ECOLOGICAL ASPECTS OF HOUSE CONSTRUCTION IN JILIB DISTRICT, SOMALIA

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ABSTRACT

Houses of sedentary residents of Jilib District, Middle Jubba Region, Somalia are constructed of poles cut from local forests and woodlands. The terminology and composition of the building materials is presented. Twenty important tree and shrub species are listed and described in terms of phytogeography, ecological factors and use for various house components. Details on harvesting of trees, economic effects of recent land use changes, and a comparison with the situation in adjacent districts along the Jubba river is made. Suggestions for further forestry research include investigating impacts of cutting on the remaining forest resource; learning about the silviculture of the following particularly important species: Adenopodia rotundifolia, Albizia antehelmentica, Cordia goetzi, C. sinesis (?), Ficus sycamorus, Newtonia erlangeri, Terminalia prunoides, and Thespesia danis; and further application of agroforestry techniques.

KEYWORDS: deforestation, house construction, Jubba river valley, polewood, riverine forest, Somalia.

INTRODUCTION

House of sedentary residents of Jilib District, Somalia are constructed almost entirely from locally obtained materials. The design and composition of houses are similar to those built elsewhere in southern Somalia. The framework and walls are made from poles cut from nearby forests or woodlands. Only doors, window shutters and their frames are made from sawn timber. Most of this is produced from native trees by village carpenters. Thus, housing construction in Jilib District is closely linked to the state of the local forest resource. In this paper, I will describe the terminology used for different kinds of poles used to build houses, as well as the main species cut for polewood. Ecological, cultural, economic and land use considerations

relating to the main topic will be discussed.

STUDY AREA

Jilib District is the southernmost of the three districts in Middle Jubba Region (Fig. 1). It is approximately 60 km north to south and over 100 km from east to west. Since boundaries vary depending on which map is consulted, precise land area cannot be given. Probably 80,000 people live in the district (no recent census material is available). The vast majority are farmers concentrated in villages of 200-2000 inhabitants on the banks of the main channel of the Jubba river and a secondary channel called Webi Yaro ("little river"). Labadaad Island lies between these channels and is nearly 40 km long and 2-5 km wide.

The Jubba river flows southward along the western quarter of the district. From the district capital Jilib, it is 55 km by air to the Indian Ocean coast. Jilib is over 100 km upstream from the mouth of the Jubba near Kismaayo. The Jubba is one of two perennial streams in Somalia and its volume fluctuates greatly according to the season.

Landforms and soils

With the exception of 20-30 km wide band of mainly stabilized coastal sand dunes, Jilib District is a nearly level plain. Soils in much of the district are derived from marine clay and are somewhat saline. Within the floodplain of the Jubba river (more than 15 km wide in places) soils are developed from medium and fine-textured alluvium. Floodplain soils are generally fertile and neutral to slightly alkaline.

Climate

Jilib District has a semi-arid to sub-humid tropical climate. Rainfall totals 500--850 mm per year and falls in a bimodal pattern. Between the main Gu rainy season (April-June) and the "short rains" of the Dayr (late October--early December) is the Xagaa* season (July--October) characterized by occasional showers and cloudy skies. The long Jiilaal dry season is virtually rainless and lasts from mid-December to early April. Temperatures range from 20° to 40° with the lowest in the Xagaa and the highest at the end of the Jiilaal. Relative humidity is usually above 50%. Winds are from the northeast in the Jiilaal and the southwest in the Xagaa. Wind velocities are less in the Gu and Dayr with the shifting of the monsoon.

Vegetation

The fine-textured alluvial soils were mainly dominated by evergreen riverine forest, with a closed canopy of 20--30 m tall trees, lianas, and a shaded, hence, lightly vegetated understory. These areas were usually flooded every 3--5 years. Medium textured soils in the floodplain were rarely flooded and support woodland vegetation with a discontinous canopy of tall trees above a denser growth of small trees and shrubs. Bushlands occur mainly outside the floodplain and are composed of small trees, tall and medium height shrubs with occasional emergent large trees. The forest has the highest percentage of evergreen, unarmed species while the bushland is made up mainly of deciduous thorny species. Woodlands are intermediate in composition. Most polewood is harvested from riverine forest or woodland. For an overview of riverine forests in Somalia, see Douthwaite (198).

