

Fundamentals of *Hidmo* in Īnderta: A Traditional House Type in Tigray Region, Ethiopia

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Hidmo, a traditional house type seen in Tigray Region, Ethiopia, and the adjacent area of the Eritrean highlands, mainly consists of masonry walls, wooden ceilings, and a soil roof. This paper specifically focuses on the *hidmo* found in the former Īnderta province, Southeastern Zone of the present Tigray Region. The objective of this paper is to clarify the typical parcel layout, spatial components of typical *hidmo* house and building elements of *hidmo* house, based on the basic knowledge of the local building materials. On that basis, the hierarchy of the traditional house is discussed. Making glossary of each building and space in the parcel, each space in the *hidmo* house, and each building element of the *hidmo* house is helpful to understand the themes clearly.

Hidmo applies to the main house built in the parcel, and is where the vast majority of daily indoor activities are carried out. The central space with entrance door of the house is named *midri-bét*. In addition, a two-storied part for cereal storage and housing small domestic animals, and one-storied part for sleeping and storing equipment are often attached. The indoor environment of the *hidmo* house is stabilized because of the thick walls, ceiling and roof, and the limited number of openings.

Stones and woods are the principal building materials of *hidmo*. While stone materials that are easy to deal with could be collected from the neighborhood or nearby, wooden materials were scarce in Īnderta province. Therefore, the use of more wooden materials contributed to increasing the prestige of the house.

Key words: Traditional house, Building material, Masonry, *Hidmo*, Tigray, Ethiopia

1. INTRODUCTION

In Tigray, Ethiopia, there are two major types of traditional house. One is a conically roofed circular house, and the other is a flat-roofed rectangular house; specifically, the roof is slightly sloped, and a circular shaped plan is sometimes found as discussed below. The focus of this paper is the latter building type referred to as *hidmo*, which consists of masonry walls, timber pillar(s) and beams, ceilings of wooden planks between the beams, and a roof-top structure of hard-packed muds (Fig. 1, 2). From the archaeological survey in Hawelti, approximately 10km southeast of Aksum, it is estimated that *hidmo* had already appeared in the late first millennium B.C. (Contenson 1963).⁽¹⁾



Fig 1. External Appearance of *Hidmo*.



Fig 2. A *Hidmo* Ceiling, photo by Higuchi, R.

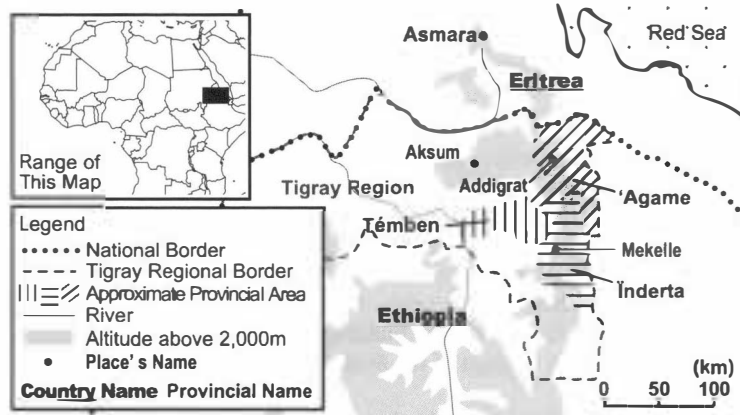


Fig 3. Map of the Targeted Area.

Hidmo houses are distributed through Southeastern, Eastern and several parts of Central Tigray, and the adjacent area of the Eritrean highlands (Fig. 3). There is a typical *hidmo* house plan in each province, though it differs depending on the provincial areas.⁽²⁾ Naigzy (1971) who introduced several traditional housing across Ethiopia raised two types of *hidmo* named the “Eritrean type” and the “Addigrat type,” although the “Addigrat type” should be called “Agame type” because Addigrat is the name of a town, and this type is found all over ‘Agame province. However, he did not list the *hidmo* seen in Inderta province, the specific targeted area of this study located in Southeastern Tigray. Inderta is located in the highlands at approximately 2,000 m altitude adjoining the eastern lowlands. In Inderta, the present regional capital—Mekelle city—is located.

Although the studies on *hidmo* have not advanced much since the explanatory description by Naigzy (1971), there are several important studies in the literature. For example, Lyons analyzed the role of *hidmo* as active political locales in the local community (2007) and the gendered division of labor in constructing *hidmo* (2009). Bauer (1977) discussed the *hidmo* house in relation to household organization. The author also recently analyzed the process of material collection and planning of *hidmo* (Shimizu *et al.* in press-1), and the traditional techniques and local knowledge on *hidmo* from the perspective of the construction process (Shimizu *et al.* evaluating review⁽³⁾). However, the basic issues of *hidmo* house such as typical parcel layout, house plan, and building elements have not been adequately discussed.

The objective of this paper is to clarify the typical parcel layout, spatial components of typical *hidmo* house, and building elements of *hidmo* house in Inderta, based on the basic knowledge of the local building materials, concretely stones and woods. On the basis of that, the hierarchy of the traditional house is discussed in association with building construction methods, plans, and materials.

Clarification of the typical parcel layout and spatial components of typical *hidmo* house is con-

cerned with the understanding of local lifestyle. Making glossary of each building and space in the parcel and each space in the building is helpful to understand the role or function of each building and space, and spatial needs of the local daily life. On the other hand, clarification of building elements of *hidmo* house is concerned with more technical issues. By resolving building structure into its constituent elements and making glossary of each of them, the way to use and assemble materials is clarified. Availability of building materials is a key background of the traditional house. Therefore, the status of principal materials of *hidmo* house, namely stones and woods, is firstly reviewed in this paper. This basic knowledge is helpful to understand building elements of *hidmo* house and hierarchy of the traditional house in the targeted area.

