of this, the carrying capacity is generally exceeded.

b) The Highland Zone forage production could be approximately 10–15 ton/sq. km. although less in many of the over grazed parts. In all parts of this zone the carrying capacity is very much exceeded and this is the area where heavy number of animals survive.

c) In Central Range Zone there are many bore wells, whose surrounding areas are disasterously overgrazed and replaced by such plants as Aervia jewanica. During the raining season the area could produce 10–15 ton/sq. km., but due to severe overgrazing the production goes down to 5–6 ton/sq. km.

d) Inter Reverine Zone has the highest rainfall and thus the highest fodder producing zone.

MOVEMENT OF NOMADS

The Somali nomads generally follow a set seasonal pattern of movement which depends on the rainfall and availability of grazing ground. Any change in their traditional movement is seen when their traditional grazing area does not offer enough vegetation for their animals as a result of rain failure or drought.

In the North, because of the high temperatures in summer nomads of the coastal areas move towards the south in search of cooler climate and pastures. Those at the plateau are moved towards the Haud where the vegetation is suitable for all types of livestock and resume backward trend on the improvement of vegetation in their areas with exception of those who has cement tank (berkads) or those who could afford to stay there for long. Camels during this period are brought to feed on salt bush species such as Salsola, Saueda and other species.

The nomads in the central areas move from East to West during the Gu (March–June) and return back during the season when it gets drying.

The mobility of the nomadic community is no longer intact due to the general trend of people including nomads who have been farming in settlements and cooperatives with the assistance and guidance of the Government.

NOMADIC POPULATION AND THEIR PATTERN OF GRAZING

Seventy five per cent of the population of Somalia follow nomadic system of existence and through out history has developed adaptive method of rearing their livestock in their continuous movement minimizing the risk and making adjustment to the hazards of the environments. Rural sociologist, Ecologist and Animal husbandry experts has wrongly quoted the nomads of this country as well as of other countries for hazards and denudation of rangeland alone. It is stated that nomads like to refrain from selling their animals because of prestige and wealth. It was also quoted that nomads have not changed their traditional system of grazing and were exclusively blamed for the destruction of rangeland. These statements are far from being the factual truth. It is my firm belief that not only the nomadic herders are responsible for the destruction of the rangeland and thus allowing the process of desertification alone but the responsibility also lies on the state planners for indiscriminate water provision and veterinary authorities for lack of care. Example of this could be illustrated by the water Development Programmes in Central Sudan and Sahelian areas of Africa.

The Somali nomads today had aquired a taste of better standard of live and are not contented to live on meat and milk alone. Their demand for more luxuries, education for their children and medical care has increased and they are trying hard to achieve their increased requirement through the meagre resources of the arid country by improving the production of their livestock by utilizing their know how to the best. They are very receptive to the modern ideas of proper range planning and management, if they are convinced that these programmes help them and their stocks.

Many planners are today of the opinion that nomadism is something to be done with or the nomads may be confined to few festricted areas and their mobility may be hampered. Both solutions appear to be impractical. Because nomadism is not a profession but it is a culture, a way of life and has been developed through centuries experience in fighting the environment. Totally ignoring the fact and trying to change them into different kind of people is impossible. No doubt the a chepest and logical way of maintaining production and creating better opportunities for the nomads is through a programme based on modern knowledge, technique and equipment. At the same time compelling the modern ideas without respecting their fundamental values will be disasterous. We can easily blame the nomads for not discovering a better s system comparable to the modern ideas in a way that would have fit the environment keeping in mind their cultural values and ignorance from the modern knowledge. It is therefore most important that before introducing any development programme the planner should think how to not very much disturb the rational nomadic values. Only then success can be achieved in this direction.

EFFECT OF WRONG PLANNING

Many writers had drawn our attention to the determental affect which nomadic way of life had on plants. But as stated earlier none has stressed the fact that indiscriminate water pores holes, reservoirs had also more serious effect.

Considering both together, there is no place in this country that has not been severely grazed or cut out. The process lead to the loosening of top soil which has carried by short torrential rains and even more by strong wind of the Kharif. The exposing of poor subsoil and rocks expose the roots of plants which lead to death of vegetation and ultimately erosion causes desertification. This phase of destruction has reached a horrifying stage and certain areas today are beyond any stage of reclimation. This is proved by the fact that degradation has

resulted in disappearance of some of the best forage and fodder species that used to be extensive all over the country. Such as the Daremo (Chrysopogon aucheri), and Cenchrus ciliaris which used to be extensive in all over Northern areas, and Themeda spp., one of the best grasses in Africa used to be abundant in Tug-Wajalle plain are no longer seen or only few are surviving on the fringes of the plains under Acacia bush. In view of its high palatability and nutritive value it was also selectively destroyed by the livestock. Taking instance of another, Golol (Acacia bussei), which is now either dead or dying in the whole northern areas used to be abundant. This tree is considered most useful by the nomads because of its many uses. i.e. for making ropes, houses, carved wood, made from the different parts of the tree. Since this tree has more lateral surface roots and when the top soil is removed through overgrazing, erosion occurs and then the roots die due to exposure. In many areas where this tree used to be abundant is now replaced by Ged Waraabe (Hypoestes).

START OF A NEW PHASE OF DEVELOPEMNT

No rangeland could be improved or developed without proper land use related to the ecological potential of each rangeland. This could only be realized when political and economic institutions understand and accept the realities of ecological situation, the needs of the population and animals involved and take the necessary steps to bring these aspects into balance. The requirement in this connection is critical in Somali Democratic Republic and other regions of the world. We are dealing with a situation where most of our people depend upon their livestock for survival in a country where drought is common and expected any year; soil is rendered unstable, plant cover is reduced drastically and disturbed; and process of desertification is going at a rapid rate.

Today the threat of destruction of the range resource has been felt and created much concern since the 1974-1975 drought. This natural

disaster has really altered the atitude of the livestock community, public and government; and activated the desire to ease any future calamity through viable Range Conservation and Development Programme.

Against this background the Somali Government being aware of the situation has given more attention to develop the livestock section through conservation of the rangeland. In response to this, the Government created the National Range Agency as the Government institution under Range Conservation and Development Act and entrusted the Agency to deal with development of rangeland, forest, conservation of wildlife and related subjects. The act has been applied through out the country. The Agency in collaboration of the World Bank, F.A.O., UNDP, Kuwait Fund and U.S.A.I.D. put into operation three Project since 1976.

1. Northern Rangeland Development Project (Jan. 1977 - Dec. 1981)
2. Central Rangeland Project (1980 - 1984)
3. W.F.P. 719 Programme (1976/78 and 1979/1981.)

Through such programmes, the Government in order to conserve and develop the rangeland has taken the following activities:-

a) A system of grazing reserves has been introduced in all water points to recieve a period of rest to induce revegetation cover, natural reseeding, and production of vigorous root systems.

b) This system could be effective if the noamdic society take part in running these reserves through non-formal training programme. A campaign has been carried on along these lines to train nomadic elders in the methodology of preserving the rangeland through seminars and the radio media.

c) Forage and fodder production farms has been established in the high rainfall areas and below watershed as well as on dry and others denuded areas using both the best local species and others imported of known nutritive value which adopted to the climatic condition of the country. These areas will serve as demonstration areas for the

semi-settled community, cooperative ranchers and numerous private enclosures. These will also serve as "fodder bank" for the livestock within the vicinity or for animals intended for export.

d) Encouragement of nomads and semi-nomadic communities to form into cooperative ranching societies where feasible. The process has been started in Sanag Region but still far from being satisfactory. Those cooperative run and owned by business men with few of their nomadic relatives seems to be working alright and it is expected that these will follow and implement any management plan provided to them.

e) Series of fodder and trees nurseries as well as seed preservation and collection centres are established in various location, based on topography and available plant species. The idea is to preserve grass fodder and forage species of known palatability and nutritive value for the four livestocks, camels, cattle, goats and sheep.

CONCLUSIONS

Reviewing the progress of the above projects and the other activities of the National Range Agency since its establishment in the year 1976, one of the major achievements is the understanding it developed among the public, Government and the nomadic society regarding the role of range science in rural development. Many range principles has recieved wide acceptance by the Somali nomads who are now quite inclined to adopt the range management and development methods for their better life and production. They have started to settle down by constructing cement water tanks (berkas) and supplying water by trucks to the animals in waterless grazing land instead of moving their animal tremendously from the stress of walking long distances in which quite a number of the stocks used to collapse in between. Not only this but the Somali nomads especially in the North have learnt sharing water with the others in the time of need. They are building enclosure to conserve

forage and grass, cultivating certain forage like Cassava near Mogadishu to feed their livestock those are kept in the city, as well as construction of bunds, plugging gullies, contour furrows. The Agency has been recieving requests for the advise for such work.

Once the nomads, livestock traders and public are receptive to range development and conservation ideas then the next important step of reducing their number of livestock according to the carrying capacity should not be difficult.

As our range development programms develop in size we will need more trained personals to lookafter the interest of nomads. It is very encouraging that the N.R.A. has given priority to the training of staff and has already sent quite a number of suitable persons for further training abroad.

At the end I will again emphasize that whatever we have achieved it is not through compulsion but through agreement completely respecting the nomadic culture and their way of life. And we should stick to this friendly policy in future.

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WHAT ARE SOMALI'S PRIORITIES FOR DEVELOPMENTS ?

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1. This is an interesting question and no doubt many people have tried to find the right answers over many years. It is obvious that if Somalia possessed mineral resources such as oil or copper, etc., then the development of those resources would have high priority. The search for such buried treasure will be well planned and one hopes for success.

2. A look at the situation of Somalia, as a geographical exercise, shows the other possibilities for development and at the same time points to the limitations. It is obvious that Somalia, as with most other countries, needs to use all possible resources to the full in the fight for survival.

3. A factor of potentially great value is the long coastline in the Indian Ocean and the Gulf of Aden. Off this coastline there are warm seas which are known to be well stocked with fish. A supply of valuable food, supplying high quality protein and minerals, is therefore available to Somalia and perhaps this is one of the main areas in which expanded development could take place. In addition to food for humans, a fish industry also provides oil, fertilizer and animal food of high quality. Of course people who have been used to living on milk and meat may take a little time to adapt to eating fish, but the city dwellers have already shown that they can enjoy eating fish and that they know its value.

4. The second area of great potential value is the large area of higher rainfall around the rivers Juba and Shebelli. The higher rainfall, together with the maximum use of irrigation water offer opportunities for mixed farming, that is crop production together with more intensive livestock farming. Once again, of course, people attitudes need to change. Mixed farming is a skilled job

requiring hard physical work on a day by day basis. People who have lived by nomadic livestock methods would take more than a generation to adapt to this new sort of life. Production per hectare is much greater from arable or mixed cultivation than it is from random livestock herding.

7. The largest area of Somaliam as we all know, is made up of rangeland. Rangeland is generally known as land which is suitable only for livestock and which is unsuitable for cultivation. Normally the restriction of use to livestock only is related to climatic limitations. For this reason most of the rangelands of the world are in areas of low rainfall and hot sun. In Somalia about 70% of the land is rangeland.

Here then is a potential resource of great value, because of its size. We need to look very carefully at these large areas if they are being used to the best advantage for all.

The overall picture, at present, of the rangelands, is one of reducing potential due to the following reasons:-

a. Soil erosion, leaving large areas of bare land.

b. Too many animals, leading to deaths in drought years.

c. Loss of trees due to cutting, and bare roots due to erosion.

d. Destruction of land due to long walks by livestock between water and fodder areas.

e. Insufficient water.

f. Moving sand-dunes.

Against this background in the rangelands, what can we see as the priorities for development ? In other words what is needed in order to make full use of these large areas without turning them into desert ?

A geographical appraisal of the Somali rangelands suggests that the following are the priorities which need to be considered in order to improve environment and so lead to improved production:-

a. Tree conservation and tree planting on the largest possible scale (i.e. a major programme).

b. Water development, for two reasons. Firstly to reduce the livestock trek to water and secondly to support the tree planting programme.

c. Communications that is road development to all districts in order that tree and water development can be supported. there appears to be a need also for regular air links between the capital city and all regions. The latter need is due to the large size of the country and the importance of mobility in the carrying out of development surveys and supervision.

d. Increased livestock marketing. In order to reduce the numbers before the drought and so to save excess deaths of animals and erosion of land. Resting of the land in large blocks for regeneration, should also take place when the livestock population is correctly related to the carrying capacity of the land..

e. Manpower Resource Development. It is difficult to create an infrastructure within which all employed persons can work effectively, but nevertheless this is what needed to be done. Education is of no value unless the people are given a defined job to do and have the material support necessary to enable them to carry out their duties on a daily basis. The creation of an infrastructure of development is therefore an essential of manpower resource development and it is more important than education as a priority. Education can be paid for by successful development but education alone does not creat development. The present skills of the nomads need to be assessed and used.

7. Conclusion. The above simple outline of development priorities constitute the views of the writer. It would be interesting to have the views of many others about Somalia's development priorities.

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OUR MOST PRECIOUS AND UNIQUE RESOURCE

W have Somalia's wildlife in our hands, a mos precious and unique resource to keep alive.

We all have our part to play in working to save our wild-life. Young or old - each of us has a job to do in helping to preserve our country's heritage.

I F

W know of poaching we must report to the police. The poachers must be punished severely.

SOME BROWSE AND FODDER PLANTS WORTH TRYING IN THE NORTHERN AREAS OF SOMALIA

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

There can be no two opinions about the fact that the progress in livestock production in Somalia quantitively and qualitatively depends on the adequate provision of food to the livestock in times of drought. No matter how vigorously water supplies are improved, unless the feeding of livestock during the time of scarcity is planned for, little permanent relief is likely. Along with the development of rangelands and drought reserves it is also important to pay considerable attention towards the development of fodder farms and browse grooves. Because of the high cost of seeds and preparation of the land it is very important that the most suitable species with the maximum nutritional value may be selected. It is considered generally, that the introduction of indigenous species in the fodder farms should be the easiest and cheapest because of the availibility of seeds locally. But the indigenous species may also differ in its fodder production/ha and nutrition. May be sometimes the exotic species prove much better than the indigenous ones.

Side by side to the fodder farms establishment of browse grove as a fodder reserve for the dry season or drought feeding as shelter belts and a source of fuel also can be very useful. In the times of drought many of the gramineous and herbacious species either die or are so heavily grazed that there is little dry matter available. It is then the importance of browse for animal nutrition becomes vital. Completely new concept of browse has arisen with the introduction of urea supplementation of roughage in animal nutrition. With change in the microbial flora of the remen animals have quite readily turned to

eviously untouched woody plants and this new tool in browse use and bush control is worthy of serious investigation and implementation.

POTENTIAL FOR GROWING FODDER

The potential for growing fodder crops is quite promisable mainly in the North-Western area of Aburein, Kalabeit, and Borama which benefit from good rainfall of 400-600 mm, and where good deep alluvial medium textured soil exists over more than 150,000 hectares. It is considered that there is also a potential of about 20,000 ha north of Hargeisa. This area is also a main cattle production and farming zone. There are also potentials of growing drought resistant fodder and browse under watershed management in the areas like Burao, Bohotleh, Erigavo, Zeila, Berbera and Las-Anod. For all the above areas, however, it is necessary that experimental and demonstration plots should be set up in each area to explore the feasibility and economic value of the crops selected for the purpose.

In the following paragraphs some of the promising species worth trying in the northern areas have been given.