METHODS

Information has been gathered in my past three years of residence on Labadaad Island, across the Jubba from Jilib town. Interviews with local woodcutters, carpenters, and forestry guards (see Appendix) provided most of the information. This was supplemented by personal experience in purchasing polewood for project building needs.

* "x" represents an emphatic, aspirated "h" sound not found in European languages

POLEWOOD TERMINOLOGY

The Somali language has a rich vocabulary for the different kinds of poles used build houses (Table 1). Rectangular houses are called carlish*, while those built on a circular plan with a conical roof are called mundul or muddul. Carlish are larger and more expensive since they require more poles and larger (hence, costlier) components than a mundul. Wealthier people often have roofs of makuuti (plaited coconut palm fronds) or corrugated iron sheets. Mundul's necessarily have only roofs of grass thatch.

House floors are made of well-packed earth. Walls are plastered with a mixture of medium-textured, silty soil and cattle manure. The only materials used in house construction that are not produced locally are hinges , wire and doorlatches (as well as the above-mentioned iron roofing sheets). Virtually all sedentary inhabitants of the district live in either carlish's or mundul's. Only a few government officials, wealthy merchants and upper and middle level employees of the Jubba Sugar Project and Faanoole Project live in modern concrete block houses (less than 15% of all permanent houses).

Figure 2 illustrates the various components of a mundul and a carlish. Estimates of the amount of materials used per house, along with unit cost, are also presented in Table 1. Extrapolations from Helin's (1985) survey at the Farjanno site (near Sablaale on the Shabeelle river), 200 km northeast of Jilib, are used to provide data for the amount of small poles used in an average house. These extrapolations are confirmed by research conducted along the Jubba river (Deshmukh 1987).

RESULTS

Species composition

Seventeen tree and three shrub species were named by informants as providing building materials. There was a strong consensus for the importance of these 20 species, confirmed by purchasing polewood and sawn timber on various occasions and identifying individual pieces. These species are presented in Table 2, along with vernacular names and family affiliation. Spelling of the vernacular follows the official Somali orthographical rules. Subsequent tables will use abbreviations of the scientific name, printing only the first three letters of the generic and specific epithets.

For several species, identification is not definite and this is indicated by a (?). Specimens so marked are awaiting identification at Kew Gardens.

The shrub xararaay is uncertain and likely to be one of the three names given (Deshmukh 1987).

Phytogeography

In terms of species diversity, the riverine forests of the middle and lower Jubba valley are richer than those further upstream, or those along the Shabeelle river. This reflects the presence of numerous species characteristic of lowland East African forests that reach their northern and eastern range limits within Middle Jubba Region. From those listed in Table 2, the following five are restricted in their distribution to extreme southwest Somalia: Adenopodia (Entada) rotundifolia, Cordia goetzi, Lecaniodiscus fraxinifolius, Newtonia erlangeri. and Soringeia madagascariensis.

The practical significance of this is that residents of Jilib District have a more diverse forest resource from which to select polewood than communities living further north along the Jubba (Gedo Region) or those along the Shabeelle river. The other 15 species are more widely distributed throughout Somalia, although Combretum hereroense , Ficus sycamorus, Hyphaene benadirensis(?), Phyllanthus somalensis, Terminalia brevipes, Thespesia danis, and xararaay tend to be restricted to alluvial or seasonally flooded sites.

* "c" represents a sound like the "ain" in Arabic and is a guttural consonant difficult for Europeans to pronounce.

Ecological factors

Table 3 summarizes morphological and ecological data for the species under discussion. The majority are evergreen and thornless. In terms of current population status, common trees are those still found in patches of uncultivated land near settlements or as individuals retained for shade within fields or villages. They tend to produce abundant seed and they are quick to regenerate when fields are left uncultivated for a few seasons. Uncommon species are occasionally seen near villages and farms but are mainly restricted to remote areas. Rare species have been virtually eliminated from the populated part of the district and are scarce even in remote places. Comparing this category and geographical range discussed above, those species with distributions restricted to the middle and lower Jubba valley are all either rare or uncommon. Conversely, no species widespread in Somalia are in the rare category.

Regeneration data are based on observations made both in the field and at the demonstration garden and nursery of the World Concern project on Labadaad Island. Species for which I have not observed regeneration have the presumed mode noted with a question mark. While the genus Terminalia produces abundant seed, it is difficult to overcome dormancy under nursery conditions. Species for which vegetative reproduction is indicated (ie. cuttings) have been noted as sprouting by local residents; this condition is liable to occur when poles are driven into the ground in the process of house building. Cuttings of Commiphora boiviniana are used to mark graves and for live fencing by villagers.