The resulted outcomes are the fundamentals to understand *hidmo* house in Īnderta. They provide the essential and basic information to protect and promote the *hidmo* house as the cultural heritage. Furthermore, they give hints to search for the potentials to design locally desirable living environment and to consider local building culture in the future. Though many *hidmo* houses have still been able to be seen in the countryside, *hidmo* is becoming less popular choice when building new houses, and the number of local builders with adequate knowledge of *hidmo* house is becoming to decrease. Clarification of the fundamentals of *hidmo* house is now becoming more urgent.

2. METHODOLOGY

To clarify the typical parcel layout, spatial components of typical *hidmo* house, and building elements of *hidmo* house in Īnderta, two research activities were carried out. One was via interview research with local builders. Between 2012 and 2016, the author interviewed thirteen local builders in Īnderta with experience of *hidmo* house construction.⁽⁴⁾ An in-depth interview was conducted with ten of these builders, who had a good knowledge on the building materials, building techniques, and building preparation and construction processes. Among these, the questions concerned with the following are covered in this paper: the name and function of buildings and spaces on each parcel, the name and function of each spatial component of the *hidmo* house, the name of built-in furniture placed in the *hidmo* house, the name of each building element, and the name of the most prestigious house types in the targeted area. The research was done with the assistance of the native Tigrinya-speaking assistants. Though each name of buildings, spaces and building elements is the word of Tigrinya, it should be noted that whether the same name is applied in the whole of Tigray or other provinces or not is not clear. Because the name is obtained through interviews with the builders in Īnderta, the name is of Īnderta, too. Concerning the cases of other provinces, other surveys should be required. It may be that the terms used are sometimes, or often, different in other provinces' *hidmo* house.

The second research activity involved observation and measurement of the *hidmo* house and the parcel that *hidmo* house is located. A set of drawing made on the basis of the measurement results provides a base for explaining each spatial component and building element. To show examples of a local parcel, the site visited by the author at the time of the interview research is used.

In previous papers, the author has already provided introductory descriptions on the domestic layout of a local parcel (Shimizu *et al.* in press-2⁽⁵⁾) and the spatial components of a *hidmo* house (Shimizu *et al.* in press-1⁽⁶⁾). However, they did not include the analysis of the interview results and enough photos, because the focus of those papers was not to clarify the fundamentals themselves. In this paper, the authors attempt a more detailed and clearer description by analyzing interview results and adding illustrative photos. In addition, explaining issues on both parcel and building scales at one time is helpful to understand the local lifestyle more clearly.

3. REVIEW OF STONE AND WOODEN MATERIALS IN ĪNDERTA

In Īnderta, stone materials to erect masonry walls are collected from the neighborhood or nearby

places. Therefore, the masonry walls of Mekelle and its environs are usually made from various types of local limestone, a type of sedimentary rocks, with the colors of black, white, yellowish-white and so on (Asfawossen *et al.* 2008). Geologically, this limestone is known as Ant'alo limestone (Fig. 4). Around 180 million years ago in the Mesozoic era, the eastern part of Gondwana⁽⁷⁾ began to separate and the water gradually extended and basins including the present Mekelle Basin were flooded and overflowed. Ant'alo limestone was formed due to the deposition of the thick layers of limestone, some by chemical precipitation of carbonate minerals dissolved in the seawater, and some from the shells of organisms living in the sea (Williams 2016). This Ant'alo limestone is in places overlaid by fine-grained and thinly bedded Agula' shale, which comprises variegated shale, marl, and clay interlaminated with fine crystalline black limestone and some thin beds of gypsum and dolomite (Asfawossen *et al.* 2008). The sea began to retreat in approximately 150 million years ago (Williams 2016). These sedimentary rocks are easier to deal with than basalt, a type of igneous rocks that is dominant in the area where *hidmo* is not found. In other areas where *hidmo* houses are located, stone materials such as sandstone and granite, which are also easy to deal with, are exposed (Fig. 4). However, the typical settlement location, parcel layout, and building plans are different than those of Īnderta. Interestingly, the area where the common parcel layout and building plans, which are analyzed in this paper, are found corresponds approximately to the area of the Mekelle Basin where predominantly limestone is exposed.

Although the reason for the correspondence cannot be determined conclusively, some speculation can be offered. According to Asfawossen *et al.* (2008), the Ant'alo limestone area is characterized by the existence of gradually terraced slopes geomorphologically. In Īnderta, local settlements are often located on such a slopes. According to Corbeels *et al.* (2000), the hillside settlement location is preferable for local farmers, who can reserve the bottom of the crystalline black limestone slope where the most fertile soil with high water-holding capacity is available. Therefore, people tended to find level pockets of land on the slope, and settle there. This type of parcel formation is similar to terraced agriculture, therefore the authors called this type of enclosure "terraced-enclosure" in the previous paper (Shimizu *et al.* 2018). On the other hand, the geomorphology of the adjoining Enticho Sandstone area in 'Agame province is likely to be low hills dissected by deep canyons and buttes (Asfawossen *et al.* 2008). That is to say, it is more difficult to find the same geomorphological location in 'Agame. Hillside settlements can be often seen in the Eritrean highlands, too.

As compared with stone, wood is a scarcer material. In Īnderta, where bare rock is often exposed, little natural vegetation remains. Indigenous species, such as *Jeniperus* (*tseḥīdi*) and olive (*awli'i*), are currently rare. In Tigray, a few remnants of indigenous forests are found in scattered remote locations, such as Dés'a (approx. 40km away northeast of Mekelle) and Hugumburda (approx. 100km away south of Mekelle). To address the deforestation that had become a serious problem as early as the 19th century, eucalyptus was imported from Australia at the beginning of 20th century (Girma 2017). Currently, this is the dominant construction material commercially available in Tigray because other indigenous species are prohibited from being logged.

