

“Conical Hut”: A Basic Form of House Types in Timor Island

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Commission VI, WG VI/4

KEY WORDS: Timor Island, Timor Leste, house type, basic form, typological study, Pair-House, *Uma Lulik*, *Uma Tidor*.

ABSTRACT:

Timor Island situates in the southeast end of Southeast Asia. The island accommodates many ethnic groups, which produce many diverse house types. As visiting East Timor in 2012 and Timor Island in 2014, we found the “Pair- House Type” widely spread over Timor Island. *Uma Lulik* (holy house), accommodating the ancestry soul, fireplace and elder’s bed, and *Uma Tidor* (house for sleep), containing living, sleeping and working space, compose the pair-house. The research team visited 14 ethnic groups and their houses, some of which were measured and drawn into 3D models as back to Taiwan.

Uma Tidors of each ethnic group are quite similar with rectangular volume and hip roof, however, one of the fourteen ethnic groups can build cylinder houses for *Uma Tidor*. *Uma Luliks* of different ethnic groups are diversified and special. One group of the *Uma Luliks* shows a rectangular or square volume sheltered by a hip roof. The other group of *Uma Luliks* presents a non-specific volume under a conical roof, that we called the “conical hut”.

Seven ethnic groups, Atoni, Weimua, Makassae, Mambai, Bunaq, Kemak and Bekais, have built “conical huts” for the use of *Uma Lulik*. People of the seven ethnic groups can construct a reasonable structural system to support the conical roof, and take good advantage of the space under the conical roof to meet their sacred needs and everyday life.

“Conical Hut” may be regarded as the basic form of the house types adopted by the seven ethnic groups. It contains the basic spatial limits and the formal properties that the construction systems have to follow. Based on the concise rules of the basic form, people of each ethnic group use their talents, skills and building materials to generate variations of “conical hut”, which are different in house scale, spatial layout, construction system and form. The “conical huts” contain the consistency that all the huts come from the basic form, meanwhile, they also present the diversification that each conical hut has differed. “Consistent but diversified”, is one of the most interesting issues in typological study that we can observe in Timorese houses.

1. INTRODUCTION

Located at 124°56’ East longitude and 9°14’ South latitude, Timor is an island at the southern end of Maritime Southeast Asia, north of the Timor Sea. The island is divided between the sovereign states of Timor Leste (East Timor), on the eastern part, and Indonesia, on the western part. The Indonesian part, also known as West Timor, constitutes part of the province of East Nusa Tenggara. The island is 30,777 km² in total and 490 km from West to East. The maximal distance from North to South is 100 km in West Timor and 80 km in Timor Leste. The whole island is full of mountains, with the 2,963m Mt. Ramelau as the highest peak. The rivers run in north-south direction, and the distance between the origins and the outlets to the sea is quite short(Fig.1). During rain seasons, the torrential streams result in constant mudflows and impede the traffic. Owing to the blockage by mountains and streams, there is a high variety and complexity in ethnic groups and languages, which can be divided into two major language systems, Austronesian Languages and Papuan Languages. The traditional houses of different ethnic groups are also diverse.(Fig.3)

Antonio de Abreu, a Portuguese navigator, reached Timor Island during 1509-1515. The Portuguese army established the colony here in 1642. In 1653, Dutch army established forts in Kupang, east tip of Timor Island to control the area. In 1815, Portugal and

the Netherlands signed Treaty of Lisbon and separated the island into East and West Timor, which belonged to Portugal and the Netherlands respectively. In 1949, West Timor became part of the newly independent Indonesia. The Indonesian army invaded Timor Leste in 1975. After more than two decades of resisting movements, Timor Leste finally became the youngest country in the world. (Cocks, 2011)