Harvesting of polewood

Polewood is cut by some villagers who then sell their products directly to their neighbors or to middlemen at the main market in Jilib town. While tree cutting is a somewhat specialized occupation, no one exists solely from this source of income. Virtually all sedentary families in the district own farmland and production of maize, sesame, cotton, tobacco, mango, and coconuts are the mainstays of the local economy. Villagers not wanting (or not able) to pay for polewood have the option of cutting it themselves when they need to rebuild a house.

Harvesting of trees takes place mainly in the Xagaa and Jilaal seasons. The rainy seasons are avoided since it is difficult to transport the polewood and danger from snakes is greater when the understory vegetation is denser. This seasonality is reflected in the scarcity of polewood during the Gu and Dayr seasons with corresponding higher price. Thus, tree cutting activity takes place when there is a labor surplus for agricultural work. House building tends to occur in the dry seasons, particularly the Jilaal.

Tree cutting is usually carried out by small groups of men. The chief tool used for both felling and trimming is a large, machete-like knife (known as a panga throughout East Africa, but called seef in Jilib District). Axes are sometimes used; saws are used only by carpenters in their village workshops. Large poles are stacked and transported individually, but faf and marti are bundled together (using the bark of Thespesia danis as rope) in groups of 15, 20 or 30. These bundles, called madax, are also the units by which small poles are sold (however the prices in Table 1 are all for individual pieces). The prime consideration for cutting trees is durability, with form being secondary. Crooked raklis, marti or faf are straightened by making a diagonal cut halfway into the stem and then cracking the pole in such a way as to produce a straighter effect. This technique is repeated at .5 m intervals and, following felling and trimming, is a major activity of tree cutters. However, this technique cannot be done for large support poles (alfaaq), so there is an effort to locate straight, durable trees for this category (such as Terminalia prunoides).

Materials for building houses is a major category in terms of biomass harvested from forests and woodlands, yet it is not the only use. Residents of Jilib District have numerous uses for the native plants in their environment. Fuelwood, furniture, fruit, fiber, implements, and medicine are other important uses (Madany 1987). The twenty species under discussion are presented in Table 4 in terms of their use for providing polewood for house construction. Following this category, fuelwood and furniture are the next two most important categories (in terms of both biomass and economics). Of the species listed, Acacia bussei, A.

nilotica, Adenopodia rotundifolia, and Thespesia danis are important for fuelwood. The first two of these species are of relatively minor importance for polewood, while the last two are of nearly equal importance in both categories. Cordia sinesis (?),Dobera glabra, Ficus sycamorus, and Thespesia danis are much used for furniture.

Importance ratings, with 1 being the most, and 3 the least, are a qualitative assessment of use of each species. Species with a rating of 1 are either highly sought after due to high durability, good form, or large size (eg. Adenopodia rotundifolia, Terminalia prunoides) or because they are so abundant (eg. Thespesia danis) that they are much used. Species rated 3 are either now quite rare or else of value only when more desirable species are difficult to to find.

Economic effects of land use change and deforestation

The last decade has seen tremendous changes in land use in Jilib District. Irrigated rice fields have been established 15 km south of Jilib by the Faanoole Project and irrigated sugar cane fields west of the Jubba river in conjunction with the Jubba Sugar Project at Mareerey (10 km southwest of Jilib). Much of this land had been primary riverine forest. The net result of the deforestation has been a shrinking of resources available to the local population. At the same time, the population of the district has grown rapidly due to immigration of job-seekers and their families.

At present, there are only scattered remnants of riverine forest in the district. The last sizeable area of primary riverine forest in the district was cleared for cultivation by residents of Kaytooy (35 km north of Jilib town) in January 1987 (Deshmukh 1987). Most residents of the riverine zone now travel 15-20 km west of the main channel of the Jubba to a seasonal channel known as Far Shabeel (Gol Hindi). The Far Shabeel branches off the Jubba near the Faanoole dam at the north end of the district and flows westward past the district boundary into Afmadow District, returning to the main Jubba channel about 25 km south of Jilib near Kamsuuma. Since it has only seasonal flow, some species of the riverine forest (such as Ficus sycamorus) are absent and a closed canopy of tall trees is lacking in places. However, within this woodland community, virtually all the species on this list are found.