GRASSES

Cenchrus ciliaris is a native grass with a high feeding value. It has been observed that it thrives well in protected conditions like inside the spiny bushes in all ecological zones. It is possible that local strains would be propagated successfully by seeds owing to low germination rate as it often happens because of the chemical inhabitor in the glumes. But improved strains and varieties with a good germination rate are available on the market in America, Australia and elsewhere. Another species C. setigarus which has been very successful in the arid areas of Rajisthan is also worth trying.

Chrysopogon aucheri is the local "Daremo". We dont know anything about its germination rate. But it is observed that the potential for this type of fodder crop should be, at least, 5 to 10 tons of hay per ha with a fairly good production technique and manuring.

Lasiurus hirsutus which is usually to be found in the large bushy thickets in Somalia is considered to be a good desert fodder. The seeds may be collected for trail at the fodder farms. Another species Lasiurus sindicus which has been cultivated as a valuable fodder in Indo-Pakistan arid areas is releshed by camels, cattle and sheep may also be tried.

Pennesetum americanum The Pearl Millet is widely cultivated in different countries. A large number of races are known which may vary in colour and grain, in the hairness of panicle, in size and many other ways. It can be cut green and provides an excellent forage for stock. Some strains of P. americanum has also been developed which are cultivated in the arid areas of Sind in Indo-Pakistan.

Pennisetum purpureum commonly known as "Elephant grass" or "Nappier's Fodder" grows very rapidly and if cut before it is fully grown, yields an excellent hay. When full grown the stems are reed-like and can be used for fences, walls of huts etc. The mature leaves are razor-sharp on the margins and therefore unpopular with stocks at this stage. A hybrid of P. typhoid and P. purpureum has been produced in South Africa which is in appearance like a very robust P. perpureum and is a very useful fodder.

Setaria sphacelata distributed in tropical and South Africa being a very excellent grazing grass has been introduced in many countries. It grows well on red dry land.

Bromus unioloides, a native of South America, introduced in many other countries as a valuable fodder grass.

Urochloa pullulans grows in dense tufts and provide coarse grazing for cattles. In some parts of Africa the grain is said to be eaten by the poorer people in times of femine.

Ehrharta calycina has a good reputation as a grazing grass in arid areas.

Bothrichloa insculpta is a fodder grass, probably needs some irrigation or can be grown in run-off.?

Chloris gayana or "Rhodes Grass" which is eaten greedily by all stocks has a high nutritive value and makes a most excellent hay. It is a grass of open grasslands and Savannah.

Eragrostis curvula is a very important ley and fodder grass, widespread in South Africa and now introduced in other countries.

Eragrostis tef. a native of Ethiopia, where the grains are used as food has been introduced in many parts of the world. This annual can be grown as a useful hay crop, and is extensively grown for this purpose in South Africa.

Eragrostis lehmanniana is another South-West African grass which flourishes in areas with a small rainfall (35-50 cm).

Panicum miliaceum grown as a hot weather crop in north-western parts of India, both as a grain crop and as a greenn fodder. It produces a large amount of leaves.

Panicum maximum a tropical African grass also known as "Guinea Grass" is one of the best fodder grasses which is much liked by stocks.

Panicum antidotale is a suitable grass generally for sand-dunes, dry beds of rivers and in desert places, where its extensive rooting system, often extending for many yards, ensures its survival in the times of drought. In more favourable habitats it grows luxuriently. It is an excellent sand-binder and probably it is accepted as fodder where little else to be found.

Hyparrhenia hirta of Middle East, Iran, Iraq and tropical and South Africa is a good fodder grass which grows in places where little else will.

FORAGE SHRUBS AND TREES

Cassia sturtii a native of Australia is providing nutritious forage in experimental projects in Israel's arid region. It has good grazing resistance and the leaves have a protein content of about 12% with dry matter yield of about 1000 kg/ha in a semi-arid area with 200 mm rainfall. It grows in variety of soils including sandy and slightly alkaline.

Acacia tortilis indegenous in Somalia is extremely drought resistant. Because of its valuable pods which are devoured by wild herbivors, camels, cattles and other domestic livestock, its palatable foliage and the high caloric value of its wood which makes superior firewood and charcoal it deserves attention and extention.

Acacia albida a native of Africa's dry savannas and reverine basins have been introduced in the northern areas of Somalia few decades back. The few scattered surviving trees are thriving well. Although it prefers deep sandy soil and annual rainfall of 650 m, if deep ground water is available, A. albida also thrives well where the rainfall is only 300 mm. Greedily eaten by sheep, goat, camels, and cattles, the leaves, small branches and twisted pods make excellent fodder. Acacia albida can be planted on large scale on a village and community level.

Acacia victoriae is a fodder shrub widespread in semi-desert areas in inland Australia. The shrub has shown excellent growth and survival characteristics in arid plots in Israel, with good palatability during the winter growing seasnn an excellent ability to recover after grazing. It tolarates a wide range of climates and soils ranging from sand to heavy clay and even grows on saline soils.

Prosopis alba a very important native tree in the arid subtropical plains of South America grows in the areas with a rainfall of 250-500 mm. It is valuable for windbraks and roadside planting and is also valued as a fodder and timber tree specially in afforesting dry and saline soils. The fruits are milled into flour from which cakes are made for human consumption.

Prosopis tamarugo a native of Chile grows in the areas which recieve only 100-200 mm. rainfall annually and sometimes gets no rains for years on end. The trees produce forage, timber and firewood. In 1960's an afforestation programme in Chile using this species transplanted tens of thousands of hectares into dense forest planed specially for raising sheep and angora goats, which feed on falling leaves and pods. The trees tolarate even the highest salty areas.

Atriplex nummularia and A. Lalimus are, along with cactuses, one of the best fodder crops for arid zones and with use of runoff water, they can be cultivated in areas recieving as few as 150 mm (6 inches) of rainfall. They are also extremely salt tolerant; above 2000 parts per million of salt content in soil solution. The root system is very deep and they can tap water from water tables as deep as 5 to 10 m. and perhaps more in sandy soils.

There are very good potentials for growing Atriplex in many parts of northern Somalia including coastal plains of Zeila and Berbera, where-ever there is a water table. It is assumed that those areas cover several thousands of hectares in the coastal plains and in the gypsous areas like Las- Anod to Erigavo. The production expected may be of the order of 1000 to 2000 feed unit per ha., i.e. enough to maintain 10 to 20 sheep per ha for 3 months. However, the Atriplex intake may be reduced in areas where the drinking water is very salty since the leaves of Atriplex may contain as much as 20 percent of salt on the dry matter. The combined use of Atriplex and cactus has proved to be successful diet for sheep both in South Africa and North Africa. The sheep industry in arid Australia is to a great extent based upon ranges where salt bushes are the only feed during dry season.

Opentia species: many countries have been successful in introducing cactus as fodder. In South-eastern U.S.A. (Texas) spineless fodder cactus like Opuntia ellisiana has been grown as fodder for at least 70 years. In north-eastern Brazil, where the ecological conditions are close to those of north-western Somalia with more or less similar vegetation, the cattle industry is to a large extent based upon 300,000 ha. of cultivated fodder cactus and the yields recorded per ha may reach 100 to 200 tons of green fodder yearly. The species and varieties cultivated in north-eastern Brazil are O. ficus-indica var. inermis, O. inermis and Nopalea cochenillifera. In South Africa, in Karoo region, the merino sheep industry is partly based on cactus, Atriplex and small amounts of hay during the dry season. The main species and varieties cultivated are Opuntia robusta cultivar "Chico", cultivar "Monterrey" and cultivar "robusta" and Opuntia fusicaulis. In the arid and semi-arid areas of North Africa Opuntia ficus-indica var. inermis is mainly cultivated.

Leucaena lecocephala is another plant which offers the widest assortment of uses. Through its many varieties, Leucaena can produce nutritious forage, fire wood, timber, and a rich organic fertilizer. Some strains of Leucaena are many branched shrubs that average 5 m. at maturity; others are single-trunked trees growing as high as 20 m. The plants withstand large differences in rainfall, sunlight, salinity and land terrain as well as periodic inundation, fire, windstorm, slight frost and drought and is quite suitable for semi-arid and arid lands. While still very small, Leucaena seedling develop a substantial taproot to reach water before the vulnerable young plant is cought by drought. Seed viability of Leucaena is usually high and the seeds can successfully planted by hand or by machine.

Leucaena can be grown interspersed among fast growing pasture grass. Its leaves allow sunlight to filter through to the grass, and the combination makes a highly productive two level pasture. Established Leucaena is compatible with the most vigrous grasses like Panicum maximum and under heavy grazing the combination remains well balanced so that neither Leucaena nor the grass dominants.

Forage yields are influenced by the variety as well as by the climatic and environmental conditions. From the best forage varieties on good sites, annual yield of edible dry matter (leaves and fine stem) are 12-20 tonnes per ha but under the dry-land conditions it averages 2-3 tonnes per ha.

It need careful trails of the selected strains obtained from the arid areas for introducing in the northern areas. The trails should concentrate on the same strains and should use a common methodology at each location. Forage, timber and firewood production should be listed.

Desmodium distortum An upright herbaceous perennial plant growing 2 m. high in Zambia. During the rainy season it produced a massive crop of fodder of 7355 kg dry matter per hectare. It produced a very useful secondary growth between March & June and continued to grow during the latter part of the dry season. Inspite of its stemy nature and coarse appearance, it is relished by stock and even much of the stem is eaten. Inspite of the fact that it is not suitable for inclusion in grass-legume pastures still it is a very promising fodder plant for specialized use.

Many other local species belonging to the family Capparidaceae, for example: Boscia minimifolia "Megag", Maerua crassifolia, "Ditab" and Cadaba farinosa, "Anamais", etc. are worth testing as fodder trees and shrubs. These species are heavily browsed and might perhaps play an important role in supplying trace elements.

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PROBLEMS OF POPULATION AND ENVIRONMENT

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

The Somali Democratic Republic occupies an area of about 638.000 sq. km (table 1) with a population of approximately 4 million according to a 1976 census and a growth rate of about 2.9% per annum. About 60-65% of the population is nomadic or semi-nomadic, about 20-25% are farmers cultivating land along the Juba and Shabeli rivers, and rest are either government employees, traders or engaged in some other economic activities. More than 40% of the population lives in rural areas particularly in the area between the two rivers.

The terrain is characterised by narrow (0-70 km) coastal belt on the north along Red Sea which sharply rises on the south to the escarpment of Golis Ranges which from a plateau gently sloping to the south and southeast, draining the major of the country to the Indian Ocean. The climate influenced by Indian Ocean and the two monsoons generally is controling physical factor. The whole area is hot and has been classified as semi-arid. The average annual rainfall for the country varies from 100 mm in the north to 400 mm in the south (Table 2). The most part of the country is suitable for grazing of livestock mainly cattle, goats, sheep and camels (Table 3).

The economy of Somalia is based on agriculture and mostly dependents on the export of uproceossed agricultural products mainly livestock, Banana, hides and skins, Myrrah and fish. There is a small manufacturing sector which is based on imported sem-manufactured material for the consumption of the local market.

Somalia is currently faced an acute balance of trade because of its dependence on imports on high prices, caused by the world economic crises and inflation.

Table 1.

Land Use Estimate Based Upon Available data

1. Cultivated	6500 Km.	1%
2. Riverine Forest	500 "	
3. Montane Forest	11,000 "	2%
4. Woodland/Bushland/Shrub	1,76,000 "	12%
5. Rangeland	503,000 "	79%
6. Sand dune	6,400 "	1%
7. Water & Aquatic Grassland	800 "	
8. Rock & Barren land	33,000 "	5%
9. Urban	300 "	
Total:	638.000	100%

Table 2.

Annual Rainfall

Rainfall	Biclimatic Zone	Area.
Less than 100mm	Desert to sub-desert	87.000 Km.
100-200mm	Sub-desert	221.000 "
200-400mm	Arid wooded savanna	313.000 "
More than 400mm	Wild sub-arid wooded Savanna	17.000 "
	Total Area :	638.000 Km.

Table 3.

Somalia :- Human and Livestock

1. Human	3.8	million
2. Camels	5.3	"
3. Cattle	3.7	"
4. Sheep	9.4	"
5. Goat	15.3	"

SOMALI WAY OF LIFE

As mentioned above a major part of the Somali population is nomadic, who earn their livelihood by rearing livestock. Livestock directly and the nomads indirectly depend on the vegetation which improves or deteriorates by the availibility of required or less water, specially in the livestock rearing areas. Rains are very uncertain in this country. When the rains are enough and there is enough fodder for livestock the nomads have no problems, but when there are delay in rain or drought, nomads and their livestock face lack of water, scarcity of food, lack of animal feed, desease and even death.

In such hard situation nomads migrate with their livestock in search of better grazing area with enough of water. During such journies usually they are endangered on one side by the wild animals and on the other by hostile tribes. The distances of their migration vary usually from 200 to 500 Km. They travel without knowing the people and the new environment, which they are compelled to adapt for the sake of themselves and their livestock.

Sources :- Table 1 : 1975 census.
" 2 : Range Agency Development Plan 1978
" 3 : Hendrikson Planning Group. 3 year Development plan. 1979-81.

Basic needs of nomads are very limited. Mostly they live on meat, milk and the animal fats obtained from livestock. They get the energy for cooking their food by cutting trees and shrubs from the bushes. Their dewelling are made of wooden frames and grass matting designed for easy transportation. Sometimes if the members of the family are too many, they sleep outside in open air. For clothing they usually use only two sheets of cloth. There are no or few schools for their children and usually their children are tought "Quraan" by sheiks from within their groups.

The rate of mortality and desease is very high, because of the lack of hospitals, modern medicines and doctors. They are still using mostly the indigenous medicines to cure or prevent the desease, obtained from animal and vegetative sources in a primitive way. The agriculturists face difficult hardships, because of low production of crops, non availibility of manure and good quality of seeds etc. The city dwellers who form a small percentage of the population live on the two former sections (nomads and farmers) of population and face problems different from the above two group and cannot be dealt here in detail.

ENVIRONMENTAL CONDITION

It is understood that a good environment means a balance of natural and physical factors in which a community of living being can live progressively. The environmental conditions in Somalia are summerized below:

Like any other human being on the earth the requirements of Somalis are also food, shelter, clothing, energy, medicine and education. These requirements can be provided by three ways: a) all from our own resources. (b) from outside world or (c) partly from our sources and partly from outside.

The reasonable way of the three for a developing country like ours appears to be the third. Being one of the least developed countries we don't have the means, the know-how or equipments for development of medical facilities in health sector, raw material for clothing and sophisticated shelters and even well qualified teachers and experts to advice us. For quite a long time we need sufficient foreign exchange "Hard Currency" which should mainly come from our own resources for the import of our requirement. What else we can produce from our resources is food, simple shelter, energy and partly clothing and medicine and of course earn the money for our development programmes in the health, education sectors ect. Both components of production for use of our people and exports for earning foreign exchange should improve simultineously. Seventy five percent of our economy presently and for the last many decades, even centuries depended on the production of livestock. Production of fodder, forage and their improvement for the livestock depends on the availability of water and good soil.

ATTEMPTS TO IMPROVE THE SITUATION

Somali Government being fully concious of the deteriorating environment and its effects such as deterioration of the land by soil erosion, desertification, cutting and burnning of the trees, killing and hunting wild animals, created the National Range Agency by Law No. 23 of August 1976, with the following responsibilities concerning the environments:-

1. To plan National Range Development
2. To establish grazing and drought reserves
3. To carryout planned water development programmes
4. To promote a technique of fodder production
5. To promote organizations for guiding and training
6. To map the range and arid land and classify rangeland areas.