Fig.1 Timor Island Map with Field Survey Routes of This Study

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“Arquitectura Timorese” in Portuguese, has established a classification for the architecture in Timor Leste according to seven main geographic divisions, based on climate, landscape, agrarian system, settlement structure and ethnic features, (Cinatti, et al. 1987). Japanese studies with house drawings in eastern Indonesian islands, including West Timor houses, can be found. It encompasses some ethnic group names, distribution, house plans, languages, living, and quantity of houses (Yatsuo, et al. 1993). The Indonesian literature published by Universitas Widya Mandira in 1992, “ARSITEKTUR: PROTO MONGOLOID, NEGROID, AUSTRALOID,” elaborated on the architecture of Atoni, an ethnic group in West Timor in elaborated details with sketched layout, plan, section, and detail drawings. “ARCHITECTURE-Indonesia Heritage” includes simple plans and sections of houses in Atoni of West Timor, Dagada (Fataluku) of East Timor, and Suailoro region (Tjahjono, 1998) ◦

This research revealed that most families have two houses, with one called *Uma Tidor*, and the other *Uma Lulik*. The former means sleeping room (*uma*= house, *tidor*= sleep), whereas the latter holy house (*lulik*= holy). *Uma Tidor* serves for holding guests and sleeping, while *Uma Lulik* accommodates altar for ancient ancestors, resting space for seniors, grain storage, and stove. *Uma Tidor* is usually shabbily arranged, whereas the construction and decoration of *Uma Lulik* are mostly brilliantly elaborated. The research targets of this study are the *Uma Lulik*s of seven ethnic groups.

2. METHOD

This study is based on the fieldwork in 14 ethnic groups in East Timor 2012 and Timor Island 2014. (Fig.1) Architectural space, construction, and types were recorded with emphases on drawing and photographing. Local residents were interviewed in order to have a deeper understanding of their living, families, religions, etc. All drawings were drawn into 3D models with SketchUp software as back to Taiwan. A detailed and solid database was established for analysis and comparison of house types.

The collected cases are considered as various derived forms for spatial and constructive analysis. By decomposing their construction process, the constructive system and spatial forms can be better understood. Several Timor house types are elicited, and derived forms are categorized under certain basic forms. Basic forms can be divided into spatial basic forms and constructive basic forms. Within the same geographical region, different house types often share the same constructive basic forms but have different spatial basic forms (Chen, 2013) ◦

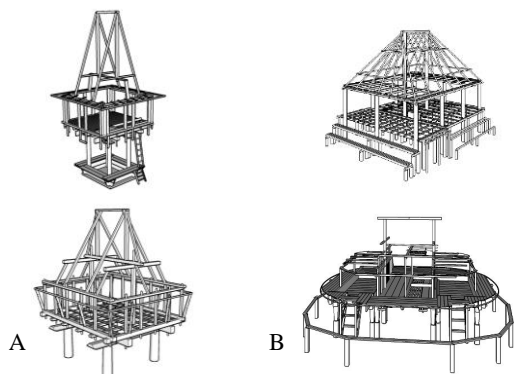


Fig.2 Two Basic Types of Construction Systems in Timor Island

The house construction systems in Timor Island can be divided into two types. Constructive Basic Form A is piled upwards with four columns, house body, and roof. Constructive Basic Form B is composed of ridge, roof, and floors, which are all supported by different column groups. (Chen, 2013) Constructive Basic Form B can be roughly divided into two types, square or rectangular roof and conical roof (Fig.2). Various spatial structures are derived from these two types of roofs, and thus *Uma Lulik* of different ethnic groups. This study focuses on the comparison and investigation of construction systems and spatial structures of Timor houses with conical roof.

3. HOUSE TYPES BENEATH THE CONICAL HUTS

Figure 3 shows the distribution of ethnic groups on Timor Island. Uab Meto, or Atoni, the ethnic group on West Timor, has *Uma Lulik* and *Lopo Lopo* (barn) with conical huts and will be discussed as follows.