Due to the increased distance between place of harvest and place of use, the cost of the resource has greatly increased in recent years. Polewood is transported either by trucks or by tractors and trailers. The latter are ostensibily for hauling sugar cane to the sugar factory at Mareerey. However, most drivers supplement their income by hauling other goods, including poles. Periodic scarcities of diesel fuel further increase the transport price.

Not only have polewood prices risen dramatically (as have fuelwood), but there has likely been a shift in the species composition of poles being cut. As species of first preference become scarcer, less desirable tree species are substituted. This trend will likely accelerate in the coming years should the pace of present deforestation and increasing population continue. The original areas cut in the Far Shabeel ten years ago are now depleted so that new areas are being harvested each year. Trees with hard, durable wood tend to be slow growing and they are the first to disappear. However, cutover areas are by no means denuded of vegetation; trees and shrubs of less desirable species are left, as are smaller size classes of some desirable species. Also, certain of the species discussed here coppice readily after cutting (eg. Thespesia danis). Actually, tree-cutting per se has a lesser impact on the forest resource than clearing for agriculture.

The economic situation with regard to polewood differs in the northern quarter of the district. Here, the population along the Jubba is less and the impact of the new agricultural projects on land use is miminal. Secondary riverine forest and woodland areas are more common than in the southern three-quarters. This is reflected in polewood prices, as the following example illustrates: an alfaaq pole of Adenopodia rotundifolia (considered to have the most resistant wood against insect attack) costs only 10/- while in Jilib town it is 120/-.

Comparison with adjacent districts

The other two districts within Middle Jubba Region (Bu'aale and Saakow) are relatively lightly populated. Bu'aale has the last sizeable remnants of primary riverine forest along the Jubba river (Madgewick et al. 1986). Thus, as in the adjoining area of extreme northern Jilib District, polewood is more abundant and prices are correspondingly lower. Further north, in the district north of Saakow, Baardheere, prices of polewood are even higher than in Jilib (Deshmukh 1987). This reflects the fact that Baardheere is a much older and larger town than Jilib, with a recorded history of over 150 years. (Jilib was settled only a century ago). Also, the climate is more arid so that forest vegetation is sparser and less diverse to begin with. The northernmost district on the Jubba is Luuq, and here the polewood shortage is extreme, due to the influx of many refugees from Ethiopia in recent years (Wieland 1987).

CONCLUSION

As elsewhere in Africa, deforestation is taking place in Jilib District in response to increasing demand for agricultural land. Deforestation results not only in scarcer and more expensive fuelwood, but also has serious ramifications for house construction. This paper has documented the use of twenty native woody species for this sector.

Are there solutions to the current problem of shrinking forest resources coupled with expanding population? Here are some recommendations:

1. Research into regeneration and post-harvest succession dynamics in forest and woodland remnants in the district. The purpose of this should be to provide guidance for sustainable use of this resource.

2. Research on silviculture of the following tree species: Adenopodia rotundifolia, Albizia antehelmentica, Cordia goetzi, Cordia sinesis (?), Ficus sycamorus, Newtonia erlangeri, Terminalia prunoides, and Thespesia danis.

3. Continued research into appropriate agroforestry techniques to grow polewood within cropland. Preliminary results from the World Concern demonstration garden show promise for Cassia siamea and Leucaena leucocephala for alleycropping. Azadirachtica indica, Albizia lebbeck, and Casuarina equisetifolia also have potential for use in agroforestry polewood production. Species trials with Eucalyptus have begun, and this genus could provide several species for polewood production.

Residents of the district have responded to deforestation by going greater distances to obtain polewood or paying higher prices for it. Conditions have not become critical enough (as they have in Luuq District) to produce a demand for widespread planting of trees (native or exotic) to alleviate the polewood shortage. Hopefully, agroforestry innovations already being demonstrated will be adopted when they become profitable in the opinion of the residents of Jilib District.

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APPENDIX: LIST OF INFORMANTS

Name	Village	Occupation	Age
Cabdi-Caasiis "Weershe" Xasan Milney	Mobileyn	woodcutter	25
Cumar Xuseen Muuse	Cabdalla Kakane	carpenter	45
Cusmaanow Mukhtaar Gudow	Jilib	ex-forest guard	75
Yuusuf Cali Soc	Bender Jadiid	agroforestry extension	45

Figure 1. Map of southern Somalia. District capitals along the Jubba river are shown.