Among other activities, the Agency was also given the responsibility of maintaining and developing forests, ranges, wildlife

production, water development, re-education and rehabilitation of nomadic community in the country. The problems of environment is a result of the combination of several factors, some of which are natural and completely beyond our control while other as we very well know, are the direct result of human and animal interaction with the environment.

As with all matters concerning environment there is a delicate balance and should that balance be upset it is very difficult to bring to its original status. The effects of the 1973/1974 drought were a clear indication of the problems of the nomadic community when innumerable losses were sustained of both human and the livestock. National Range Agency can do much to alleviate the prblems which arise but to ensure a success it needs helpful hands with all seriousness at all levels of Government as well as the help of individual and community.

Over-grazing which ultimately leads to soil erosion and loss of productivity, renders rangeland completely useless for purposes of livestock production. In country like Somalia, which has essentially a rangeland economy spread over 90% of it's territory, and where scarcity of the rains is a recurring phenomenon, the protection of rangelands is of higher importance.

In view of these considerations, the National Range Agency divised a system of rotational or restricted grazing to conserve the rangelands. The following are the steps taken:

a. IMMIDIATE ACTIONS

Survey and development work was undertaken initially in the Northern regions and was soon extended to rangeland in all parts of the country. The conservation measures undertaken so far can be divided into:

i) IMMIDIATE MEASURES ..T OF TWO TYPES :-

A. IMMIDIATE MEASURES

a) The establishment of seasonal reserves: These are 70 in number, each has an area ranging from 500 to 1000 sq/km. These reserves are closed to grazing for three months (March-May) of rainy season and are opened again for grazing in the next quarter. Again these are closed for about three months (Sept. - Nov.) of rainy seasons and opened for grazing again during the following quarter. Variation in the duration of such periods of grazing and non grazing are of course made in accordance with the early and later arrival of rains.

b) The establishment of femine reserves: Presently 30 of such reserves have been opened for grazing during grave emergencies like severe drought.

B. THE LONG-TERM MEASURES ;-

Fodder Production : Nine Fodder Production enclosures, each with an area of 50 to 100 km are already established in the country. Fodder crops and local grasses are growing in the enclosures. The crops are kept as "Fodder Bank" to be released at reduced prices to nomads in times of need such as drought or rain delay. These are managed intirely by N.R.A. Staff. The 17 cooperative ranches which have an area of about 25 km are managed by cooperative families privately as advices by the N.R.A. Staff. A rotational use of the land on such ranches is helping the regeneration of rangelands very considerably. There are other 21 enclosures of small areas managed by the Government for ecological studies and training of modern techniques will soon act as research and training centres for official as well as nomads.

CONCLUSIONS

We should protect environment because it is a matter which concerns to all of us, as individual, community or government. To undertake this job we need trained staff and, therefore, training and education should be given high priority with an emphasis both on formal and non-formal education, for which necessary funds may be allocated by the Government so that the programme of training may be carried on independently.

The National Range Agency should take immediate steps to produce fodder for livestock in general and for export in particular. To prevent or minimize the nomadic migration in search of water, more wells should be developed. It is very necessary that the nomadic community and National Range Agency (N.R.A.) staff co-ordinate side by side to achieve the disered success.

To avoid illegal killing of wildlife, a special team against poachers should be created in every region and district.

As far as urban settlements are concerned a non-profit building agency should be established with the aim of using preferably indigenous available or cheap imported raw material.

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MATERIAL FOR FLORA OF SOMALIA - 1

Identification List of Some Plants Collected From Somalia in 1977 - 78

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Since the establishment of National Herbarium at Mogadishu many collections were made from the different parts of the country, due the lack of literature and other facilities these were awaiting identification. Now as some of these facilities have been created we hope the naming of the plants will be possible. In preparation for the compiling a flora for Somalia it was considered useful to publish the identification list as and when convinient. The following list comprises of about 350 specimens collected in the year 1977-78. Most of the duplicates have been distributed to K, WAG, M. and some to Fl and East African Herbarium at Nairobi. A complete set of the specimens have been preserved at the National Herbarium Mogadishu (MOG).

A C A N T H A C E A E

Asystasia schimperi T. Anders.

N-W. Reg.: Dist Hargeisa; along the dam, few km W. of Hargeisa town; shrub, ca 40 high, fl. white, Kazmi, Elmi, Mahmuud and Sulaiman 171 (27.12.77)

Barleria eranthemoides R. Br. ex C.B. Clarke

Mudug Reg.: Dist Galkaiyo: Margara, 52 km from Galkaiyo towards Garoe, Dodi area; per, 0.5 m high, fl. orange, Kazmi, et al, 22 (20.12.77). Middle Shabelle Reg.: Dist. Jowhar: between Balaad and Jowhar, near village Farbarko; small shrub, fl. redish orange, Kazmi, et al, 306 (25.2.78).

Blepharis linariifolia Pers.

M udug Reg.: Galkaiyo: Margaara, 52 km from Galkaiyo towards Garoe, Dodi area; plants much branched at the base, fl. light purple much liked by camels, "Yamarug", Kazmi, et al. 10 (20.12.77).

Ecbolium revolutum (Lindau) C.B. Clarke

Nogal Reg.: Dist. Las-anod, between Og and Ainabo villages, about 227 km from Garoe towards Burao, fl. white, eaten by camels, "Sarin" Kazmi, et al, 49 (21.12.77). Togdheer Reg.: Dist. Burao, between Burao and Dudhadheer, 8 km from Burao towards Sheikh, per. bushy, 25-50 cm high, fl. white, Kzmi et al, 69 (23.12.77).

Hypoestis verticillaris (L.f.) Soland.

Togdheer Reg.: Dist. Burao, between Galale and Qudha-dheer, on Burao-Sheikh rd, rocky area, fl. pink, "Gedwarabe", Kazmi et al, 88 (23.12.77)

Monechma debile (Forsk.) Nees.

Benadir Reg.: Dist. Afgoi, proper and around Afgoi town, shrub, fl. yellow, Kazmi et al, 279 (14.1.78)

Persistrophe bicolyculata (Retz.) Nees.

Benadir Reg.: Dist Afgoi proper and around Afgoi town, Ca 1.5 m tall, fl. pink, weed, Kazmi et al. (14.1.78).

Ruellia discifolia Oliv.

N-W. Reg.: Dist. Hargeisa, proper Hargeisa town, Sha'aab area, Shrub, ca 30 cm high, fl. blue, Kazmi et al, 180, 186 (27.12.77).

Ruellia patula Jacq

Mudug Reg.: Dist. Galkaiyo, along the banks of stagnant water called "Yameas" 1 km from Galkaiyo towards Garoe, per, ca 30 cm tall, forming cushions, much branched at base, fl. light blue to liliac, "Nagadaad", Kazmi, et al. 2 (20.12.77).

A L I S M A T A C E A E

Limnophyton obtusifolium (L.) Miq.

Middle Shabelle Reg.: Dist. Jowhar, proper Jowhar town and surrounding areas, along the stagnant water, fl. white, Kazmi, et al, 313 (25.2.78).

A M A R A N T H A C E A E

Achyranthes aspera L.

Togdheer Reg.: Dist. Burao, between Sheikh and Go-o, rocky hills, ca 1 m tall, fl. pink, Kazmi et al, 126 (23.12.77).

Aerva javanica (Burm. F.) Juss.

Mudug Reg.: Dist. Galkaiyo, Margaara, 52 km from Galkaiyo towards Garoe, Dodi area, per, infl. stuffed in pilows, "Somagle" Kazmi, et al 20 (20.12.77).

Amaranthus retroflexus L.

N-W. Reg.: Dist. Hargeisa, proper Hargeisa town, Sha'aab area, weed in cultivated fields, infl. red-purple, Kazmi, et al. 190(27.12.77). Middle Shabelle Reg.: Dist. Jowhar, proper Jowhar town and surrounding areas, weed in cultivated fields, Kazmi, et al. 320 (25.2.78).

Celosia shcweinfuthiana schinz.

N.W. Reg.: Dist. Berbera, around village Lalase on Sheikh Berbera rd., on fences around cultivated fields, fl. pale green, "Lolace", Kazmi, et al, 132 (24.12.77).

Digera alternifolia (L.) Aschers.

Middle Shebelle Reg.: Dist. Jowhar, proper Jowhar town and surrounding area, small shrub, fl. pink, Kazmi, et al. 315 (25.2.78).

Pleuropterantha revoilii Franch.

Togdheer Reg.: Dist. Burao, between Burao and Dudh-dheer, 8 km from Burao on Burao-Sheikh rd., shrub, ca 1 m tall, higher with support, Kazmi, et al. 75 (23.12.77).

Pupalia lappacea (L.) Juss.

Togdheer Reg.: Dist. Burao around and proper Burao, within a radius of 5 km, shrub ca 75 cm high, Kazmi, et al. 259 (30.12.77).

Sericomoposis pallida (Moore) Schinz.

Togdheer Reg.: Dist. Burao, between Queta and Qudhadheer villages on Burao-Sheikh rd., tall shrub, Kazmi et al, 86 (23.12.77).

A N A C A R D I A C E A E

Schinus molle L.

N.W. Reg.: Dist. Berbera, Da'arburugh, between Berbara and Sheikh Yusuf Kounaen, on Berbera-Hargeisa rd., medium to large tree, fl. red, cultivated, "Mirmiri", Kazmi et al. 157 (25.12.77).

APOCYNACEAE

Nerium oleander L.

N.W. Reg.: Dist. Hargeisa, proper Hargeisa town, Sha'aab area, large shrub, fl. white, cultivated, Kazmi, et al, 192 (27.12.77).

ASCLEPIADACEAE

Glossonema revoillii Franch.

Nogal Reg.: Dist. Garoe, 160 miles from Galkaiyo, between Burtinle and Garoe on Galkaiyo-Garoe rd., raw fruits are eaten, "Oneho" Kazmi, et al, 42 (20.12.77). Bay Reg.: Dist. Dafed, between Afgoi and Bur-Hakaba, stem and leaves with white latex, raw fruits eaten, Kazmi, et al, 290 (28.1.78).

Gomphocarpus physocarpus E. Mey.

Togdheer Reg.: Dist. Burao, Ga'an Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., ca 1 m tall, fl. yellow with purple center, fr. spiny, plant used for fiber, "Dofea'o", Kazmi, et al, 235 (28.12.77).

Pergularia daemia (Forsk.) Chiov.

N.W. Reg.: Dist. Hargeisa, along the Dam few km. W. of Hargeisa town, on slopes, prostrate or climber, stem & lvs. with latex, fl. greenish-white, Kazmi, et al, 160 (26.12.77).

Pergularia tomentosa L.

Lower Shebelle Reg.: Dist. Merka, between Awdegle and Shalanbod, along the main rd., shrub, fl. purple turning yellow, Kazmi, et al, 283 (21.1.78).

B O R A G I N A C E A E

Heliotropium pterocarpium (Hochst. & Steud. ex DC) Jaub. & Spach.

Togdheer Reg.: Dist. Sheikh, in and around of the Range reserve area, few km south of Sheikh town; large shrub, fl. white, Kazmi, et al, 114 (23.12.77).

Trichodesma zeylanicum (Burm.) R. Br.

N.W. Reg.: Dist. Berbera, around village Lalase on Sheikh-Berbera rd. ca 0.5 m tall, fl. light purple, Kazmi, et al, 141 (24.12.77).

B U X A C E A E

Buxus hildebrandtii Baill.

Togdheer Reg.: Dist. Burao, Ga'aan Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd.: "Dosug", Kazmi, et al. 248 (28.12.77).

C A E S A L P I N I A C E A E

Cadia purpurea (Picc.) Ait.

Togdheer Reg.: Dist. Burao, between Sheikh and Go-o, rocky hills, medium sized tree, Kazmi, et al. 128 (23.12.77); Ga'aan Libaah, ca, 140 km from Hargeisa on Hargeisa-Burao rd. ca 6000 ft. a.s.l., small tree 3-4 m high, fl. Large, pinkish to red, "Sulabmaa", Kazmi, et al. 204 (28.12.77).

Caesalpinia gilliesii (Hook.) Wall. ex Benth.

N.W. Reg.: Dist. Hargeisa, proper Hargeisa town, Sha'aab area, small tree, fl. yellow, stamins long, red, cultivated, Kazmi, et al. 191 (27.12.77).

Caesalpinia pulcherrima (L.) Sw.

N.W. Reg.: Dist. Hargeisa, proper Hargeisa town, Sha'aab area, small tree, fl. red with orange margins, cultivated, Kazmi, et al. 193 (27.12.77).

Cassia bicapsularis L.

N.W. Reg.: Dist Hargeisa, proper Hargeisa town, Sha'aab area, large shrub to small tree, fl. yellow, Kazmi, et al. 182 (27.12.77).

Cassia occidentalis L.

N.W. Reg.: Dist. Hargeisa, proper Hargeisa town, Sha'aab area, Shrub, fl. yellow, Kazmi, et al. 164 (26.12.77).

Cassia senna L. Var. obtusata Brenan

Nogal Reg.: Dist Las-anod, between Ogo and Ainabo villages, ca 227 km from Garoowe towards Burao, large shrub, fl. yellow, Kazmi, et al, 63 (21.12.77). Togdheer Reg.: Dist. Burao, between Burao and Qudha-dheer, 8 Km from Burao on Burao-Sheikh rd., fl. yellow, Kazmi, et al, 77 (23.12.77).

Parkinsonia aculeata L.

N.W. Reg.: Dist. Berbera, Da'arburugh between Berbera and Sheikh Yussuf Kaunaen on Berbera-Hargeisa rd., small tree, fl. yellow, "Sesemain", Kazmi, et al. 156 (25.12.77). Middle Shabelle Reg.: Dist. Jowhar, proper Jowhar town and surrounding areas, small tree, fl. yellow, cultivated on the border of fields; Kazmi, et al, 322 (25.2.1978).

C A P P A R I D A C E A E

Boscia angustifolia Rich.

N.W. Reg.: Dist. Hargeisa, proper Hargeisa town, Sha'aab area, shrub, ca 1.5 m high, fl. greenish-white, Kazmi, et al, 188(27.12.77).

Cadaba farinosa Forsk.

Benadir Reg.: Dist. Mogadishu, 10 km from Mogadishu on Mogadishu-Balaad rd., large shrub to small tree, fl. dirty yellow, Kazmi, et al, 303 (25.2.78).

Cadaba glandulosa Forsk.

Benadir Reg.: Dist. Mogadishu, between Mogadishu and Balaad, large shrub to small tree, fl. yellow, Kazmi, et al, 328 (11.3.78).

Cleome brachycarpa Vahl. ex DC.

Nogal Reg.: Dist. Garoe, 160 miles from Galkaiyo, between Burtinle and Garoe on Galkaiyo-Garoe rd., per., sub-erect, 10-15 cm high, fl. yellow, Kazmi, et al, 33 (26.12.77).

C H E N O P O D I A C E A E

Chenopodium opulifolium Schard.

N.W. Reg. Dist. Hargeisa, proper Hargeisa town. Sha'aab area, weed in cultivated fields, Kazmi, et al, 189 (27.12.77).

Chenopodium scharaderianum Roem. & Schult.