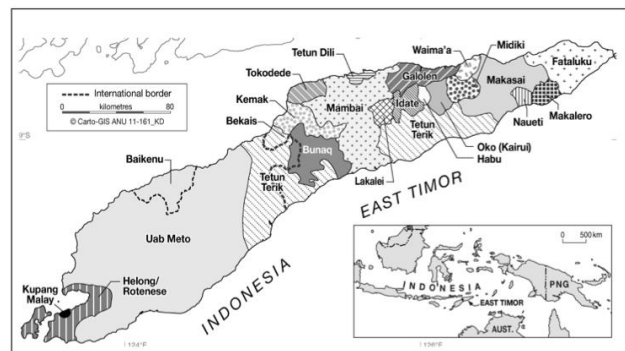


Fig.3 The Distribution of Ethnic Groups in Timor (ANU, 2011)

3.1 Atoni's *Uma Lulik* and *Lopo Lopo*

Atoni ethnic group has three types of houses: holy house (*Uma Lulik*), house for sleep (*Uma Tidor*), and barn (*Lopo Lopo*). The combination of these elements differs from region to region.

3.1.1. Western Atoni

All houses are composed of *Uma Lulik* and *Uma Tidor*. *Uma Lulik* faces the street and are arranged in front of *Uma Tidor*. A platform higher than one person is supported by four columns erected from the ground. A central post and surrounding small posts on the platform support a peripheral perlin. Radius rafters are tightened between the top of central post, all levels of peripheral perlines, and the ground, appearing like a conical mushroom grown on the ground.

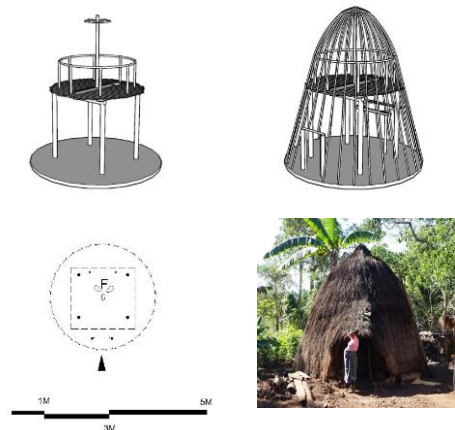


Fig.4 *Uma Lulik* of Atoni (Chen, 2014)

The four columns are arranged in the middle of the inner space of *Uma Lulik*. In the centre is a simple stove piled up with stones. The four columns forms four small areas with the round roof that touches the ground. One small area is taken as entrance, and the other three are used for bed, tables, sleeping, or storage. (Fig.4)

3.1.2. Middle Atoni

Every household is composed of *Uma Lulik* and *Uma Tidor*. Several households share one *Lopo Lopo* (barn), which appears like a *Uma Lulik* with four longer columns on the ground, forming a half-outdoor space on the ground floor for socializing and a closed floor on top of the four columns for storing grains which can only be reached with one little door. (Fig.5)

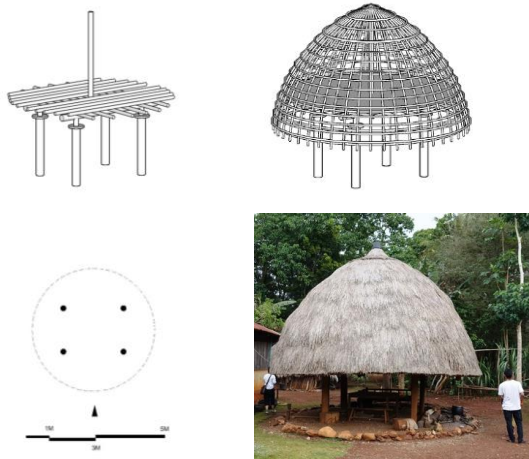


Fig.5 *Lopo Lopo* (barn) of Atoni (Chen, 2014)

3.1.3. Eastern Atoni

Each household is composed of *Uma Tidor* and *Lopo Lopo*, with the former usually arranged behind the latter. Several households share one communal *Uma Lulik*, which is equipped with a foundation with columns of in concentric circles. The inner circle is walled with wood panels, while the outer circle forms a circular column group. Two high columns support the roof ridge. Two groups of rafters form double roof slopes. Stove and beds are arranged in the inner space, and ceremonies are managed by specialized persons. (Fig.6)