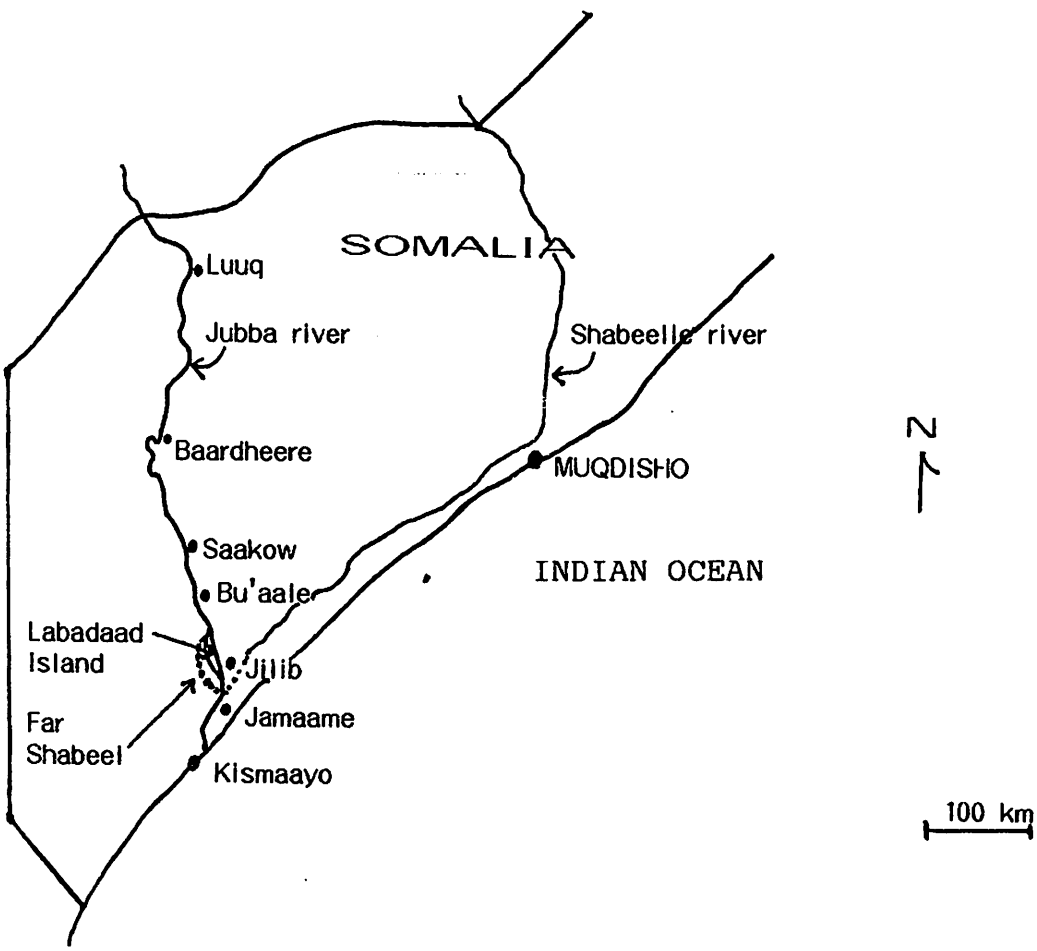
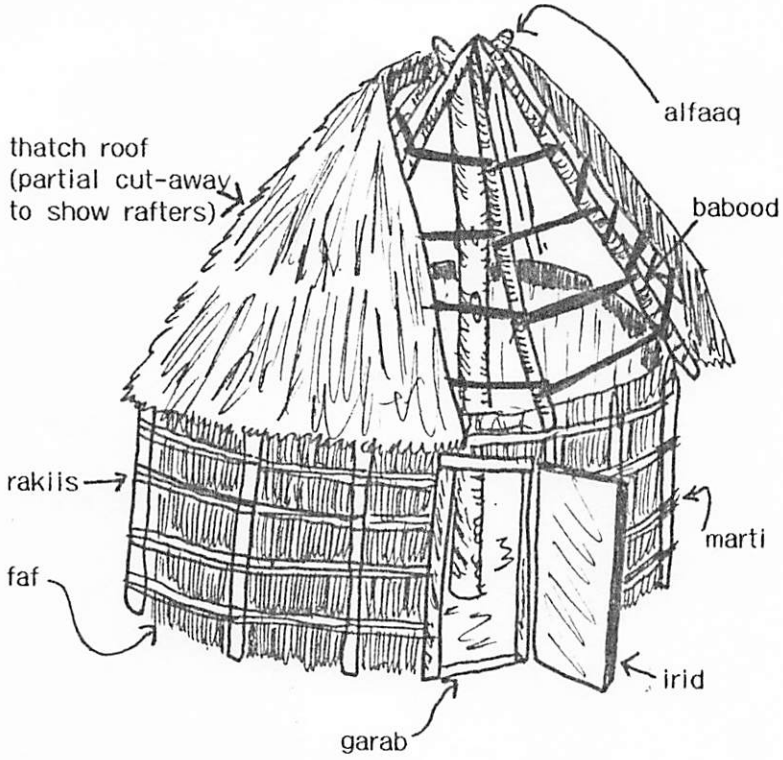