Togdheer Reg.: Dist. Burao, Ga'aan Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., ca. 2000 m. a.s.e., weed in cultivated fields & waste places, Kazmi, et al, 210 (28.12.77).

C O M B R E T A C E A E

Combretum aculeatum Vent.

Benadir Reg.: Dist. Mogadishu, between Mogadishu and Balaad, large shrub to small tree, fl. white, Kazmi, et al, 332 (11.3.78).

Combretum molle R. Br. ex G. Don

Togdheer Reg.: Dist. Burao, between Shèikh and Go-o, rocky hills, tree, "Obol" , Kazmi, et al, 120 (23.12.77).

C O M P O S I T A E

Ageratum conyzoides L.

Lower Shabelle Reg.: Dist. Merka, Janale Agricultural farm, ca 1 m tall, fl. pink, weed, Kazmi, et al, 351 (25.3.78).

Aspilia mossambicensis (Oliv.) Wild.

N,W. Reg.: Dist. Hargeisa, along the Dam few km west of Hargeisa town, per., ca 75 cm tall, much branched, fl. yellow, Kazmi, et al. 159 (26.12.77). proper Hargeisa town Sha'aab area, ca 1 m tall, fl. yellow, Kazmi, et al, 185 (27.12.77).

Bothriocline schemperi Oliv. & Hiern.

Bay Reg.: Dist Dafed, between Afgoi and Bur-Hakaba, shrub, 75 cm tall, Kazmi, et al, 294 (28.1.78).

Conyza pedunculata (Oliv.) H. Wild.

Togdheer Reg.: Dist. Burao, Gaa'an Libaah, ca. 140 km from Hargeisa on Hargeisa-Burao rd., ca. 2000 m. a.s.l. shrub, ca. 30 cm tall, fl. yellow, Kazmi, et al, 209 (28.12.77).

Geigeria alata (DC) Benth. & Hook. ex Oliver & Hiern.

Mudug Reg.: Dist. Galkaiyo, Hargaara, 52 km from Galkaiyo towards Garoe (Dodi area), ann., ca 30 cm high, fl. yellow; milk saurs soon if given to camels, Kazmi, et al, 9 (20.12.77).

Helichrysum glumaceum DC.

Togdheer Reg.: Dist. Sheikh, in and around of range reserve area few km south of Sheikh town, ca 20 cm. high, fl. white, Kazmi, et al, 111 (23.12.77). Dist. Burao, Ga'aan Libaah, ca. 140 km from Hargeisa on Hargeisa-Burao rd., ca .5 m tall, fl. white, Kazmi, et al, 236 (28.12.77).

Lactuca capensis Thunb.

Togdheer Reg.: Dist. Burao, Ga'aan Libaah, ca. 140 km from Hargeisa on Hargeisa-Burao rd., ca 2000 m a.s.l., ca .5 m tall, fl. yellow, Kazmi, et al, 213 (28.12.77).

Launaea hafunensis Chiov.

Togdheer Reg.: Dist. Burao, Ga'aan Libaah, ca. 140 km from Hargeisa on Hargeisa-Burao rd. ca. 2000 m a.s.l., much branched shrub, fl. yellow, considered poisonous, "Burdut ?", Kazmi, et al, 231 (28.12.77).

Lannaea intybacea (Jacq.) Beauv.

N.W. Reg.: Dist. Hargeisa, along the Dam few km W of Hargeisa town, ca 50 cm. tall, spreading in the upper part, fl. yellow, Kazmi, et al, 163 (26.12.77). Proper Hargeisa town, sha'aab area, small shrub, fl, Yellow, Kazmi, et al, 196 (27.12.77).

Mikania cordata (Burm.f.) B.L. Robinson

Togdheer Reg.: Dist. Burao, Ga'aan Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., ca 6000 ft. a.s.l., fl. yellowish, Kazmi, et al, 212,221 (28.12.77).

Sonchus oleracens L.

Togdheer Reg.: Dist. Burao, Ga'aan Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., ca 6000 ft. a.s.l., fl. yellow, "Burdut", Kazmi, et al, 240 (28.12.77).

Sphaeranthus ukambensis Vatke & O. Hoffm.

Middle Shabelle Reg.: Dist. Jowhar, near village Farbarako between Balaad and Jowhar, large shrub, spikes pink, Kazmi, et al, 309 (25.2.78).

Tagetis minta L.

Togdheer Reg.: Dist. Burao, village Qudha-dheer on Burao-Sheikh rd., reserve area, fl. yellow; considered poisonous, Kazmi, et al, 90 (23.12.77). N.W. Reg.: Dist. Hargeisa, along the Dam few km west of Hargeisa town, ca 1 m tall, fl. yellow, repulsive odour, Kazmi, et al, 168 (26.12.77).

Vernonia cinerea (L.) Less.

Lower Shabelle Reg.: Dist. Merka, Janale Agricultural farms, small shrub, fl. pink, Kazmi, et al, 354 (25.3.78).

Volutaria abyssinica (A. Rich.) C. Jaffrey

Togdheer Reg.: Dist. Burao, around proper Burao town, within a radius of 5 km, shrub, ca 1m tall, Kazmi, et al, 265 (30.12.77).

C U C U R B I T A C E A E

Momordica charantia L.

N.W. Reg.: Dist. Berbera, around village Lalase on Sheikh-Berbera rd., climber on fences around the cultivated fields, fl. red; roots are used for making soup; "Saar", Kazmi, et al, 134 (24.12.77).

EUPHORBIACEAE

Chrozophora oblongifolia (Del.) Juss.

N.W. Reg.: Dist. Berbera, around village Lalase on Sheikh-Berbera rd., shrub ca 1 m tall, fr. green, Kazmi, et al, 133 (24.12.77).

Ricinus communis L.

N.W. Reg.: Dist. Berbera, around village Lalase on Sheikh-Berbera rd., ca 1.5 m tall, fr. green, Kazmi, et al, 139(24.12.77).

GRAMINEAE

Aelūropus lagopoides (L.) Trin. ex Thw.

N.W. Reg.: Dist. Berbera, proper Berbera along the beech near the Range reserve area on south of town, Bathalare area, grass binding small sand dunes, Kazmi, et al, 151 (25.12.77).

Andropogon abyssinicus Fresen.

Togdheer Reg. Dist. Sheikh, in and around the range reserve area few km south of Sheikh town, ca 0.5 m high, spikes pale, Kazmi et al, 106 (23.12.77).

Aristida adscensionis L.

Nogal Reg.: Dist. Laasanod, between Og and Ainabo villages, about 227 km from Garoe towards Burao, main highway, nodes sticky, spikes pinkish, "Birrhe", Kazmi, et al, 45 (21.12.77). Togdheer Reg.: Dist. Burao, Ga'aan Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., ca 6000 ft. a.s.l., 50–80 cm tall, "Birra", Kazmi, et al, 202 (28.12.77).

Aristida somalensis Stapf.

Nogal Reg.: Dist. Las-anod, between Og and Ainabo villages about 227 km from Garoe towards Burao, main highway; eaten by camels & goats, "Birrhe", Kazmi, et al, 43 (21.12.77).

Brachiaria lachnatha (Hochst.) Stapf

Togdheer Reg.: Dist. Burao, Gaa'an Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., favourite fodder, "Selasidhik", Kazmi, et al, 234 (28.12.77).

Cenchrus setigerus Vahl.

N.W. Reg.: Dist. Berbera, around village Lalase on Sheikh-Berbera rd., tall grass in the cultivated fields, Kazmi, et al, 131 (24.12.77). Benadir Reg.: Dist. Mogadishu, between Mogadishu and Balaad, reserved fenced area, ca 1 m tall, Kazmi, et al, 326 (11.3.78).

Coelachyrum poaeflorum Chiov.

Togdheer Reg.: Dist. Burao, Ga'aan Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., grazed by cattle, "Budweyne", Kazmi et al, 233 (28.12.77).

Cynodon dactylon (L.) Pers;

Lower shabelle Reg.: Dist. Merka, Janalle Agricultural farms, under the shade of trees, Kazmi, et al, 345 (25.3.78).

Dactylactenium aegyptium (L.) Richter

Lower Shabelle Reg.: Dist. Merka, Janalle Agricultural farms, along the cultivated fields, Kazmi, 357 (25.3.78).

Dactylactenium scindicum Boiss

Nogal Reg.: Dist. Las-Anod, between Og and Ainabo villages, about 227 km from Garoe towards Burao, main highway, "Saddeho", Kazmi, et al, 44 (21.12.77).

Dichantium annulatum (Forsk.) Stapf.

Lower Shabelle Reg.: Dist. Merka, Janalle Agricultural farms, under the shade of trees, Kazmi, et al, 347 (25.3.78).

Echinochloa colonum (L.) Link

Hiran Reg.: Dist. Beledweyne, between Balaad and Buloburti, tall grass, Kazmi, 269 (14.1.78). Lower Shabelle Reg.: Dist. Merka, Janalle Agricultural farms, Kazmi, 345 (25.3.78).

Halopyrum mucronatum (L.) Stapf

N.W. Reg.: Dist. Berbera, proper Berbera town, along the beach near the range reserve area on south of town, Bathalale area, tall grass growing on sand dunes, Kazmi, et al, 153 (25.12.77).

Hyparrhenia hirta (L.) Stapf

Togdheer Reg.: Dist. Burao, Ga'aan Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., ca 6000 tf. a.s.l., ca 50 cm tall, Kazmi, et al, 201 (28.12.77).

Panicum maximum Jacq.

Togdheer Reg.: Dist. Sheikh in and around of the range reserve area few km south of Sheikh town, 1-2 m tall, spikes purple-brown, Kazmi, et al, 105 (23.12.77).

Pannisetum setaceum (Forsk) Chiov.

Togdheer Reg.: Dist. Burao, between Sheikh and Go-o, rocky hills, spikes reddish-brown, Kazmi, et al, 127 (23.12.77).

G O O D E N I A C E A E

Scaevola taccada (Gaertn.) Roxb.

Lower Shabelle Reg.: Dist. Merka, between Shalanbod & proper Merka town, large shrub, fl. white; fr. green, ca 5 cm long, tapering on bath sides, Kazmi, 301 (11.2.78).

L A B I A T A E

Leucas urticifolia (Vahl.) R. Br.

Nogal Reg.: Dist. Lasanod, between Og and Ainabo villages, about 227 km from Garoe towards Burao, main highway, large shrub, fl. white turning pink-brownish, "Hobrole", Kazmi, et al, 54 (21.12.77). Benadir Reg.: Dist. Mogadishu

Ocimum basilicum L.

N.W. Reg. Dist. Berbera, around village Lalase on Sheikh-Berbera rd., small shrub, weed in cultivated fields, Kazmi, et al, 144 (24.12.77). Benadir Reg.: Dist. Mogadishu, between Mogadishu and Balaad, shrub, ca 1 m tall, Kazmi, 327 (11.3.78).

Otostegia modesta Moore

Togdheer Reg.: Dist. Burao Ga'aan Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., ca 6000 ft. a.s.l. shrub, fl. greenish-yellow, Kazmi, et al, 238 (28.12.77); shrub, ca 50 cm tall, fl. white, Kazmi, et al, 211 (28.12.77).

M A L V A C E A E

Gossypium somalensis (Gurke) J.B. Hutch.

Mudug Reg.: Dist. Galkaiyo, along the banks of stagnant water called "Yameas", 1 Km from Galkaiyo towards Garoe, per. up to 1.5 m tall, fl. pink turning red, "Balmbal", Kazmi, et al, 4 (20.12.77).

Pavonia burchellii (DC) R.A. Dyer

N.W. Reg.: Dist. Berbera, around village Lalase on Sheikh-Berbera rd., climber on fences around cultivated fields, fl. pink, Kazmi, et al, 136 (24.12.77).

Serra incana Cav.

Mudug Reg.: Dist. Galkaiyo, along the banks of stagnant water called "Yames", 1 km from Galkaiyo towards Garoe, per., to 2 m tall, fl. deep purple, "Balanbal", Kazmi, et al, 8 (20.12.77).

M E L I A C E A E

Melia azedarachta L.

N.W. Reg.: Dist. Hargeisa, proper Hargeisa town, Sha'aab area, large tree, fl. liliac, Kazmi, et al, 198 (27.12.77).

Trichilia emetica Vahl ssp. emetica

Middle Shabelle Reg.: Dist Jowhar, proper Jowhar town, and surrounding areas, large tree, fl. pale-white, ripe seeds red, cultivated, Kazmi, 314 (25.2.78).

MIMOSACEAE

Acacia bussei Harms.

N.W. Reg.: Dist. Hargeisa, proper Hargeisa town, Sha'aab area, large shrub to small tree, Kazmi, et al, 173 (27.12.77).

Acacia tortilis (Forsk.) Hayne

Benadir Reg.: Dist. Mogadishu, between Mogadishu and Balaad, large tree, fl. yellowish white, Kazmi, 333 (11.3.78).

Albizzia lebbeck (L.) Benth.

Middle Shabelle Reg.: Dist. Jowhar, proper Jowhar town and surrounding areas, large tree, fl. white, cultivated, also scapes, Kazmi, 323 (25.2.78).

Dichrostachys cinerea (L.) W&A.

Middle Shabelle Reg. Dist. Mogadishu, between Mogadishu and Afgoi, med. sized tree, slpikes long, drooping, upper fl. pink, lower yellow, Kazmi, 338 (11.3.78).

Pithecellobium dulce (Roxb.) Benth.

Lower Shabelle Reg. Dist. Merka, Janalle Agricultural farms, large tree, fl. white, cultivated, Kazmi, 353 (25.3.78).

OLEACEAE

Jasminum officinale L.

Benadir Reg. Dist. Afgoi, proper Afgoi and around the town, large shrub, fl. white, cultivated, Kazmi 274 (14.1.78).

PAPILIONACEAE

Calpurnea aurea Bak.

Middle Shabelle Reg.: Dist. Jōwhar, near village Far-barako, shrub, ca 2 m tall, fl. light purple, Kazmi 307 (25.2.78).

Clitoria ternatea L.

Lower Shabelle Reg.: Dist. Merka, between Awdegle and Shalnbod, along the main road, climber, fl. large yellow, Kazmi, 287 (21.1.78). Janalle Agriculturalfarms, climber, fl. white, under the shade of trees, Kazmi 348 (25.3.78).

Rhynchosia malacophylla (Spreng.) Boj

Benadir Reg.: Dist. Mogadishu, 10 km from Mogadishu towards Balaad, climber, fl. yellow, Kazmi s.n. (25.2.78). Lower Shabelle Reg.: Dist Merka, between Awdegle and Shalnbod, along the main road, climber, fl. yellow, Kazmi 289 (21.1.78).

Tephrosia nubica (Boiss.) Baker

Lower Shabelle Reg.: Dist. Merka, between Awdegle and Shalnbod along the main road, large shrub, Kazmi 285 (21.1.78).

PHYTOLACCACEAE

Rivina humilis L.

Lower Shabelle Reg.: Dist. Merka, Janalle Agricultural farms, small shrub, fl. white, Kazmi, 359 (25.3.78).

PLUMBAGINACEAE

Plumago zeylanica L.

Benadir Reg.: Dist. Afgoi proper and around Afgoi town, large shrub, fl. blue, cultivated, Kazmi 273 (14.1.78).

RHAMNACEAE

Zizyphus mauritianus Lam.