Nevertheless, plenty of wood is required to build a *hidmo* house. Therefore, collecting wooden materials was a serious task that consumed time and manpower (Shimizu *et al.* in press-1). The reasons why such a type of housing became popular in Īnderta are highly contested. Nevertheless, a survey of the pollen and charcoal analysis that was carried out in Lake Hayq (approximately 240km away south of Mekelle) and Lake Ardibbo concluded that *Juniperus* forest with *Olea* and *Celtis* expanded from AD 1400 to 1700, possibly because of drought-induced depopulation followed by increased rainfall (Darbyshire *et al.* 2003). Indeed, whether this was also the case in Tigray is not clear, however, it is safe to say that deforestation has intensified during the last three centuries in either case. The widespread absence of forest in northern Ethiopia at that time was confirmed by a series of foreign explorers (Pankhurst 1995). Although it is not clear in which period the *hidmo* house was the most actively constructed, the extensive use of wood for building construction as well as for fuel would have accelerated the deforestation. The lack of a proper forest management system was often reported by a series of foreign explorers.

4. BUILDINGS AND SPACES WITHIN THE PARCEL

Each parcel of land in Īnderta is usually enclosed by a curvilinear wall of piled stones or sometimes wattle, while parcels in 'Agame are often rectilinear. The curvilinear shape in a hillside location is not surprising because the shape of the terrain is always curvilinear in nature (Shimizu *et al.* 2018). Such a technique or method of parcel forming is applied even in flatland settlements. Furthermore, even at the initial phase of Mekelle's urban development, this method was applied by identifying the micro terrain (*Ibid.*).

In each parcel, several buildings and spaces are dispersed in the courtyard (*mereba*). The existence of an open and uncovered courtyard is an essential characteristic of the traditional domestic layout of Tigray. One can enter the courtyard through the parcel's entrance. This entrance is locally called *beri* or *af-gebeta* (*af* meaning "mouth" and *gebeta* meaning "parcel of land"), although the interview research with builders could not clarify the distinction (Table 1).⁽⁸⁾ In the entrance, a door(s) is often installed. Fig. 5 is an example of such a site located in a village near Mekelle. In the parcel, the following buildings or spaces are installed:

- (a) The main house(s), where the vast majority of daily indoor activities are conducted (Fig. 6). Although only one residential house exists in this example, instances with more than one main house for the owner's children or relatives, are normally found. The house is usually a *hidmo* house (A detailed discussion of *hidmo* houses appears below).
- (b) *Damigogo* is the space where *injera*, the traditional dish of the Ethiopian and Eritrean highlands, is prepared (Fig. 7). A conically roofed building is usually apparent, because its better ventilation makes it more suitable for cooking.
- (c) *Bét-meadi* (*bét* meaning "house" and *meadi* meaning "the state that food is ready") is a space where other foods are prepared. It is often combined with *damigogo*. A conically roofed building is usually applied here as well.
- (d) This is a space for cattle and other large domestic animals (Fig. 7). Cattle are used for plowing and paying tribute as well as for food and drink. Therefore, they have a high value and are connected with the household's wealth. The space is often covered with a roof. In this example, the animals are unconfined within the courtyard. This is one of the essential reasons why each parcel is enclosed by walls. According to the interview research with builders, the space where domestic animals, especially larger ones such as cattle, cows, or oxen, exist is called *dembe* or *ger* (Table 2).⁽⁹⁾
- (e) An unroofed space with walls for smaller domestic animals. This space is often omitted because these animals are usually kept within the main house (Fig. 8).

Other than *dembe* or *ger*, the space for domestic animals can be simply called *inda-mirakut* (meaning "a space belonging to calves") or *inda-t'ēle-begi'i* (meaning "a space belonging to goat and sheep"). Apart from this residential parcel, there is often adjoining farmland. In Tigray, the majority of people were, and still are, farmers.

5. SPATIAL COMPONENTS OF HİDMO HOUSES

From the courtyard, one can get a full picture of the main house (Fig. 1, 6). There is an entrance to the house, called *dege'af* or *afdege* (*dege* meaning "outside")⁽¹⁰⁾ and positioned in a longitudinal direction. Concerning the orientation of the house, two builders interviewed responded that an entrance on the north side is preferable, while one responded that the north or south side is better, albeit five taking no notice. According to two builders, the east side should not be open to protect from strong winds. In Īnderta, wind is prone to blowing from the eastern lowlands. One builder also mentioned that the south side should not be open because people do not like direct light and heat, and another mentioned that the west side should not be open because the light is strong in the evening.

The inside of the house feels dark because of the limited number of openings, but cool in the daytime and warm in the evening owing to the thick walls, ceilings, and roofing. This construction helps to cut down on strong sunlight during the day and retain warm air in the night. Indoor conditions with iron sheeting roofs in the present day are worse than the traditional *hīdmo* roof because the heat is more easily accumulated inside of the house.

With the exception of the rainy season, and especially the harvest season, men often fall asleep on the flat roof at night. According to seven builders, they need to keep watch over their parcels, including their farmland, to protect it from thieves and birds. One builder said that sleeping on the roof is due to the existence of insects inside a house. After harvesting crops, the flat roof is used as a location on which a sheaf of straw is placed (Fig. 9). It must be placed out of reach of cattle in the courtyard because it is their food.

The typical plan of *hīdmo* houses in Īnderta fulfills the demands of the local lifestyle. When referring to the most prestigious version of the *hīdmo*, the space can be divided into three components (Fig. 10). In the case of minified versions, one or another component is omitted as shown in Fig. 11. Each spatial component is explained as follows:

- I. The space is called *midri-bēt* (Fig. 12); *midri* means “ground”. This is the central space of the house with an entrance door and serves as a space for living, dining, sleeping, and reception. Related furniture, such as the *medeb* (Fig. 13), a platform for sleeping or sitting purpose, is set along the walls. A platform for sitting can be called *meqemet’i*, too. These are made with stones and gravel, covered by hard-packed mud. In addition, *medeb-lī’ilo*, a shelf to place materials, is often installed (Fig. 14). These indoor constructions were carried out by females (Lyons 2009).
- II. This space is separated from space (I) by walls and it usually serves for sleeping purpose. In this space, the *medeb* or *medeb-lī’ilo* (a platform for sleeping with a shelf between the floor and the platform level) is often fixed.⁽¹¹⁾ The length of the wall separating space (I) from space (II) is sometimes short and those spaces are unified (Fig. 15). According to the interview research, the names for this space are often confusing (Table 3).⁽¹²⁾

In the upper part of the space, *goro-‘arat*, the row of logs, is usually hung between the wall separating space (I) from space (II) and the back wall (Fig. 16). The agricultural implements and other tools are kept here.