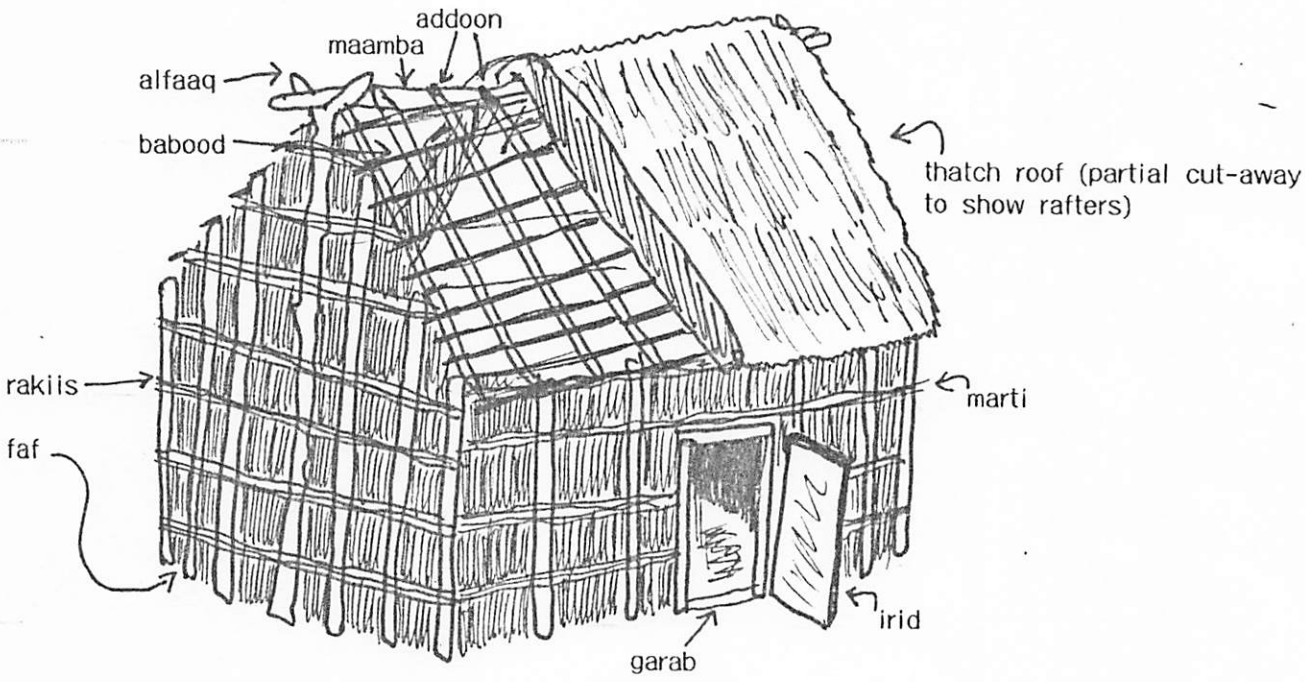