Togdheer Reg.: Dist. Burao, between Sheikh and Go-o, rocky hills, large tree with drooping branches, fr. eaten, "Gop", Kazmi, et al, 123 (23.12.77).

Zizyphus spina-christi (L.) Desf.

Benadir Reg.: Dist. Mogadishu, between Mogadishu and Afgoi, large tree fl. white, fr. eaten, Kazmi 339 (11.3.78).

SANTALACEAE

Osyris lanceolata Hochst. ex Steud.

Togdheer Reg. Dist. Burao, Ga'aan Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., ca 2000 m.a.s.l., small tree, fl. yellow, fr. red, used for tanning skin; "Asasu", Kazmi , et al, 215 (28.12.77).

SAPINDACEAE

Cardiospermum helicacabum L.

N.W. Reg.: Dist. Hargeisa, along the Dam few km west of Hargeisa town, climber, fl. small, white, Kazmi, et al, 170 (26.12.77).

Deinbollia borbonica Scheff.

Lower Shabelle Reg.: Dist. Merka, between Awdegle and Shalanbod, along the main rd., medium tree, fl. white, fr. green, Kazmi s.n. (21.1.78).

Dodonea viscosa (L.) Jacq.

Togdheer Reg.: Dist. Burao, between Sheikh & Go-o, rocky hills, large shrub; used in building mud-houses, Kazmi, et al, 124 (23.12.77). Ga'aan Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., ca 2000 m a.s.l., shrub to small tree, fl. white, "Hayramud", Kazmi, et al, 214 (28.12.77).

S O L A N A C E A E

Capsicum annum L.

Benadir Reg.: Dist. Afgoi, proper and around Afgoi town, shrub, fl. white, along cultivated fields, Kazmi 280 (14.1.78).

Datura innoxia Mill.

N.W. Reg.: Dist. Berbera, around village Lalase on Sheikh-Berbera rd., large shrub, fl. white, Kazmi 140 (24.12.77).

Withania somnifera (L.) Dunal.

Togdheer Reg.: Dist. Burao, between Burao and Qudha-dheer, 8 km from Burao on Burao-Sheikh rd., fl. white fr. 2 cm in diam, Kazmi, et al, 70 (23.12.77). Around Burao proper, within a radius of 5 km, shrub, Kazmi, et al, 261 (30.12.77). Middle Shabelle Reg.: Dist. Jowhar, proper Jowhar town and surrounding areas, shrub in waste places, Kazmi, 317 (25.2.78).

STERCULIACEAE

Melhania grandibracteata K. Schum.

Nogal Reg.: Dist. Garoe, 160 miles from Galkaiyo, between Burtinle and Garoe, per., erect, ca 1 m tall, bracts pink showy, Kazmi, et al, 41 (20.12.77).

Waltheria indica L.

Middle Shabelle Reg.: Dist. Jowhar, proper Jowhar town and surrounding areas, small shrub, fl. orange, Kazmi, 312 (25.2.78).

THYMELAEACEAE

Gnidia somalensis (Franch.) Gilg.

Togdheer Reg.: Dist. Sheikh, in and around the range reserve area few km south of Sheikh town, per., to 20 cm tall, fl. orange, Kazmi, et al, 93 (23.12.77). Dist. Burao, Ga'aan Libaah, ca 140 km from Hargeisa on Hargeisa-Burao rd., shrub, fl. yellow, Kazmi, et al, 247 (28.12.77).

TILIACEAE

Corchorus trilocularis L.

Nogal Reg. Dist. Garoe, 160 miles from Galkaiyo, between Burtinle and Garoe, prostrate, fl. yellow, Kazmi, et al, 34 (20.12.77(.

Grewia tembensis Fresen.

Hiran Reg.: Dist. Beledweyne, about 20 km from Mataban towards Beledweyne, shrub, .5 m tall, fl. pink-purple, "Gagabood", Kazmi, et al, 255 (31.12.77).

V E R B E N A C E A E

Priva cordifolia (L.) Druce
Var. abyssinica (Jaub. & Spach.) Moldenke

Benadir Reg.: Dist. Mogadishu, between Mogadishu and Afgoi, shrub, ca 1 m tall, Kazmi s.n. (14.1.78).

Z Y G O P H Y L L A C E A E

Tribulus terrestris L.

Nogal Reg. Dist. Lasanod, between Og and Ainabo villages, about 227 km from Garoe towards Burao, per., prostrate, fl. yellow, "Gahet", Kazmi, et al, 55 (21.12.77).

POSSIBILITIES OF GAME FARMING IN SOMALIA

By: Alberto Simonetta
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The greater part of Somalia is an arid or semi-arid land where rains are usually very local. True, during a good rainy season all or the greater part of any region will have its due amount of rains, but it is seldom that rains occur at one time over large areas. Favourable temperatures, on the other side, result in rapid budding and growth of leaves and grasses as soon as it rains at any given place.

Consequently, since times immemorial, Nomads have been moving their herds following the rains and the availability of water in the wells. This has set a pattern on the nomads' culture that will be hard to change in its aspects clashing with modern criteria of soil conservation, optimisation of products etc.

As a matter of fact it is well known that wildlife (and for what concerns farming that practically means antelopes and ostriches) has a higher productivity per unit of surface area than any traditional stock. Their physiology is better adapted to withstand heat, scarcity of water and most common diseases, while their effect on soil erosion is less than those of sheep, goats or cattles, which graze in compact groups. Indeed it is a common sight in times of drought that herds of gazelles or oryxes survive in good and fair conditions while around them domestic stock die of starvation.

The present situation is a tragic one because almost everywhere, game is being hunted to extermination. The people who are killing all sorts of wildlife are ignorant of the fact that they are actually destroying their best source of improving their lot and that of their children.

We may, however, ask ourselves whether some sort of "Game Farming" is practically possible and whether it may pay dividends in a reasonable time. We shall try in the following pages to show that chances are good, although some practical experiments will be needed for a final answer.

Let us first stress that game farming is not exclusive of farming traditional stock. Indeed the two are often complementary because several kinds of game graze preferably herbs that are scarcely used by domestic stock. The first advantage of game keeping is therefore, that pastures will be grazed in a more balanced way. Where meat production is not the sole concern domestic stock may not be excluded and mixed farming will be the best choice. For instance so far only one kind of antelope, the Eland (Tauroterague oryx) which is called by Somalis of the Wajir area "Aal Weyn"), has been domesticated to the point that it allows milking, its productivity being in the average of 5 liter per day. This antelope can be used for mixed farming.

In order to evaluate the possibility of game farming in Somalia, let us first very briefly describe the basic features of an average game farm.

We shall not discuss here crocodile farming, as this is feasible only along the rivers, where irrigation farming allows the production of fish necessary to feed corocodiles. These reptiles, therefore may be useful complement to farming in non-rangelands.

A reasonable game farm is usually a fenced area of 5.000 - 10.000 hectares. Smaller or greater areas either are too small for allowing a substantial production of game for the market, or are too large to be handled properly. Fencing is usually necessary to prevent the game from outflowing from the farm and to control the animals during cropping operations. Fencing, on the other side is never done to protect the game from predators. Some lions or cheetahs are usually welcomed in a game farm as a sort of health insurance, because they usually kill any sick or defective animal promptly, thus preventing epidemics and helping

in selection. If such preditors are not too many they are reckoned as an assest in the farm rather than as a liability, because they fatch higher fees from sporting hunters specially from abroad thus a source of income to the farm.

Any kind of fencing can serve the purpose, but the tendency is now to use one or two electrified wires, one set at about 30 cm and the other at 60-70 from ground. Low voltage gives the game approaching the wire a slight and harmless shock which prevents their escape. Such fencing is less costly in erecting and maintaining and any small engine may supply enough power for it. The breakage in traditional fences may well go unnoticed for quite some time, while any interruption along the electrified fence can immediately be detected and is easy to repair.

It is usual in game farms that the lot is subdivided into sections in the same way for managing purposes, but this is not strictly necessary, although electrified corrals where domestic stock is kept at night are useful to protect cattle from lions and hayenas.

A holding pen of some 100 hectares is usually fenced for many possible purposes: (a) when a new kind of game is introduced in the farm, usually with few animals in the beginning it is necessary to keep them together in the best protected and favourable grounds of the farm until their numbers have sufficiently increased; (b) it may be used as a holding pen for game to be shipped alive, for veterinary checks, and till their crating and transport are arranged; (c) some smaller pens are also usually useful for treatment of especially valuable subjects, and domestication of calfs, etc.

Usually a game farm is started with a comparatively low number of game animals specially this will be the case in Somalia, where game has been overhunted everywhere. During the first years the breeding stock will be build up, and the only way to make some profit can form selling some shooting permits for males. Usually the males

are soon in excess of need. An average proportion of 1 male to 4 females is usually considered best for the breeding purposes except Dikdiks, Oribis and few other. It is also possible to have in addition to those species which make the bulk of the game, a small number of rarer species, for instance the greater Kudu in the northern provinces or Hunter's hartebeest in the Lower Jubba area, not as meat producers, but for supplying permits at a high price to the local or foreign hunters, for whom a small, simple, but comfortable hut or lodge may be made at the game-farm.

The other essential facilities needed are those for the treatment of the game killed in the farm, i.e. the cleaning and preparation of skins and trophies for sale to tanning firms or for export, and the frigeration or drying or smoking of the meat for the market. The drying and smoking of meat is familiar to the Somali nomads who have a tradition of curing oryx (Bi'id) Soemmering's gazelle (Awl), Giraffe (Geri) etc. in this way. The dried and smoked meat lasts for months. There is no doubt, however, that the possibility of producing refrigerated game meat or even canned meat does also exists. Nevertheless the production of dry meat will be the easiest on most of the areas.

Cropping of game is the delicate operation and it must be based on the best possible assessment of the available population, directly related to the range's carrying capacity. Actually the best productivity can be obtained if the population of game is kept around 90% of carrying capacity. Census techniques are different according both the kind of game to be censed and the type of vegetation cover occurring in the range, which are beyond the scope of this article, it must be, however, stressed that these techniques have been sufficiently perfected so that for most species both the assessment of the total numbers occuring in a given area and of the population structure can be fairly reliable and quite safe to operate with.

The cropping plan is a delicate operation and until the farm has been successfully established for quite some years it can not be left to the unskilled judgement of the farmers themselves and should be prepared by a trained officer of the National Range Agency. The cropping operations may be done in several ways. Where there are facilities for dealing with large quantities of animals at one time the usual practice is to have a shooting team of specialist on a land-rover to visit the farm and shoot the game in the exact quantity by age and sex required by the cropping plan, a truck following the team collects the animals and take them to the farm center. This operations are concentrated over a very short period of the year, one or two weeks at most. The alternative is to kill and cure a few animals almost daily and this is usually preferable when the produce is intended for the local market.

An objection that I have heard to the general idea of game-farming, with gazelle or ostfiches, is that the fencing of considerable areas of rangeland may be resented by nomads. I think that the reply is that firstly any such program will have a very gradual development, seconds that if the initial farms are somewhat spaced by carving out of the common lands such small bits as to go almost unnoticed, the nomads will continue to be able to graze all around them and finally when these farms have shown their practical value to people, I belief, that the nomads themselves will appreciate the advantages the farms offer on the traditional one sided usage of rangelands, and ultimately the nomads will be encouraged to understand this economy. This will also certainly help in the gradual settlement of nomads.

A practical problem which some time is faced, while starting new farms is the shortage of game. Fortunately in Somalia there is no shortage of such animals. The first experimental farms should be established in areas impoverished in game and where, probably, some very important species are disappearing. I am especially thinking of the Oryx and Soemmering's gazelles, their meat is so appreciated that they have been destroyed over much of their original range. It will, therefore, be necessary that the National Range Agency organizes a highly trained team with proper equipment for the capture of the necessary animals to establish the first farms.

SAVE THE ELEPHANTS FROM EXTINCTION IN SOMALIA

By: Hassan Sheikh Omar,
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Poaching is an old problem wherever valuable wild animals occur, although in countries where landed propriety has been established, poaching has always been considered as theft and it has thus seldom enjoied any tolerance and has been despised by the public opinion.

In Somalia poaching has caused serious damages even in the past: in the North, the availibility of fifles since long has caused the destruction of the Rhino, the Elephant the Giraffe and Swayne's hartebeest on a large scale with the result that these had already been vanished around 1930 from the northern provinces. As compared to the North the situation was not so bad in the former Italian territories, but after World War II the Italian trustee administration positively encouraged the export of skins and trophies, so much so that the leopard was brought to the verge of extinction.

The great fault of the colonial powers was, anyway, that in Somalia they did not care at all to establish an effective game service such as it was established in so many other African countries. After revolution the good results that were to be expected by the decision of the Revolutionary Government to stop the trade in skins and trophies did not materialize because in these last years the price of meat has greatly increased, so that even if the skins were no longer profitably marketable, it was still convenient to go on killing game as this would allow the poacher to save a bit more of his stock for the market.

It is impossible to estimate the damage that poaching has already made to the Somali economy, but it may safely be said that it is a catastrophe at least as great as the great droughts which struck the country in last years. The possibility of sustained and economic develop-

ment in many marginal areas have been paralyzed for years, because no balanced and ecologically sound approach to the development of meat production and tourism are possible until the wildlife stocks are recovered.

Poaching of Elephants for ivory is possibly the most serious immediate threat to our economy. The elephant population in Somalia about 8 years ago was variously estimated by experts to be between 18.000 and 22.000 heads. Poaching had always been a problem, but the effort of the police, the difficulty for poachers to equipe themselves with efficient weapons and the limited scope of the local market concurred to keep the threat within limits and the elephant population was approximately stable. Then, almost suddenly automatic weapons became easily available because of the war between Western Somali Liberation Front (WSLF) and Ethiopia, the local market expanded many-folds with the appearance of a number of ivory shops and the international price of ivory started climbing, so that it became more profitable to smuggle it to Aden by the traditional Dhow and both foreigners and Somalis started buying ivory as a good investment.

Despite the efforts of the police, there is no doubt that in the last five years over one half of the elephants of this country have been killed and that in many areas this average has been largely passed. There are places where perhaps at most one tenth of the elephants which were formerly present now survive. Indeed, while the efficiency of the poachers and their sheer numbers have greatly increased, the police forces devoted to their control are more or less the same as before and their equipment and training has scarcely improved. In absence of modern training and the modern techniques like air reconnaisance, air-ground direct cooperation, better mobility and advanced fighting tactics all the efforts of the wildlife department of N.R.A. to control the ivory trade have badly failed. Further, this failure has been caused first of all due to insufficient staffing: with few officials overwhelment with the most various tasks. With this meagre staff it became impossible to mount a systematic control over the whole retail trade

in ivory. Pedlars go about everywhere with two or three objects of little value in their pockets and deal with would-be customers at the corner of the street or at the beachside, offering to get the more valuable items directly at the purchaser's home. To catch these people one by one is a very difficult job which would require a specially trained group of half a dozen men working full time, at the same time it is not that difficult to identify these people and to catch them with sufficient, indisputable evidence as to be sure to obtain their conviction.

Shops are no better: the Department has issued regulations to the effect that all item sold should be weighted and the weight duly reported, so that a cross check could be made for the amount of ivory legally issued to the workshops and that which is traded out as manufactured items. The only result is that nowadays some shops issue regularly a receipt, some issue it on demand, but none cares to keep a scale and to weight and record the weight of the items sold, so that the very purpose for which the receipt system was devised is defeated.