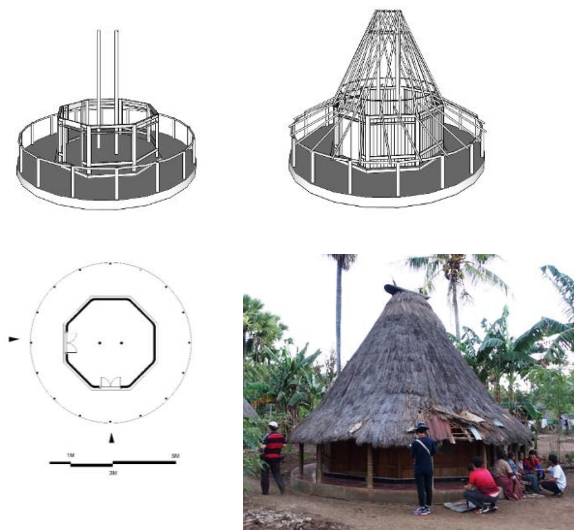


Fig.6 Communal *Uma Lulik* of East Atoni (Chen, 2014)

3.2 Weimua's Uma Lulik

The *Uma Lulik* of the ethnic group Weimua is covered by a big round roof, with the holy room on the highest level and four platforms on the four side levels. Platforms, holy room, and big roof are all supported by different groups of columns. The separate upward and downward ladders of the holy room are set on two different platforms in order to distinguish entrance and exit. Stove and altar are arranged in the holy room. On the four platforms is one stove for the residents' use, the hind room is usually walled as a room. (Fig.7)

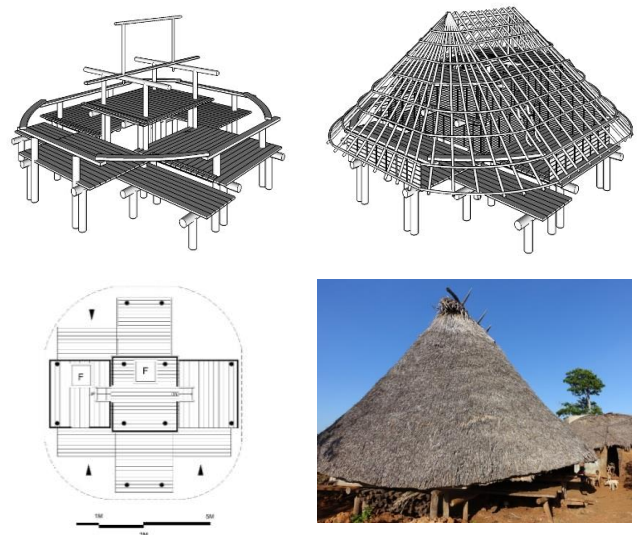


Fig.7 *Uma Lulik* of Weimua (Chen, 2014)

3.3 Makassae's Uma Lulik

The style and construction system of *Uma Lulik* of Makassae are similar to those of Waimua, except with higher roof and naked outer columns to allow users entering beneath the house without having to bend down low. The holy room under the roof is located in the middle and highest spot, with entrance and exit to the ladders on the two platforms in the front and back. (Fig.8)

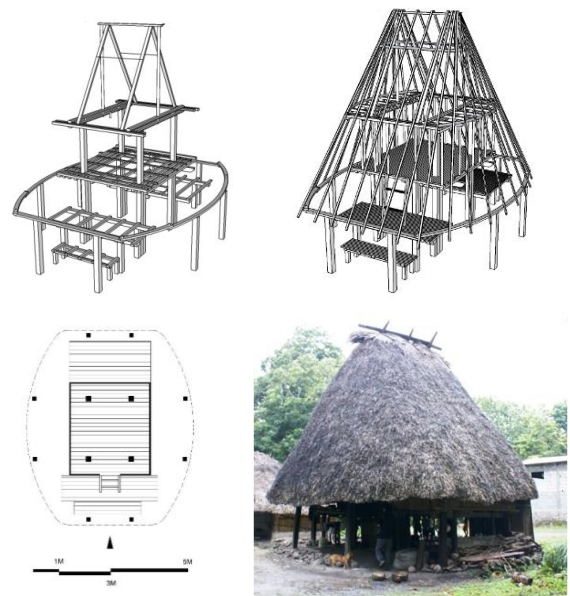


Fig.8 *Uma Lulik* of Makassae (Chen, 2014)