- III. This space consists of two stories. The upper room is called a *debri* (meaning upper floor), which often serves as storage space for cereals. Therefore, the *gotera* (box for grain) is sometimes placed here (Fig. 17). A large window is often cut out in this room (Fig. 18). In addition, *ch’igwat* (a built-in shelf) is often formed by making a void in the wall (Fig. 18). Stairs (*medeyayb*) or a ladder (*mesaliil*) allows access from the ground floor (Figs. 10, 11: section).

The lower space below the *debri* has two variations. The majority have a continuous space between the building’s wall and the pier-like wall supporting the *debri*, as shown in Fig. 11. In this case, the space is called a *guaro* and it traditionally serves as a space for livestock, such as horses, donkeys, mules, sheep, and chickens (Fig. 19, Table 4). The other variation is that the space is separated into several parts by walls below the *debri*, which meet the building wall at a right angle, as shown in Fig. 10. This space is more likely to be used as a place to deposit valuable items, such as honey and milk. In this case, the space is often called *wushat’o* (*wushat’o* meaning “innermost space”), although this space exists only infrequently (Table 4).⁽¹³⁾

6. EACH BUILDING ELEMENT OF A HĪDMO HOUSE

To understand how to assemble materials and erect a building, specifying the building’s structure into each of its element is helpful. Structurally, the *hīdmo* house can be divided into stone masonry walls and wooden ceilings. Therefore, each element is listed as (a) elements of the walls and pillars, or (b) elements of the ceilings and roof, as indicated below. On that basis, (c) patterns for placing wooden

materials of the ceiling, are listed.

(a) Elements on the Walls and Pillars (Fig. 20)

- a-1) Wall (*mendeq*): Stone is piled up.
- a-2) A masonry wall separating space (I) from space (II) is usually called *filatsa* (Fig. 12; Table 5: a).
- a-3) A masonry pillar supports the upper floor. According to five builders, it is called *harweltsi* or *harweltsi-nay-debri* (Fig. 19; Table 5: b); *harweltsi* means “monument” and *nay-debri* means “for upper floor.”
- a-4) When space (I) has two spans, a timber pillar(s) (*amdi*) is (are) set up (Fig. 12).
- a-5) A door installed in the building is called *ma'itsa*.⁽¹⁴⁾ The height of the door is sometimes lower than body height (Fig. 21). According to four builders, this is to secure from horses or a person riding a horse entering into the house directly.⁽¹⁵⁾ One informant living in the local village mentioned that local people preferred not to entertain elite people, because it required plenty of food and drink. On the other hand, generally speaking, entertaining elite people enhanced the social status of that household in the local community.
Arched doors cannot be found in *hidmo* houses. Although a timber is used for a lintel, the term pointing “lintel” is not fixed. The concept of a lintel seems not to be important for local builders because openings are set up after assembling the timber frame. Builders interviewed expressed it in terms of “*metsqeti dege'af (afdege)*” (meaning “spanning entrance”), “(*afdege*) *tedefayt*” (*tedefayt* meaning “opposite”), and so on (Table 5: c).
- a-6) There is sometimes an eave made from stones over the door (Fig. 22). Locally, this is called *ch'ihmi* (Table 5: d); meaning “mustache.” According to three builders, *ch'ihmi* refers to an eave only when grass has grown, and it is called *tsaf-tsaf* when it is made only from stones.
- a-7) A thin window, the lintel of which is stone, is called *meshkot*. This is placed in the upper part of the building (Fig. 1 and 6). In case of the house shown in Fig. 10, there are ten *meshkot*, albeit often ones buried by stones. Inside the room is not well lit.
- a-8) A large window, the lintel of which is timber, is called *meshkot birhan* (*birhan* meaning “light”). This is usually set in *debri*, and does not illuminate space (I) (Fig. 1). The ground floor usually does not have it. In the case of the house shown in Fig. 10, two *meshkot birhan* are set in *debri*. There are often cases with one *meshkot birhan*, such as the house of Fig. 11 as well. The way to assemble this has much in common with the way to assemble a door (a-5).
- a-9) In the wall of the *hidmo*, several holes lined up at the same height are often found. Locally, these holes are called *bukko* (meaning “hole”) and are used to set up a scaffold. Builders work on the row of wooden logs bridging the logs below, each of which is inserted into a *bukko* (Fig. 23). These holes are filled with stones in some cases, but left as is in other cases.
- a-10) The top of wall is covered with thinner stones with a large surface area. Locally, this type of stone is called *qatsela*; it forms a stringcourse and keeps water from entering the inside wall. It requires two or more layers because water more easily penetrates through the gap between *qatsela* in the case of only one layer. According to seven builders interviewed, not only the type of stone itself, but also stringcourse made from it is called *qatsela*. *Zabebe* is perhaps an alternative term of a stringcourse (Table 5: e).

(b) Elements of the Ceilings and Roof (Fig. 20)

- b-1) When a timber pillar(s) is (are) set up, a timber beam is placed on it on the short side of the building (Fig. 12). The beam is called a *gadim* (Table 5: f) meaning “horizontal.” Three builders suggested the alternative term *rogid medegefi* (meaning “thick supporter”).
- b-2) Between a wall and a *gadim*, a series of upper beams, each of which is smaller than the *gadim*, is placed (Fig. 2). These upper beams are called *serayt*, and they are usually placed in alternating twos.
- b-3) The void between the *serayt* (or the *serayt* and the wall) is filled with wooden planks that are usually called *mihuts* (Fig. 2). It consists in the ceiling of the *hidmo* house. The pattern of plac-

ing the *mihuts* has three variations as explained below (c-1, 2, 3).