The worst aspect of this wholesale massacre of elephants is that we have now a surviving population which is totally unbalanced. Actually when male herds are attacked by poachers usually they run away but even if one of them is wounded or killed, the herds of females and calves do not leave the ground in an effort to defend their wounded member and so whole herds are shot down to the last. Often our guards have found up to 80 elephants killed at one spot. It has been observed that even the belly of the pregnant females cut open to get the pityful tusklets of the unborn calves.

If we consider that on the original population of about 20.000 elephants we might have regularly culled some 500 adult males, with an average ivory weight of 50 kilos, we could have harvested 25 tons of ivory annualy without any damage to the population, while the records of all the ivory recovered by the police over these last years gives

an average tusk weight of about 7 kilos, that is 14 kilos per pair, it appears that to get the same amount the poachers have killed about 1800 animals per year. Now, with our depleted an unbalanced population the only sane policy is to stop all trade in ivory. This means, obviously that ivory shops have to be closed, this has been done in several African countries e.g. Kenya and the results have proved to be good. Antipoaching teams should be strengthen by well trained staff equiped with effective equipments. Arrangements should be made to stop the smuggling of any sort of ivory out from the country. The ivory recovered from the poaching should only be used by the ivory factory of N.R.A. and the manufactured goods should be sold only with the permission of Wildlife Department of N.R.A. If we do not take these measures seriously it will not be far away that we loose one of our important wealth - the Elephants.

=====oooOooo=====

TOO MANY LIVESTOCK

If we put too many livestock on land that can only feed certain number. The grass will be eaten away completely and the earth will remain unprotected. It will cause erosion. Eroded earth is baren. No more livestock on baren land.

SILVICULTURE AND UTILITY OF COCONUT PALM IN SOMALIA

By: Choudhary M. Saleem
Forest Officer, Forestry &
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Afgoi.

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

The coconut palm is called botanically as Cocos nucifera. It needs hot and moist climate. It grows in deep alluvial soil or loamy soil. The stem of this tree is straight generally attains a height of 70 to 80 ft. There is also a dwarf variety which bears smaller but numerous fruits when 4 to 5 years old. The dwarf variety yields about 100 nuts when 8 year old. This variety is not recommended except as ornamental palms, because the bearing is seasonal and the nuts being small, cannot be scrapped easily with a coconut scarper. The tall variety is actually grown for commercial purposes.

C U L T I V A T I O N

Coconut Nursery:- The nursery site should be selected on a well drained soil. The ground needs through ploughing and then levelling. After the complete earth work, the beds are prepared. Now the ovoid nuts are sown in the husk in nursery beds, laid on their sides and then covering these with fine soil containing manure. The nursery beds are then regularly watered i.e. four watering each month. the nuts germinate in about 3 months. In about ten months the seedlings with nuts attached are ready for planting in the Forest area.

Method of Planting:- After the seedlings have attained a size of 1 foot to 1½ foot in the nursery beds, these may be planted in the field area. The size of pits should be 3 x 3 feet. The cattle manure may be put in the pits before planting. The seedlings may be planted in the centre of the pits. The best season for planting is the rainy season, when the soil is also wet. The pits may be dug 30 feet apart

and in this way there will be 20 pits in one acre. After planting, four waterings should be given each month until the plants are fully established.

Weeding:- Regular weedings around the plants, when ever required should be carried out till the plants attain a height of 4 feet.

Protection of Plants:- The planting area may be fenced with barbed wire to save the plants from the grazing cattle. The Balck Beetle and the Red weevil are the common pests of this plant. In case of any attack, necessary spray be arranged. In case of termite attack the 'dieldrin' may be used while watering the plants, in earlier stage.

E C O N O M I C I M P O R T A N C E

The coconut palm furnishes the tropical inhabitants with practically every requisite. This coconut palm has many uses. It furnishes food, sugar, drink, medicine, palm wine, fibre, timber, thatch, domestic utencils and alcoholic spirit.

The dried kernels (endocarp) are commonly called as the "Copra" of commerce yield a valuable fatty oil which is used in cooking, lighting, soap making and in other lubricants. The "Copra" of Ceylone contain 65% oil which ranks the finest quality. 21 million whole copra nuts are exported from Ceylone every year. The husk (pericarp) when retted in water for 3 weeks, yields coir fibre which is made into mats, brushes, netting, coarse strings and rope.

The sweet juice extracted from the spadix by tapping is known as "toddy", which after fermentation yields alcoholic spirit. One tree normally yields 4o gallons of "toddy" by taping. The residue left after the expression of oil from the "Copra" is called as "Poonac". It is a valuable cattle feed as well as the fertilizer. 4,000 nuts should give 1 ton of "Copra" and 6 cwt. of coir fibre.

FEASIBILITY OF COCONUT PALM IN SOMALIA

The moist and hot climate of Somalia is very suitable for raising of coconut plantation, especially all along the southern coast of Somalia. If we plant coconut plants 30ft. apart, then in one acre there will be 70 plants. On planting and maintenance of 70 plants we need about 6,500 So. Sh. for the first five years only. The plants continue to yield the nuts till the age of 50 years. After 7 years of plantingm there will be a regular income of 10,800 So. Sh. every year and it will continue till the age of 50. So the coconut palm is one of the most feasible species which may be planted along the southern coast of Somalia, for getting a regular income annualy against a small investment.

====oooOooo====

P O A C H E R S

- A Poacher is a thief and a criminal. He is stealing one of his country's most precious resources.
- Laws have been made to stop hunting so that this valuable resource of Somalia can be protected, but there are many criminals like those who don't care.
- It is imperative that laws against poachers be observed. It is our duty to help other understand these laws.

CELEBERATION OF PLANTATION WEEKS AND ITS IMPORTANCE

By: Mazhar Ali Kassimani
Forest Officer, Forestry & Wildlife School, N.R.A.
Afgoi.

The paramount importance of adequate forest cover for the conservation of basic soil and water resource is crystal clear and need not to be emphasized. With the creation of Universe Allah Almighty maintained a balance between the natural resources and their utility. The ever expanding human populations amounting to ever increasing demands and incentives for growing of agriculture, making of townships etc, the man went on exploiting the tree growth without noticing the damage he was doing to this delicate balance maintained by God between natural resources and their utility.

Today we find distructed and depleted vegetation and animal habitates which directly hit the soil and water resource causing potential water losses through evaporation and reduced percipitation and floods, all these factors thus lead to poor Socio-economic conditions and food crisis in the under developed countries.

Having realised the gravity of the problem the advanced countries long back checked themselves and took practical steps towards compensating the damage done already by raising plantations over significant areas year after year, bringing about a healthy compromise between Forestry and Agriculture, improving the animal and vegetation habitates to afford protection and shelter to the biotic community, conserving the soil and water resources, meeting with the demands of wood products locally and hence better socio-economic conditions of the country.

To fully achieve the objective, it was also thought to be necessary to bring public sector in participation with the government agencies and infuse in them a sense of their part in this job of national interest. Celeberation of plantation days is arranged every year

where in all the government department, semi-government departments, armed forces, teaching institutions etc., are required to physically take part in afforestation vigorously with a pledge not only to plant but to maintain the trees to their maturity. The students can play a very effective role in this part so that in their early age they become forestry oriented. Press, films, radio, and holding of seminars constitute effective media to making a wide publicity regarding importance of tree growth and service it has rendered to the mankind so far.

It is a matter of great satisfaction that the Government of Somalia is quite conscious to this effect. A plantation day is celeberated in the country on 17th April of each year with great fervour and enthusiasm in recognition of its importance.

Yet there is a lot that could be done towards this aspect to achieve best from better results. There are two rainy season in Somalia i.e. March-June (heavy rains) and Sept.-Dec. (light rains). The plantation campaign could still be made more aggressive by extending it to 7 days twice a year i.e. 17th of April to 23rd and of April and 3rd Oct. to 9th of Oct. Thus the plantation week being celeberated twice every year all over the country and heads of all departments concerning themselves to afforestation. The village committees and rural committees be required to participate in this national duty. Participation of head of state and his companions in launching a plantation campaignm aiming at achieving self sufficiency in wood and wood products, will materially contribute to make the people realise the importance of role of forestry in the builtup of a country.

The National Range Agency can play a pivetol role in this venture by bringing about coordination between various agencies with a similar target. Secondly creation of new nurseries, improving of existing ones; preparing planting stock in the shape of poly-thene tubes, containers, collection and distribution of viable seed of plants among the interested quarters. Cocomut nurseries are also

recommended making it compulsary for inhabitants of every house to maintain at least one coconut plant in their orchards, compounds and every government institution to maintain at least 4 coconut plant in the office compounds.

The N.R.A. prior to the start of plantation week may arrange wide publicity through posters, showing of slides in the cinemahouses, issuing of slogan on the wood products viz match boxes etc. inviting articles/comments from public sector with their recommendations and convening of seminars for speeches on the subject. The farmers/agriculturalists could still be given an incentive to take part in growing of forest trees as shelterbelts, wind brakers by giving cash rewards and certificates in a ceremoney to those showing best survival results of plants in block plantations per hectare or linear plantation per km.

The Forestry wing of National Range Agency need to be greatly strengthened to a great deal in staff, conveyance and equipment.

The modernization of forestry will have no immediate effect as it will be some years before the young plants reach maturity, yet the individuals of live nations leave behind them and marks in the history and their foot prints for the young generation to remember and follow them by their great deeds and build a fine nation and a strong country.

=====oooOooo=====

IT TAKES 10 MINUTES TO CUT A TREE BUT 10 YEARS
TO GROW IT - THINK OF IT

PREPLANTING SEED TREATMENTS TO BREAK DORMENCY IN LEGUMES

BY: M.Y.K Bangash
School of Forestry &
Wildlife, Afgoi.

For a rapid pasture establishment in the arid areas leguminous shrubs & trees has the priority after the herbaceious grasses. The investment in pasture improvement is usually costly and is considered in long-term benefit. It is, therefore, very important to use the best quality seeds and treat them properly before sowing. The quality of seed is determined by the high purity and viability. Purity is important because mixture with the weedy species can cause weed problems in the coming years.

Most legume seeds have low viability percentage - that is, seeds which will not germinate even under favourable conditions. In nature the seeds are protected to ensure the survival of the species through adverse weather conditions, specially the arid region species through different machanisms which is called dormancy and the seeds dormant. In many legumes the percentage of dormant seed is between 60 and 90 percent.

The dormancy is due mainly to the presence of a seed coat so impermeable to water that imbibation and subsequent germination are delayed. Under natural conditions, the seed coat gradually becomes permeable and a germination of about 10% per year is sufficient to ensure survival. To minimize the cost of seed it is important to have a high percentage of readily germinable seed. Some treatment, therefore, is usually necessary to break the dormency shortly before planting. In the following lines some treatments to break dormancy are given.

Scarification: Abrasion of the seed coat will increase permeability to water and this is the common method of treatment for most legume seeds. For small quantities scarification can be achieved by rubbing the seeds lightly between two pieces of sand paper, or by treatment in small hand or electric scarifier. For large quantities a machanical scarifier of larger capacity is needed. Cement mixers to which gravel has been added with the seeds found quite successful, even the commercial rice hullers are also effective.

Chemical treatment: Chemical treatment with alcohol or acetone will dissolve some of the substances inhibiting germination, but treatment with concentrated sulphuric acid is more common. The sulphuric acid treatment is carried as follows: One plastic or enamel jug is filled to half of its capacity with the seeds and just enough sulphuric acid is added to wet the seeds when stirred with a glass rod or stick. This is left like this for sometime. The time of treatment differs for every species and needs a little experimentation. When the seeds have been in contact with the sulphuric acid for the right length of time, the seeds are transfered gradually into a pail of water and then the pail is put on a plastic seeve in a wash basin and the tap of water is opened in it. Any seed that is washed out of the pail will be collected in the plastic sieve underneath. A stick or glass rod can be used to separate the seeds which stick together to form a gummy mass. When nearly all the seeds has been scraped out of the jug and washed out in the sieve the sieve is then dipped in a big container, filled with lime water (a mixture of ordinary lime in water). Now the seeds are ready for planting.

Concentrated sulphuric acid can cause severe burns; thus if any comes in contact with the skin, the affected part should be washed at once with water and a little lime to nutralize the acid. The eyes should be protected with goggles and clothes with an apron. Water should never be poured into sulphuric acid. This is the reason why it is so important to ensure that all the sulphuric acid and most of the seeds are out of the jug before washing the remainder with water.

LETTERS TO EDITOR

Fodder Grasses

Dear Sir,

Bermuda, Crow foot and Buffel grass are said to have nutritive value, what are these grasses, how nutritive they are and can these be grown in Somalia ?

Miss Saeeda Mohamed Sheikh
c/o Documentation Centre
National Range Agency
MOGADISHU.

Dear Saeeda,

Bermuda, Crow foot and Buffel grasses are botanically Cynodon dactylon, Dactylactenium aegyptium and Cenchrus ciliaris respectively.

Cenchrus ciliaris or Buffel grass which is also commonly known as Arjan, Blue Buffalo grass, African foxtail, Rhodesian foxtail grass abroad is called Agar or Garde - Agar in the northern parts and Gargao in the southern parts of Somalia. This tufted tussock forming perennial up to 1.5 m high with large and strong root system is very common throughout Somalia. A very variable grass usually grows in 400 to 500 mm rainfall areas with long dry season and on many soil types preferably sandy soils. It is sensitive to waterlogging. The young grass contains more proteins, is digestable and more palatable but these qualities deteriorate with age. It is a good pasture for dry areas. It stands close grazing and fire when established.

AS % DRY MATTER

	DM	CP	CF	ASH	EE	NFE
Fresh early vegetative	41.4	9.8	38.4	9.8	5.4	36.6
Fresh, mature	21.9	7.8	41.9	8.8	4.8	37.2
Hay & St. cut	87.0	7.4	35.2	11.7	11.7	44.0

Dactylactenium aegyptium, the Crow foot grass is also found in Somalia known as Saddeh-ho in the north and Harbonde in the southern parts, is an annual grass upto 75 cm. with soft, slightly succulent leaves. It grows on denuded land in semi-arid areas as a weed of arable land. The grass is said to contain cynogenetic glucosides and considered to be dangerous to stocks at certain time.

AS % OF DRY MATTER

	DM V	CP	CF	ASH	EE	NFE
Fresh, early bloom		15.8	26.8	10.6	1.8	45.6
Fresh, full bloom		15.6	27.9	13.6	1.5	41.4
Fresh, mid-bloom		8.7	32.4	10.6	1.5	46.8
Fresh, milk-stage		7.3	33.7	12.5	1.2	45.3
Hay	91.3	8.3	36.9	6.5	0.8	47.5

Cynodon dactylon Bermuda grass, also known as Baha, As, Dhaub, Kiri-kiri, Devits cough, star or kweek grass is also found in Somalia and is called Daris or Harfo in the northern and Domar in the south. A very variable perennial grass forms dense turf with up to 120 cm high and grows almost everywhere with a rainfall above 600 mm a year and main daily temperature above 24°C. It is found on many soils particularly with a pH value above 5.5. It withstands temporary water logging and prolonged drought unproductively. Responds well to fertilizers and has a very high nutritive value retained well into dry season. Best grazed at 10 to 15 cm, when it is palatable. This grass is of no use in temporary pasture for it is difficult to eredicate from arable land. The variety coastal Bermuda has longer leaves, stem and rhizomes is more resistant to drought and leaf spot and is immune to root-knot eelworm. It is as productive as common Bermuda and less troublesome to eredicate. Best grazed at 25-30 cm.