Figure 2. Components of traditional houses.



mundul



cariish

NB: Houses are generally plastered with a mixture of mud and cow manure; this is not shown so the different types of poles may be illustrated.

Table 1. House components: terminology, dimensions, amount/house and price /unit (100 Somali shillings = 1 US $). All prices are from Jilib market and surrounding area.

SOMALI NAME	FUNCTION	DIMENSIONS	AMOUNT/HOUSE	COST /UNIT
1. Large poles (5+ cm diameter)				
addoon	large rafter*	2-3 m X 5-15 cm	30-60	100/-
alfaaq/tiir	center pole, forked	2-4 m X 15-25 cm	1-2	250-400/-
babood/quwil	rafter	2-3 m X 5-15 cm	50-100	5/-
maamba	roof crest*	3-4 m X 15-25 cm	1-3	300/-400/-
rakiis/buurdi	wall supports	2-3 m X 5-15 cm	100	30-100/-
2.Small poles (5- cm diameter)				
faf	wall filler	1.5-2 m X 1-5 cm	3000	1/-
marti	horizontal wall support	5-3 m X 2-5 cm	500-1000	1.5/-
	support (for faf)			
3.Sawn timber				
garab	window/door frame	.3-.4 m X 5-10 cm	4-20	500/-
irid	door	1.5 X .6 m	1	800-1500/-

* carlish only

Table 2. Important tree and shrub species used for house construction.

SCIENTIFIC NAME	SOMALI NAME	FAMILY
A. Trees		
1 Acacia bussei	galool	Mimosaceae
2 A. nilotica	tugaar	" "
3 Adenopodia (Entada) rotundifolia	ciddi-shabeel	" "
4 Albizia antehelmentica	reydab	" "
5 Commiphora boiviniana	dab-biriq, geed hawaaleed	Burseraceae
6 Cordia goetzi	mareer deylib	Boraginaceae
7 Cordia sinensis (?)	mareer	" "
8 Dobera glabra	garas	Salvadoraceae
9 Ficus sycamorus	mukoy	Moraceae
10 Hyphaene benadirensis (?)	baar, makooma	Palmae
11 Lawsonia inermis	alan, eelaan	Lythraceae
12 Lecaniodiscus fraxinifolius	humbeewe	Sapindaceae
13 Newtonia erlangeri	dheydhey	Mimosaceae
14 Sorindeia madagascariensis	mataan-biyood	Anacardiaceae
15 Terminalia brevipes	eeyreeb	Combretaceae
16 T. prunoides	hareeri	" "
17 Thespesia danis	kabxan, kobhan	Malvaceae
B. Shrubs		
1 Combretum hereroense	qoqon	Combretaceae
2 Phyllanthus somalensis	gamoor	Euphorbiaceae
3 Securinega virosa or Fluegga virosa or Allophyllus rubifolius	xararaay	" "

Table 3. Morphological and ecological features of tree and shrub species used for house construction.

Abbreviations: D: deciduous, E: evergreen; A: common, B: uncommon, C: rare; *: requires seed scarification (either hot water or mechanical).

NAME	X HEIGHT (m)	THORNY	LEAVES	STATUS	REGENERATION
A. Trees					
1 Aca bus	5-7	X	D	B	seed*
2 Aca nil	5-7	X	D	A	seed*
3 Ade rot	5-7	X	E	B	seed, cuttings
4 Alb ant	5-7		D	B	seed
5 Com boi	5-7		D	B	cuttings
6 Cor goe	7-10		E	C	seed
7 Cor sin ?	5-7		E	A	seed
8 Dob gla	5-7		E	B	seed
9 Fic syc	20-30		E	A	seed
10 Hyp ben ?	20-30		E	B	seed*
11 Law ine	5-7	X	E	B	cuttings
12 Lec fra	10-15		E	B	seed?
13 New erl	20-25		E	B	seed
14 Sor mad	20-25		E	C	seed?
15 Ter bre	5-7	X	E	A	seed
16 Ter pru	10-15		E	B	seed
17 The dan	5-7		E	A	seed
B.Shrubs					
1 Com her	2-3		E	B	seed
2 Phy som	1-2		E	A	seed?
3 xararaay	1-2		E	A	seed?

Table 4. Species composition of house components
Importance code: 1: most; 2: moderate; 3: minor

SPECIES	LARGE POLES	SMALL POLES	SAWN TIMBER	IMPORTANCE
A. Trees				
1 Aca bus	X			3
2 Aca nil	X			3
3 Ade rot	X			1
4 Alb ant	X			1
5 Com boi			X	3
6 Cor goe	X			2
7 Cor sin ?	X	X		2
8 Dob gla	X			3
9 Fic syc			X	1
10 Hyp ben ?	X			3
11 Law ine	X			1
12 Lec fra	X			3
13 New erl	X			2
14 Sor mad	X			3
15 Ter bre	X			2
16 Ter pru	X			1
17 The dan	X	X		1
B. Shrubs				
1 Com her		X		2
2 Phy som		X		1
3 xararaay		X		1