- b-4) On the timber ceiling structure, roofing materials of gravel and soil are placed. According to six builders, the roof of the building is simply called *ziban hidmo* (Table 5: g); *ziban* meaning “back.” One can understand the reason for *ziban hidmo* (meaning “upper part of *hidmo*”) when the appearance of four-legged animals is called to mind. Red and/or white colored soils are used for the roofing (Shimizu *et al.* evaluating review).

(c) Patterns of *Mihuts*

- c-1) In the majority of cases, the wooden materials of *mihuts* are placed in a v-shaped arrangement (Fig. 2). According to six builders, such a pattern is called *hankeshtay-qirtsi* (*qirtsi* means “shape”). Another builder call it *hankeshtay mihuts*. Owing to its ordinariness, three builders do not know the name of this *mihuts* pattern.
- c-2) In cases of buildings related to the church, the arrangement pattern often becomes cross-shaped (Fig. 24). This pattern is called *mesqel-qirtsi* (meaning “cross-shape”).
- c-3) On rare occasions, *mihuts* with a parallel arrangement can be found. Although the majority of builders do not have a way to express this in a single word, two builders called it *tara-mihuts* (*tara* meaning “normal”). When a material named *shambago*, a similar material to bamboo, is used for *mihuts*, the arrangement is usually in this pattern. In that case, the *mihuts* is called *shambago* (Fig. 25).

7. HIERARCHY OF TRADITIONAL HOUSES IN İNDERTA

A rectangular shaped *hidmo* house is sometimes called *merebāi*. This is the most common and prestigious house type in İnderta. Above all, the largest sized house shown in Fig. 10 is the most prestigious version of it. Locally, this is known as *aderash*. According to the builders interviewed, only the elite who had enough workers or the rich could afford to build it. Thus, few *aderash* can be found in a single village. Indeed, the case of the house in Fig. 10 was built by the person titled *blattén-géta* under Emperor Yohannis IV in the latter half of the 19th century.⁽¹⁶⁾ This *aderash* was mundanely used for residential purpose, however, it could accommodate family members, relatives, and guests together at times and have space for a reception, too.

Generally speaking, the word *aderash* points to a large hall employed for banquets and festivities. The word was also applied to a royal throne room. According to Pankhurst (2005), the word was used in the Chronicle of Emperor Yohannis I in the 17th century for a royal tent in the Gonder palace compound. Although the *aderash* in villages are not royal, they are perhaps called this because of the role of the reception. Indeed, one builder mentioned that when some noble people visited the village, the invitation was given in the *aderash* building.

The spatial components of the minified version of the *hidmo* share elements in common with the most prestigious version. The former is created by decreasing the number of spans of *serayt* in a longitudinal direction (Fig. 26). According to four builders interviewed, this minified version of the *hidmo* can be also called *aderash*.

Circular *hidmo* houses can sometimes be found in the local village as well. Locally, this is called *kibi-hidmo* (*kibi* meaning “circle”) and is recognized as less prestigious than the rectangular *hidmo*. The author measured three cases of *kibi-hidmo* through a series of field surveys. Two of the three buildings measured had a similar building plan, which can be understood as a derivation of the rectangular *hidmo* (Fig. 27, 28). In the center of the circle, of which the radiuses are approximately the same at one span of the rectangular *hidmo*, a wooden pillar is set up. On that pillar, a beam and upper beams (respectively corresponding to the *gadim* and *serayt* of rectangular *hidmo*) are placed. The length of the upper beams can be gradually decreased because of the circular shape of the building. Therefore, material collection is easier in a circular *hidmo*. On both sides of the circular room, small rectangular spaces are attached. Components of these attached spaces have a commonality in both

measured buildings: *goro-arat* is hung over in one of the rectangular spaces, while *medeb* is set up in the other. In this way, *kibi-hidmo* can be recognized as the derivate version of rectangular *hidmo*, although it does not have a two-storied part. The other example is a further simplified version without rectangular spaces (Fig. 29). A wooden pillar is replaced by a masonry pillar, and *goro-arat* is assembled under the beam (Fig. 30).

People who could not afford to build a *hidmo* house were forced to create conically roofed houses. For example, Bauer (1977) explained that a couple normally began married life with a single wattle-and-daub hut that served for all household functions; a new house would be built as soon as possible if the household was successful. Building a *hidmo* house meant a great deal in the local community. Bauer also mentioned a successful man of 35 years old: “the hut that had been their house when they were first married” was then used as a kitchen, and the newly built “well-made *hidmo*-style house shows that he has the ambition to be an important man in the community someday.”

Not only the building construction method and size of the house, but also the means to use wooden materials were factors determining the hierarchy of houses. As mentioned previously, wood is a scarce material in the targeted area. Therefore, the use of more wooden materials increased the prestige of the house and the owner of the house (Shimizu *et al.* in press-1). Above all, the use of finely shaped timbers was highly respected. Lyons (2007) called ceilings with such finely shaped timbers “decorated ceilings” to distinguish them from the ceiling made of unshaped rugged natural wood: “the widely held perception that decorated ceilings waste wood and labor is what makes them more meaningful than other ceilings in the production of social inequities and in creating places of authority.” However, such thoughts could accelerate the deforestation in the targeted area.

8. CONCLUSION

In this paper, typical parcel layout, spatial components of typical *hidmo* house, and building elements of typical *hidmo* house were examined through creation of a glossary. In each parcel, people made buildings and spaces for sleeping, eating, inviting others to visit, storing cereals and equipment, cooking, keeping domestic animals, and performing other daily activities. *Hidmo* is the name of a traditional type of house that is applied to the main house of each parcel. The vast majority of daily indoor activities are done in the main house. The *müdiri-bet* is a central space of the main house with an entrance door. In addition, a two-storied part for cereal storage and housing small domestic animals, and one-storied part for sleeping and storing equipment are often attached. Owing to the limited number of openings, the inside of the room is not well lit; however, the thick walls, ceiling, and roof contribute to stabilizing the indoor environment. Although each spatial component and building element has a name of some sort, it often varies depending on the builders.