AS % OF DRY MATTER

	DM	CP	CF	ASH	EE	NFE
Fresh, early vegetative	19.1	12.2	33.3	9.6	1.6	43.3
Fresh, mature pasture	30.2	8.8	33.3	7.4	1.7	48.3
Fresh, 6 weeks pasture	29.5	14.2	26.6	12.4	1.9	44.9
Fresh, 10 weeks pasture	39.8	13.2	29.4	12.0	1.5	43.9
Fresh, 14 weeks pasture	36.3	11.9	28.5	11.3	1.8	46.5
Hay	91.3	11.1	18.4	12.5	1.4	56.6

The analysis for the grasses collected from Somalia has not been done and the above data given is mostly for American samples. However this information should give a rough idea of the values.

E d i t o r.

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C H A S H E W T R E E

Dear Sir,

A friend of mine living in the residential compound of Somal-tx, Balad, claims that he has Chashew nut trees in this Compound. Sometimes back I tasted these nuts and liked them very much but these are horribly costly. If it is growing at Balaad, definitly we can grow it elsewhere in Somalia as a commercial crop. Will you please give us some information how this plant looks like, how it is cultivated and its other uses etc.

Afsar Beg
Somaltex, Balad.

Dear Hrs, Beg,

I did not see the plants growing at Balaad but it is possible because the National Range Agency has tried these plants on the sand dunes at Shalanbod few years back and it was proved quite successful. About 200 trees are growing well and bearing flowers, fruits and nuts. If we extend its cultivation, may be, even on commercial scale it can be very profitable.

I am giving below some information asked by you:

The botanical name of Chashew tree is Anacardium occidentale and it belongs to the botanical family of Anacardiaceae. Originally it is a Brazilian plant and because of its tasteful nuts it had been introduced into many countries between the latitudes of 25°S and 25°N. Under favourable condition, it is a middle-sized ever green tree up to 12m high with a large canopy of about 15 m in diameter hanging down to the ground. The tree adapts itself to a wide range of climatic condition. For economic production, a tropical climate with a dry season of 4 to 7 months and a rainfall of 1000-2000 mm is preferred, although it grows quite well under rainfall conditions varying from 500 mm to 4000 mm. It prefers light deep soils without hard pans. It can also grow in gravelly soil as long as the soil between the gravels is easily penetrable. There is a correlation between the soil volume available and drought resistance.

Chashew tree is usually propagated through seeds, but vegetative propagation is also possible by air-layering, budding or by cutting. Transplant of seedling is difficult, except when they are grown in plastic bags. Sowing is done at least 5 cm deep with usually 2 to 3 seeds per planting hole, afterwards the most vigorous seedling are selected for transplantation and the others are eliminated. The seedlings are transplanted spacing from 10X10 to 15X15 m. in the planting pits supplied with required fertilizer or manure according to the soil condition. Irrigation is necessary after the seedling and young tree, untill the canopy provides heavy shade, impeding further

weed growth. If mechanised cultivation is to be practiced, the lower branches of the seedlings should be removed. First harvest of economic value under favourable conditions is possible at the third year.

Usually the yield is 300-1000 kg/ha. The nuts are picked up from the ground under the tree, detached from the apple and sundried until 9% moisture content and packed in sacks. At moisture below 10% the nuts can be stored well for over 1 year in bulk or sacks. The nuts are further processed to separate the edible karnels, first by soaking them in water to increase the moisture content of shell then the nuts are roasted in Chashew nut shell liquid bath for a short time. Roasted nuts are crushed mechanically or manually to separate the karnels. Dried, peeled and graded karnels are packed in vacumed tins for marketing.

The nuts are in great demand as dessert nuts throughout the world specially U.S.A., U.K., and U.S.S.R. The apple is highly appretiated as a fruit. The apple is also processed into juice and jam in some countries. The Chashew nut shell liquid is a natural phenol used in industry.

E D I T O R.

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S I L V I C U L T U R E

Dear Sir,

What is silviculture and its tending operations ?

Qasim Mohamed Sufi
Faculty of Medicine
National University
Mogadishu.

Dear Mr. Sufi,

I asked Mr. Choudry M. Saleem of the Forestry School Afgoi to reply your letter and he gives us the following information :

E d i t o r.

Silviculture is a branch of Forestry which deals with the establishments, development, care and reporduction of stands of Timber. It aims at continuous production of wood. A stand is defined as an aggregation of trees occupying a specific area and sufficiently uniform in composition, age and condition. In general it means a Forest. Silviculture is divided into two natural parts:-

i) The Foundation Silviculture:-

It deals with the life history and the general characteristics of Forest trees with particular reference to the environmental factors.

ii) The Practical Silviculture:-

It deals with the various methods of raising and care of forest crops, various methods of cutting and regeneration of the forest crops, the choice of Silviculture systems and methods of tending of the Forest crops.

TENDING OPERATIONS

These are the operations which are carried out for the benefit of the Forest crops between the seedling and the mature stages. A young tree up to a height of 3 feet is called as a seedling.

The tending operations include weeding, cleaning, thinning, pruning, climber cutting, and mulching but it excludes soil working, drainage and burning etc. The tending operations ensure proper Forest Sanitation and their direct results in spread of diseases and the poor

development of the Forest Crops. The tending operations are explained as under :-

i) Weeding: It is the removal of the competing growth in the seedling crop.

ii) Cleaning: It is the removal of inferior individuals from a sapling crop. (A young tree from the time it gains 3 ft height till the lower branches begin to fall off, is called a sapling.)

iii) Thining: It is the removal of excessive stems, from the crop beyond the sapling stage, with the primary object of affording more light and growing space for the healthy individuals. This operation is chiefly concerned with the promotion of good growth in the stems which are retained.

iv) Mulching: It is the throwing of weeds and brush-wood around the roots of young plants to conserve Soil moisture in drought areas.

v) Pruning: It is the removal of excessive low side branches on the stem of a tree. This is carried out to improve the quality of timber. The dead, dying and green branches are cut quite close to the stem and this operation should always be carried out with a hand saw. In the young plantations the pruning is done from $\frac{1}{2}$ to $\frac{3}{5}$ of the total length of the plants.

Choudhri M. Saleem
Forest Officer, Forest &
Wildlife School, N.R.A.
Afgoi.

L E A F M O U L D

Dear Sir,

Would you please tell me the difference between artificial and natural manure specially how we can make our own leaf-mould.

Mr. Mohamed Haji Ahmed
P.O. Box 57
Mogadishu.

Dear Mr. Ahmed,

I requested Mr. Kassumani of the Forestry & Wildlife School to reply your question and he gives us the following information.

E d i t o r.

If any type of crop is to be raised continuously year after year on the same land, the three elements Nitrogen, Phosphates, and Potash are added to soil in the form of manure. These elements maintain the fertility of soil and hence the vigor of the vegetation which it holds. The manure should be added in such a way that these elements become readily soluble in water and absorbed by the fine rootlets of the plants. Two types of manure can be used to provide the above elements viz. organic (natural) or artificial (chemical).

Artificail manures are more or less stimulants to the plants as are vitamins to the humanbeings, imparing their effect for one season only making plants grow healthy with a better yield. But artificial manures have materially no lasting effect on the mother resource i.e. the soil.

Artificial commercial fertilizers are now extremely expensive and almost beyond the reach of an ordinary farmer. In the wake of economic crisis, the use of organic manures is advantageous in as much

as that they are cheaper, and they not only add directly to the soil the constituents needed for the good healthy life of plants but also through fermentations, which organic matter undergoes, and the acids produced subsequently, it liberates from the soil itself plant food which would not otherwise be available. The gases produced during the process of fermentation and by its own permeable texture, the organic manure tends to lighten the soil and keeps it more permeable. The addition of organic manure also improves the moisture retention capacity of the soil and reduces considerably the extent of erosion; which is a useful feature for dry areas.

PREPARATION

The waste of gardens, lawn cuttings, dry leaves, soft vegetable refuse, withered flowers, flowering and vegetable plants without woody stems or hard leathery leaves; in sum everything which rots, should be collected, well mixed and dumped in a pit to rot. During dry season the material in the pit should be waterd once or twice and given a turn over 2-3 times leading the material to decompose. The material in the pit, after turn over, should again be pressed down firmly. The process of decomposition can be accentuated by addition of some activator viz. Ammonium Sulphate or liquid manure prepared from fresh cowdung. In about 6 months time the manure will be ready for use. However, before use, it should carefully be ascertained that the compost of rubish so collected in the pit has thoroughly been decomposed.

Manure prepared as above when added to the soil, it adds humus or vegetable mould which is essential part of a fertile soil and is the actual media of supply of food to any type of plants growing on it. It does leave a lasting effect on the soil by improving its texture, permeability and improves moisture retention capacity alongwith the provision of nitrogen.

No doubt leaf mould is an invaluable manure, particularly for cultivation of ferns, palms, such foliage plants growing naturally under the shade of trees in forest viz. mulberry, excellent for bulbs, tubers and most of potted plants. It is also useful for beds and borders.

It can be appreciated that enormous quantities of this important manures can be prepared with little effort without incurring of expenditure to achieve the objective of supplying plants with the ingredients necessary for their growth and simultaneously improving the soil.

By: Mazhar Ali Kassimani
Forest Officer,
School of Forestry & Wildlife,
Afgoi.

=====oooOooo=====

You say if we cut a tree it is lost, I say if not where to get the fuel for cooking.

- Let us make a compromise -

Cut the branches and leave the mother plant for branching next year.

Get the fuel without loosing the tree.

N O T E S

NORTHERN RANGELAND DEVELOPMENT PROJECT BURAO

A REVIEW OF PROGRESS

Background.

The country's largest natural resource is vast rangeland covering approximately 350,000 km or 55% of the total area of the country supporting the national livestock industry. It contributes 70% of Somali foreign exchange and is the primary source of the pastoralists' livelihood who comprise about two-third of the country's entire population. To overcome the consequences of 1972-1975 drought which affected the nomadic livestock owners of the Northern Somalia severely, the Government of Somalia obtained a financial loan of U.S. dollars 21.2 million from Kuwait Fund for Arab Economic Development to run the Northern Rangeland Development Project covering, Togdheer, Sanaag, Nugaal and Bari (three districts only) regions. The total area of the Project is 140,000 km^2, out of which approximately 30% of the area is potentially productive rangeland. The estimated population of livestocks in the project area for predrought period was: Camels 350,000, cattle 350,000, Sheep and Goats 4,960,000, and for post-drought period, Camels 175,000, Cattle, 175,000, and Sheep and Goats 3,720,000.

Project's Objectives:

The project's primary objective is to protect the grazing lands from deterioration caused by years of overstocking of animals and improper grazing pattern, and to save the stocks in the times of periodic drought. It also aims to introduce proper range management practices for better livestock production. To meet the above objectives the following units have been established in the project and a summary of their achievement are given below for the period of 1979-81.

a) Water Spreading Schems:

QALINDHEERE :- Surveyed, designed and detailed and main canal alignment has been set out. Construction work depends upon recruitment of experience labourers and imported construction materials.

KAL SHEIKH : - Surveyed, designed and detailed.

FIQISHINNI : - Surveyed, designed and detailed and setting out has been completed. The work is proceeding slowly due to shortage of fuel and the breakdown of the equipment. So far about 10% of the work has been completed.

b) Water Harvesting Sites:

YUFLE :- Surveyed, designed and detailed. Setting out has been completed. The work is proceeding reasonably satisfactorily. About 70% of the work has been completed.

QOITA :- Surveyed, designed and detailed. The construction work is proceeding slowly and smoothly and so far 70% has been completed.

XUDUN :- 2, 3 and 4, Surveyed, designed and detailed. Construction work has been completed by hand. Considerable remedial works are needed. Repair works are to be made by machines.

GABA GABA INA-AFMADOW :- Surveyed, designed and detailed. Construction work is completed and development proposal is recommended.

INA-AFAMDOW ;- Reconnaissance survey has been completed. Design is completed and development proposal has been recommended.

BUR GALFAY ADO & JIBANGANE :- Reconnaissance survey completed and experimental schemes have been recommended.

Sites have been identified in Odweine, Dhobo Weine, Bur Anod (South), Bur Mamac Gabu.

c) Stock Water Ponds:

DUUR CAD :- Surveyed, designed and detailed. Setting out is in progress and work progressing slowly. Construction has been completed up to 10 %.

QURAC KUDLE, WARTA FAARAX GEEDI, XARAMBARRE :- Sites and locations are identified. Typical designs have been completed and drawings for standard Stock Waterponds have been completed.

GEESH WARAAJE, CABDI DHEERE, REYGAL/MIDIIDO :- Sites and locations are identified. Typical designs completed and drawings for Standard stock waterponds have been completed.

d) Range Ecology Unit:

This unit is engaged in stydying the different vegetation types, identifying the common plants grown in the project area, studying the carrying capacity of the selected cooperative ranches and establishing monitoring sites in selected places to study the vegetation changes which take place in course of time. Uptill now the following accomplishments have been made by this unit:

The management plans for Gaan Libah/Bokh Reserve, Dan Wein Cooperative Ranch, Dagaar Cooperative Ranch have been completed. The management Plan for Tugo Reserve is expected to be completed in near future. Altogether, 30 Monitoring Sites have been established in the project area. Simultaneously, the counterpart staff have been also trained.

e) Forestry Unit:

This unit is responsible for upgrading the existing forestry nurseries, locating areas for forest and forest nurseries, preparing forestry management plan and recommending for town shelter-belts, village woodlots, etc. The accomplishments made by this unit are as follows.

Recommendation for forest areas; identification of forest reserves; at National, Regional and District level; reorganization of forestry nurseries; draft preparation for sector study for next FYDE (1982-86);

preparation of village woodlots plans; proposal for a demonstration forest reserve plan; completion of forest reserve maps; completion of field documents, etc. Training of counterpart staff in map reading, nursery work and seed collection has been done.

f) Non-Formal Education Unit:

Established liason with different offices which are directly responsible for Nomadic, Non-formal or Adult Education programmes; study of the rural areas of the project and understanding the pattern of pastoralists' way of life; organized group discussions with nomadic elders in different parts of the project; study selected Cooperative Ranches; regularly displaying educational films suitable for the pastoralists by Mobile Cinema Unit; establishment and production of Black/White still pictures of the project activities; collection of colour-slides of different rural scenes for educational purposes; Video to document on going activities; preparation of monthly newsbulletin presenting upto date monthly activities in the field and releasing education periodicals in Somali for rural people.

g) Project's Workshop:

So far the project has recieved a number of heavy and light equipment and vehicles. For proper maintenance a workshop is underway and as soon as it is completed, the repairing of equipment, will be installed and training of counterpart staff for maintenance will commence. After complation, this workshop will be the biggest and best equipped in the whole of northern Somalia. However, all the equipment are engaged in field works and maintenance is being done on the spot as best as possible in order to keep going the construction works.

h) Range Institue, Burao:

This institue was established in 1976 to prepare middle level technicians in range and livestock management. Since then 125 students have graduated from this institute. Currently there are 56 students who are expected to complete their study by the end of December 1981 and 40 students enrolled this year will graduate in 1982.

D.B. Gurung,
Non-Formal Training Officer,
N.R.D.P., Burao.