The principal materials of *hidmo* house are stones and woods. While stone materials are used for walls, wood is for ceilings. Stone materials are collected from the neighborhood or nearby places. In İnderta, the sedimentary rocks, such as limestones that are easy to deal with, are available in many places. On the other hand, wood is a scarce material. Therefore, the use of more wooden materials increased the prestige of the house. That is, not only building construction method and size, but also building material applied was a factor in determining the house's place in the hierarchy in a local context. Establishing a proper forest management system is now an urgent issue.

In this paper, the fundamentals of the traditional *hidmo* house are discussed. To consider how to protect the heritage of the local building culture, and how to design locally desirable living environments in the future, this fundamental knowledge should be re-evaluated now.

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NOTES

- (1) In the site, a clay model resembling *hidmo* was found.
- (2) The province system does not currently exist in the administrative structure. In this paper, the word of province indicates the approximate area of the previous territory of the local rulers until the imperial period.
- (3) The authors submitted the following paper to the *Journal of Architecture and Planning (Transactions of AIJ)*: Shimizu, N., Ephrem T., Alula T., & Miyake, R., "Traditional" Techniques and Local Knowledge on Hidmo Houses in Tigray Region, Ethiopia: A Retrospective Study on Building Construction Processes from the Perspective of Tools and Materials.
- (4) A series of interview research with local builders was carried out by the first author, during the field survey of Jun. 2012 - Aug. 2012, Nov. 2015 - Jan. 2016, May 2016 - Jun. 2016, and Sep. 2016 - Nov. 2016, intermittently.
- (5) The authors analyzed how one settlement in Mekelle has been transformed from the spatial and building aspects in Shimizu *et al.* (in press-2). In this previous paper, to show the transformation of each parcel of the settlement, domestic layout of a parcel in the past, such as name and function of each building or space in the parcel, is introduced in brief. In this paper, more detailed information including concrete interview results, list of alternative names of each building or space, and photos taken by the author, is added.
- (6) The authors analyzed the process of material collection and planning of *hidmo* house in Shimizu *et al.* (in press-1). In this previous paper, to show the typical plan of *hidmo* house, spatial components of a *hidmo* house, such as name and function of each space, are introduced in brief. In this paper, more detailed information including concrete interview results, alternative names of each space, building orientation, and photos taken by the author, is added.
- (7) Gondwana is a supercontinent that included present-day South America, Africa, India, Antarctica and Australia.
- (8) "*Beri*" is a more popular word to point to the parcel's entrance or door. There were seven builders who knew both of these words. According to two, "*beri*" means the door to a parcel and "*af-gebela*" means the parcel's entrance space. On the other hand, according to four builders, "*af-gebela*" seems to be an upgraded version of "*beri*." However, specific distinctions in the meaning depend on the builders.
- (9) According to six builders, "*dembé*" and "*ger*" refer to the space relating to domestic animals. Of which four builders said that, they are synonyms. A few builders said that the space lies under a roof. However, to indicate a space under a roof, "*gibaza*" seems to be a more popular word.
- (10) Both words are synonyms. Only elements of the words are reversed.
- (11) The author has not seen *medeb-l'i'ilo* in this position before.
- (12) From the interview results, name of this space varies depending on the builders. The space is called *medeb*, *medeb-l'i'ilo*, *midri-bét* (same as space (I)), or *guada*. Nevertheless, it might at least be called *medeb* (or *medeb-l'i'ilo*) in a case where the *medeb* (or *medeb-l'i'ilo*) is fixed. In addition, when this space is unified with space (I), it might be also called *midri-bét*.
- (13) Three builders did not know the spatial variation of *wushto*, and only three builders could distinguish the meaning of *wushto* from *guaro*. Three builders made no distinction between the two.
- (14) While *afdege* (*dege'af*) points a whole extent of entrance, *ma'itso* points specifically a timber panel of a door.
- (15) Although one builder responded that this custom to set lower height doors started during the Italian occupation, the house example of Fig. 21 was built before the Italian period.
- (16) *Blattén-géta* is a court title of 'lord of the pages'.

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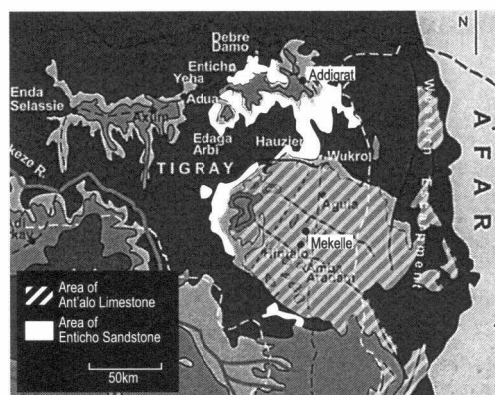


Fig 4. Geological Map, after Williams (2016)

Table 1. Meaning of "Ber" and "Afgebela"

# of Builder	Meaning of Ber	Meaning of Af-gebela
1	Parcel's door.	Parcel's entrance space.
2	Parcel's door.	
3	Parcel's door.	
4	Parcel's door.	Parcel's entrance space.
5	Parcel's door.	
6	Parcel's door.	A space for house animals.
7	Parcel's entrance without a door.	Parcel's entrance with door(s).
8	Parcel's entrance without a door.	Parcel's entrance with door(s).
9	Parcel's entrance without af-gebela.	A structure over the entrance.
10	Parcel's entrance with one door.	Parcel entrance with a bigger door(s) or more than one door.

^{**} No answer could be obtained. Whether the interviewee can answer it or not is not clear.

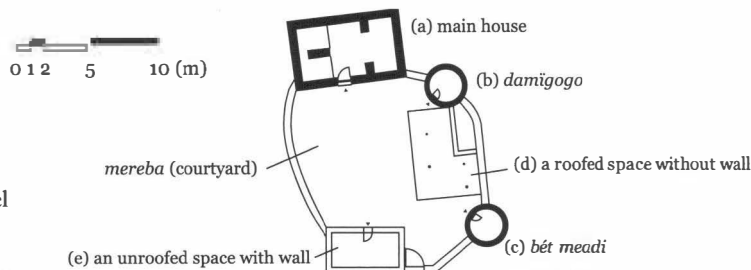


Fig 5. An Example of a Parcel from Shimizu et al. (in press-2)

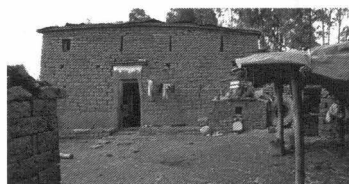


Fig 6. A Main House



Fig 7. Damigogo and a Roofed Space without Walls.



Fig 8. An Unroofed Space with Walls.

Table 2. Meaning of "Dembe," "Ger" and "Gibaza"

# of Builder	Meaning of Dembe	Meaning of Ger	Meaning of Gibaza
1	A space for domestic animals in the courtyard.	- **	- **
2		- **	- **
3		- **	- **
4	A space for domestic animals in the courtyard.		A house for domestic animals (especially for cattle).
5	A space without walls where domestic animals usually live.	- **	A space under a roof and without walls.
6	- **	A space under a roof for domestic animals, especially for cattle.	
7	A space under a roof, for cattle, cows and oxen.		A structure over the entrance.
8	A space under a roof.	A space for especially cattle, often under a roof.	A space under a roof, for the reception purpose.
9	A space for cattle.		A space under a grass roof.
10	A space for cattle and other domestic animals. A roof is optional.		A space under a grass roof for horse and mule.

^{**} No answer could be obtained. Whether the interviewee can answer it or not is not clear.



Fig 9. Hidmo roof where sheaf of straw is placed.

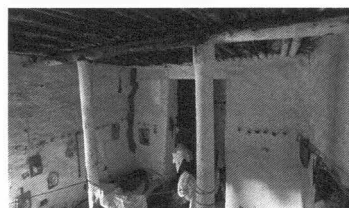


Fig 12. Midri-bét, photo by Higuchi, R.

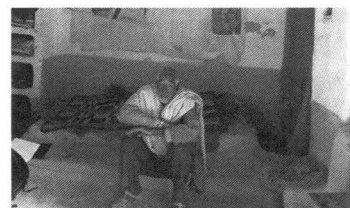


Fig 13. Medeb.

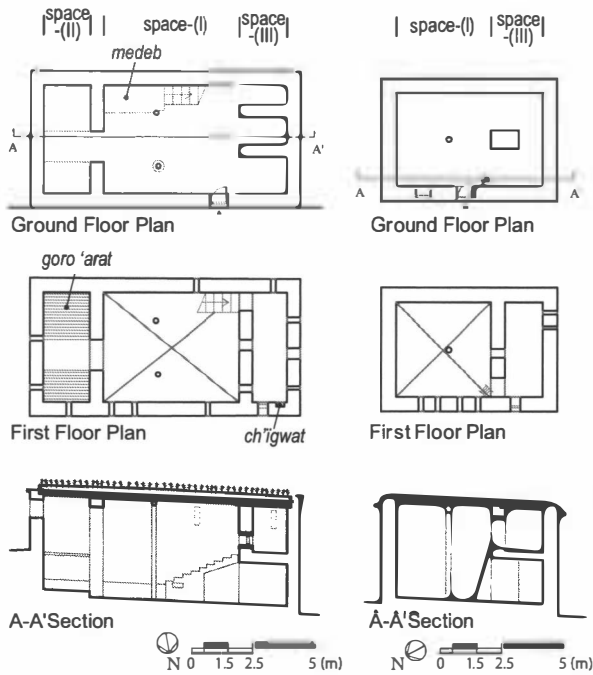


Fig 10 (Left). The most prestigious version of *bidmo* house.

Fig 11 (Right). The minified version of *bidmo* house.

Table 3. Name of Space (II)

# of Builder	Name of Space (II) (According to the Interviewed Builders)
1	medeb-li 'iro (guada)
2	midri-bét
3	medeb-li 'iro
4	guada
5	medeb (because medeb is installed)
6	medeb-li 'iro / medeb (in case that medeb-li 'iro / medeb is installed)
7	medeb (because medeb is installed)
8	medeb (because medeb is installed)
9	may-bét na medeb / medeb-li 'iro (in case that those are installed.)
10	medeb (because medeb is installed)

Table 4. Name of Space (III)

# of Builder	Name of Ground Floor of Space (III) in Cases with a Backside Space (According to the Interviewed Builders)	Name of Ground Floor of Space (III) in Cases without a Backside Space (According to the Interviewed Builders)
1	guaro	wushat' o (guada)
2		guaro / wushat' o
3	guaro	wushat' o
4	guaro	wushat' o
5		guaro
6	guaro	I know existence of this case
7	guaro	I know existence of this case
8	guaro	I know existence of this case
9	guaro (wushat' o)	
10		guaro



Fig 14 (Left). *Medeb-li'ilo*.

Fig 15 (Right). In Case of Separating the Shorter Wall.



Fig 16 (Left). *Goro-'arat*.

Fig 17 (Right). *Gotera*.



Fig 18. Bigger window (*Meshkot Birhan*, Right) and *Ch'igwat* (Left), photo by Higuchi, R.



Fig 19. *Guaro-bét*.



Fig 21. A Door Lower than Body Height. (1,022mm).