MASHRUUCA QORIDDA ILKAHA MAROODIGA KM 7

Sida runta Waaxda Ugaarta ee ka tirsan Wakaaladda Daaqa Qaranka waxey xageeda sare, markii lagu soo daray Wakaaladdatan, in ay baabiiso shatiyada lagu soo gabado kontorabaanka ilkaha Maroodiga kuwaas oo markaas ka badnaa 28 shat oo qaarkoodna dadku jeebka isag heystay oo ay ku dulaaltami jireen, waxaana la qaaday tilaabtii ugu horeysay oo aheyd in la dhimo shatiyada, oo laga qaado inta aan markaas shaqo dhab ah ku heyn.

Waxaa arrintaas barbar socday, daraaso ku saabsan sidii loo heli lahaa habka ugu habboon oo Dawladdu uga faa'ideysan karto ilkaha kontorobaanka loo qoo qabto, oo aan sidii hore oo ceyriinka loo dirin.

Sannadka markii ay ahayd 1978dii ayaa waxaa bilaawday wada hadalo ku saabsan sidii loo sameyn lahaa Mashruuca qoridda ilkaha Maroodiga ee Km 7, wuxuuna hirgelay bishii November 1979.

Ujeeddadii loo dhisay Mashruucaas waxay aheyd:-

1. In la badbaadiyo nafleyda duur joogtada ah, wixii kontorobaan lagu qabto ama sidooda u dhinta trofeeyada laga heala laga faa'iideysto loogana faa'ideysto habka ugu habboon.

2. In uu beddelo dadka shatiyada farshaxanka heysta, wixii la doono oo ilka maroodi ka qoran in meesha laga helo, ugu dambeyntana laga qaado shatiyada oo aan u heysano in ay yihiin waxa keliya ee dhiiri geliya koontarobaanka.

3. In lacag adag laga helo, maadaama uu yahay wax loo isticmaalo qurux, oo adduunweynuhu si aad ah ugu baahan yahay.

Mashruuca oo dhsnaa muddo 2 sanno, wuxuu xisaab xirkii ugu dambeeyey ee bishii Setembre 1981, ku keenay, in dakhligiisu muddadaas uu yahay 3.804.148,85 lacagtaas waxaa ku jira oo qur ah, midii loo siiyey caddaan ahaa, in howsha uu ku bilaabo oo aheyd 300.000/=.

Shaqaalaha Soomaaliyeed, oo farsamo baradka ah, waxaa lagu tirinaayey in ay muddo dheer wax ku bartaan laakiin waxey khabiiriintu noo sheegeen in ay labadaan sanno si weyn lama filaan ah qaarkood wax u barteen hawl ku filaashadooduna ka soo hormaridoonto wakhtigii loogu tala galay oo ahaa 5 sanno.

Mashruucaas yididdiilada cusub uu muujiyey waxay tahay, in Hey'adaha lacagtu, markii ay arkeen sancada meeshaas ka socoto, in ay soo jeediyeen in lagu fekero sidii loogu gudbin lahaa, in uu noqdo mid alaabtaas uu soo saaro laga dhigo keyd Qaran "Tesoro dello Stato" taas markaan maskaxda si weyn loogu hayo.

Shaqaalaha Soomaalida ee hadda ka shaqeeya waa 6 farsamo barad ah, 2 maamule ah, 3 ilaaliye 1 shufeer iyo hal hantidhowre, waxaana wax barra nin Talyaani ah, oo mashruuca dhan madax ka ah.

Waxaan sida runta ku tala galnay mashruucaas in uu u fulo sidii loogu qorsheeyey, uuna ka mid noqdo kuwa yar ee sida dhabta u hirgalay, waxaan si aad u jeclaan laheyn akhristayaalka maqaalkan in ay ka qoraan wixii talo ahna nooga soo jeediyaan.

Mahad gaar waxaan u jeedinayaa shaqaalaha mashruucaas ka shaqeeya xilkasnimo dheeraad ah muujiyey, si aad ah wax u bartay.

Yuusuf Maxamed Axmed "Xaraare"
Maareeyaha Waaxda Ugaarta W.D.Q.
Muqdisho.

S U M M A R Y

On the establishment of National Range Agency incorporating the department of wildlife the handling of wildlife products in the country was surveyed. It was observed that the people holding the licences for collecting the wildlife products for limited quantities were smuggling these items on large scale. The first step taken by wildlife department was to cancel most of the licences.

Later with the objectives to reduce smuggling, to use the confiscated material in the best way, and to earn foreign exchange for national development, a factory was established in 1979. The raw material to the factory was provided from the ivory confiscated from the poachers and the trophies collected from the dead animals.

Since 1979 to 1981 the factory produced and sold manufactured items worth So. Sh. 3.804.148,85 which includes So. Sh. 300.000 advanced to the factory to start the work.

Beyond expectations the Somali staff learnt the workmanship produced marvellous results just in two years instead of 5 year as contemplated in the beginning. Presently the total staff of the factory is composed of 13 Somalis and an Italian.

It will be highly appreciated if our readers give their suggestion for the further improvement of this factory.

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N E W S

GENERAL MANAGER NATIONAL RANGE AGENCY VISITED CHINA, ITALY AND U.S.A.

Dr. Abdullahi Ahmed Karani, General Manager National Range Agency, participated in the National Seminar on combating desertification held in China from August 29, 1981. He discussed the problems of desertification in Somalia with the different experts gathered in the Seminar from different parts of the world.

Dr. Karani visited the offices of F.A.O. at Rome and discussed with the authorities about the projects submitted by the National Range Agency.

At Rome the General Manager joined Mr. Baha-el-din, Coordinator of the World Bank Project on Central Rangeland Development and both of them proceeded to U.S.A. to interview the staff for the above project and to aquant themselves with the lastest developments in Range Management. They are expected back in the first week of November.

Mr. Mohammed Musa Awale, Project Director, Northern Rangeland Development Project took the responsibilities of the Agency and acted as the General Manager in the absence of Dr. Karani.

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SOMALI WEEK IN MILANO

Somali week was organised in Milano, Italy from 20th to 31st May 1981. Different exhibits representing the Culture, Production, Trade and Industry of Somalia were exhibited. Seminars were arranged on different topics on Somalia.

Mr. Yusuf Mohamed Ahmed "Harare", Director wildlife, National Range Agency participated in the different activities and observed that the products of the Mogadishu Ivory factory which manufactures ivory articles from the tusks, confiscated from the poachers, are in great demand.

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PARTICIPATION OF NRA STAFF IN NATIONAL AND INTERNATIONAL SEMINARS

Mr. Mohammed Musa Awale, Acting General Manager National Range Agency presented a paper entiteled "Rangeland Resources and their Management And Development in Somalia" in the First National Seminar on Population, Social and Economic Development in Somalia, organised jointly by Ministry of Education, Government of Somalia and UNESCO held at Hotel Juba Mogadishu from 3.10.81 to 8.10.81. He also participated in the group discussion on Range Management and Economic and Social conditions of nomads etc.

Mr. Mohamed Musa Haji Adan, Director Training, N.R.A. and Mr. Ali Ahmed Elmi of the Training Department also participated in the above seminar and took part in the discussions. Mr. M.M. Haji Aden presented to the seminar a paper entitled "Problems of Population and Environment".

Mr. Noor Abdulqadir Mohamed, Regional Range Director Bakool and Mr. Aden Irad Jama, Senior Forest Officer, Shalambod participated in a seminar on sand-dune fixation and desertification held in the month of September 1981 at Uzbekistan, sponsored by UNEP and the Government of U.S.S.R.

Mr. Hassan Sheikh Omar, Assistant Director Department of Wildlife, National Range Agency participated in the Conference of the International Council for Game and Wildlife Conservation held at Munich, West Germany, from 23rd to 30th May 1081. Besides addressing the conference on the wildlife situation in Somalia, Mr. Omar also met the different

delegates to discuss some of the specific problems of Somalia, specially how to develope effective anit-poaching organisation; training of the Somali Wildlife staff and possibilities of obtaining advisory experts from developed countries for Somalia.

On this occasion I.C.G.W.C. accepted the membership of Somalia to the Council.

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FOREIGN TRAINING OF N.R.A. STAFF

Mr. Mohamoud Abdullahi Osman wildlife assistant, N.R.A. has been sent for 2 years Diploma Course in Wildlife to the Wildlife college, Moshi, Tanzania. The Course is financed by the World Wildlife Fund.

International Egyptian Center for Agriculture has offered 12 Fellowships in Animal Husbandary, Animal Health and Plant Protection for a period of six month to the National Range Agency. National Range Agency has selected 12 members of its staff for the training. The first batch of 4 expected to leave Mogadishu for Cairo on 15th January 1982.

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REGIONAL GOVERNORS WERE BRIEFED ON THE PROBLEMS OF RANGE MANAGEMENT & SOCIAL DIFFICULTIES OF NOMADS

Mr. Mohammed Musa Awale, Acting General Manager, National Range Agency, briefed the Regional Governors on the problems of range management and the social difficulties of the nomads who are directly involved in range management activities. Mr. Awale seeked the help and cooperation of the regional administration in this national work.

EXTENSION SERVICES

Mr. Jabbe Mohammed Ali, Extension Officer, Central Range Development Project visited the central areas for about 45 days and discussed the range management and livestock problems with the nomads. A general training of the nomads were undertaken with the help of films, posters and general lectures.

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16th INTERNATIONAL FAIR

Mr. Ahmed Salim Awad appointed as the Chairman of the N.R.A. Exhibition Committe with Mr. Ali Haji Hassan, Mrs. Faduma Hussein Loolo, Mr. Mohiddin Haji Hussein, Mr. Kediye Ali Mohammed and Mr. Yusuf Farah Noor as members. The stall on N.R.A. at the Fair attracted people from all walks of life. It is impressive and educative. The two films on the activities of the Northern Rangeland Development in Bokh and Gaan Libah were shown to the public and were highly appreciated.

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WILD ASS WAS AT THE VERGE OF EXTINCTION
NOW ELEPHANTS ARE DISAPPEARING FROM SOMALIA

Prof. Simonetta of the University of Cameriono and Mr. Hassan Sheikh Omar, Assistant Director, Wildlife, again visited the areas where the wild ass is found. They were very much disappointed to see the number of the wild asses reduced tremendously from 300 to only 100 during the last six months. A report was prepared and submitted to the Government with recommendations to take immediate steps to conserve this very important species which is an asset to Somalia. If [illegible] to take immediate steps, may be that in next few months or a

year the last few asses left will be killed and thus the species will be extinct. Similar is the case with Elephants. It has been observed that Elephants which were seen in groups of 20s and 25s last year in the southern areas now disappearing and presently they are only found in groups of 3s and 4s.

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NATIONAL TREE PLANTATION DAY - 1981.

In April 1981. on the occasion of National Tree Plantation day, Forest Department of the National Range Agency distributed approximately half million seedlings to the public and government department from the nurseries all over the country. The Forest Department has promised theparticipants who will grow more plants to award special certificates from this year.

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5-NEW CHECK POSTS OPENED

By indiscriminate cutting of wood from the surrounding areas of Mogadishu and Benadir the possibility of extension of moving sand dunes from the coastal areas to the urban and cultivated field has considerably been increased. One of the main causes of distruction of the surrounding savannas is the high demand of wood and charcoal in the capital.

In view of the above new-check posts to check the illegal import of wood and charcoal have been opened. It is hoped that this arrangement will reduce the illegal cutting to some extent.

GABILEY NURSERY RE-ESTABLISHED

Gabiley nursery which was abundoned previously has been re-established on the demand of the people of that area and the work of raising seedlings is in progress. It is hoped that after few months the people of Gabile will be able to collect sufficient seedling from the nursery, and the shortage of seedling in Gabiley area of North-West Region will be solved.

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F O R M A L E D U C A T I O N

15 students enrolled for a diploma course at a secondary level to the newly established school of Forestry and Wildlife at Afgoi, have successfully completed the 1st semister of instructions. The School will again re-open on 1st November after one month vacations.

The mid-term vacations at the Institute of Range Management, Burao, are expiring by the end of October and theffresher will enter their second year of course in November. The School is still facing the shortage of instructors.

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NATIONAL LIVESTOCK AGENCY ABOLISHED

Among many Agencies abolished by the Government of Somalia, National Livestock Agency is the one. The development division of this Agency has been amalgamated with the National Range Agency. Mr. Abdullahi has been appointed as the director of this division under the General Manager of N.R.A. All the holding grounds, marshall yard were overtaken by the N.R.A.

NATIONAL HERBARIUM

Dr. D. Hedberg, Professor of Systematic Botany, Director of the Herbarium and Institute of Systematic Botany, University of Uppsala, Sweden, visited the Herbarium on 29,10.81 and discussed the problems of mutual interest and the ways of further cooperation between the Herbarium at Uppsala and the National Herbarium, Mogadishu.

Dr. Guido Moggi, Professor of Botany and Director of Herbarium of the University of Florence visited the National Herbarium and promised full cooperation of his organisation with the National Herbarium, Mogadishu.

Among the other visitors were professors of Botany of the Agriculture Faculty, Afgoi, Ecologists & Foresters of the Save the Children project in Somalia, other experts working in different projects and many students.

On his vacations in Augus 81. Dr. S.M.A. Kazmi, incharge of the National Herbarium visited many important Herbaria in U.S.A. and Europe.

During the last six months the following number of specimens were recieved in the Herbarium :

- Royal Botanic Gardens, Herbarium, Kew, Surrey, England.	344
- Royal Botanic Gardens, Herbarium, Edinburgh, Scotland.	177
- Jardin Botanique National de Belgique, Meisa, Belgium.	75

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

Documentation Center of the National Range Agency has published the Authors Index, the list of the books, reprints and reports at the Center by the end of 1981. The copies can be obtained from the N.R.A. P.O. Box 1759, Mogadishu.

The following books have been recieved at the Center:

Burkill, I.H. A dictionary of the Economic products of Malay Peninsula, Vols. 1 and 2.

Morazzi, G.C.A. Rossi, & A. Rabbi, Principi di Chimica Biologica. Bologna.

Kuchler, A.W. (ed.) International Bibliography of vegetation maps. vol. 4.

Jacobsen, H. Das Sukkulenten lexikon. Jena Lowdepn.

Richard M. Taxon Inded to vol. 1-20. in two parts.

Hilliard, O.M. and B.L. Burtt. Streptocarpus, An African plant study; Natal.

Chapman, V.J. Mangrove Vegetation. Jana.

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YUSUF OSMAN HAJI JAMA

Mr. Yusuf Osman Haji Jama one of the capable and young Range Administrative Director, recently posted at Jowhar could not survive the brian haemerhage resulted from a motor accident in the town and expired at Medina Hospital. Mr. Jama joined the Ministry of Livestock Range & Forestry as Veterinary Guard in 1959, in 1964 he was promoted as Vet. Assistant and later in 1970 as Regional Administrator. On the establishment of National Range Agency he joined the Agency in 1976 and served as Regional Director at Hiran, Galkayo and Lower Shabelle. The death of Mr. Jama is a great loss to N.R.A.

RUQIYA, ABDULLAHI AND DAHIR DIED IN A MOTOR ACCIDENT

While travelling from Burao to Mogadishu three students of the Institute of Range Management, Miss Ruqiya Yusuf Ismail, Mr. Abdullahi Mohamed Shirwa and Mr. Dahir Hassan Mohamed died in an accident.

God May Bless their souls in Rest.

إنا لله وإنا إليه راجعون.