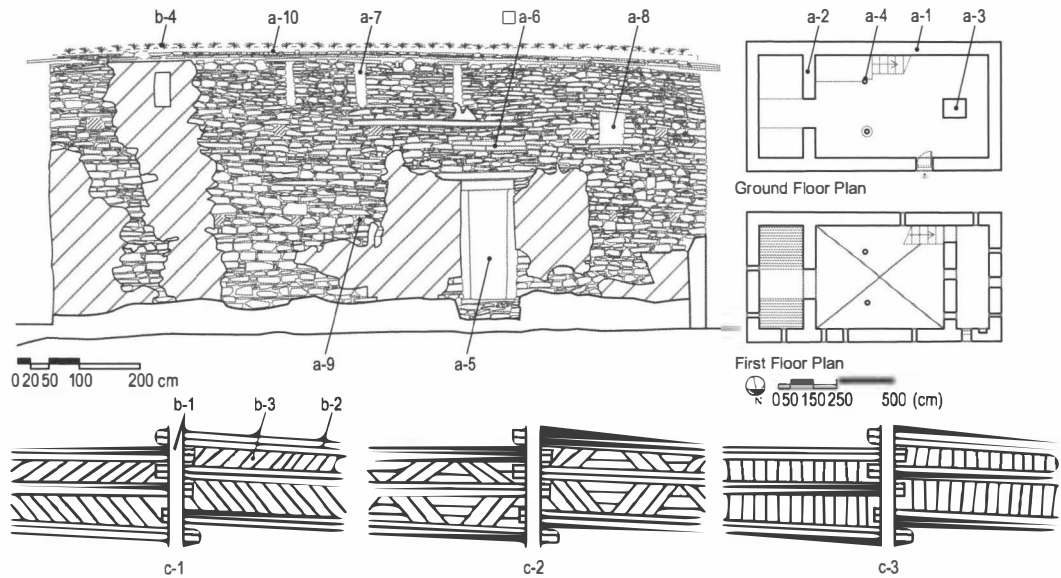


Fig 20. Each Building Element (Drawing is modified from the original to show each element).

Table 5. Name of Each Building Element

Alphabet of Element	Explanation of the Element	Name, According to the Interviewed Builders (# of Builders Who Refer to So: Cumulative Total)
a	Masonry wall separating space (I) from space (II).	<i>filatsa</i> (9); <i>filatsa-medeb</i> (1); <i>hawelli</i> (1); <i>endifti</i> (1)
b	Masonry to support the upper floor.	<i>hawelli-nay-debri</i> (3); <i>hawelli</i> (2); <i>filatsa</i> (1); <i>filatsa-nay-debri</i> (1); <i>filatsa-guaro</i> (1); <i>degahfi</i> (1)
c	Lintel (upper timber of the opening).	<i>metsqeti dege'af</i> (2); <i>metsqeti afdege</i> (1); <i>medefea-geza</i> (1); <i>afdege tedefayt</i> (1); <i>tedefayt</i> (1); <i>tedeia</i> (1); <i>derkhoyt</i> (1)
d	Eave.	<i>ch'ihmi</i> (3: with grass; 5: regardless of grass/ no grass); <i>tsaf-tsaf</i> (3: without grass); <i>zabeba</i> (1)
e	Stringcourse.	<i>qatsela</i> (6); <i>zabeba</i> (5)
f	Main beam.	<i>gadim</i> (9); <i>rogid medegefi</i> (3); <i>'amdi</i> (1)
g	Roofing part of hidmo house.	<i>ziban-hidmo</i> (6); <i>sə'iri</i> (2); <i>tahadim</i> (1)

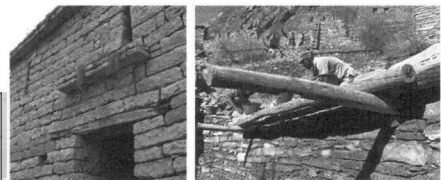


Fig 22 (Left). An Eave.

Fig 23 (Right). Bukko.

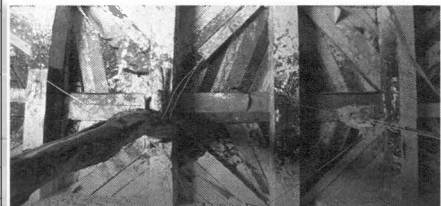


Fig 24. Mesqel qirts.

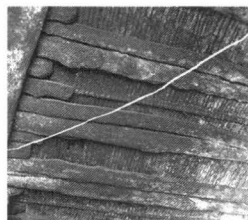


Fig 25. Shambaqa.

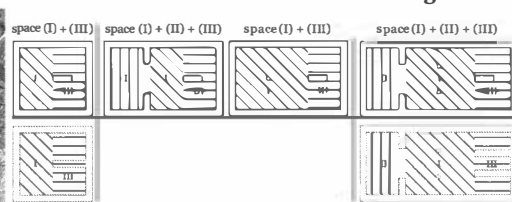


Fig 26. Planing Typology of Minified Version Hidmo, after Shimizu et al. (in press-1)

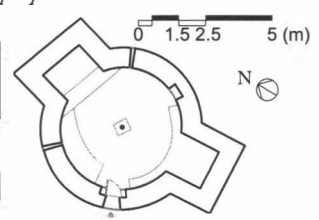


Fig 27. Plan of Kibi Hidmo.

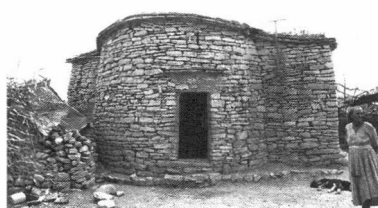


Fig 28. External Appearance of Kibi Hidmo.

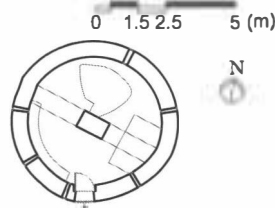


Fig 29. Plan of Simpler Kibi Hidmo.



Fig 30. Internal Appearance of Simpler Kibi Hidmo.