3.4 Mambai's *Uma Lulik*

The *Uma Lulik* of Mambai on high mountain is the largest, with two variations: circular and square-like circular. Numerous groups of column groups support the roof ridge, floors of various heights, and the peripheral beams for roof. The holy area is set in the back of the middle inner space and decorated with numerous ox horns. The centre of inner space is the rectangular stove, and the surrounding space is for living. Bedding space is lifted on the two side, and the large platform in the front is for entering and socializing.(Fig.9) Case study can be also found in "Arquitectura Timorese."

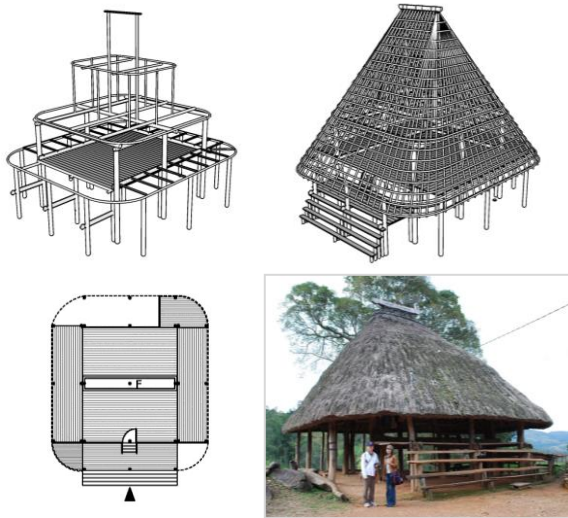


Fig.9 *Uma Lulik* of Mambai (Chen, 2012)

3.5 Bunaq's *Uma Lulik*

The ethnic group Bunaq is usually located on mountain areas. The houses are also composed of *Uma Lulik* and *Uma Tidor*. As showed in Figure 10a, the *Uma Lulik* (left) is as simple as that of *Uma Tidor* (right). In Figure 10b, however, the *Uma Lulik* is quite large, with different column groups supporting ridge, roof, floor, and platforms. The inner circle forms indoor space, while the outer circle is half-outdoor. The first inner space reached by outer circle is for living, while the second inner space is the holy space equipped with stove. The holiest area is located at the corner. (Fig.10)

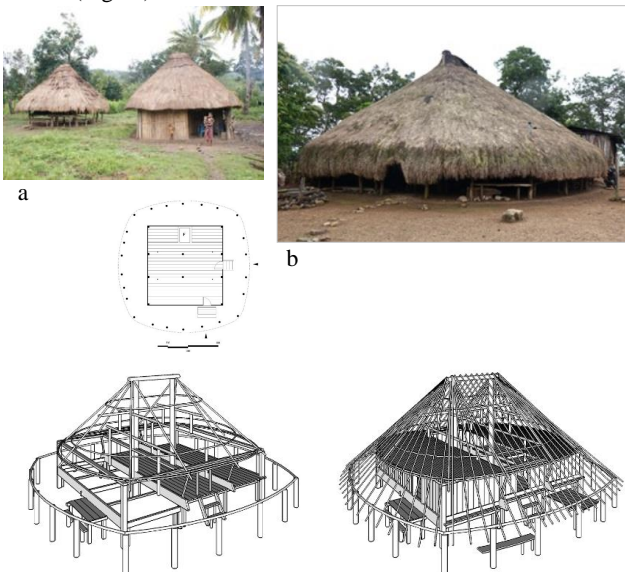


Fig.10 Two Cases of *Uma Lulik* of Bunaq (Chen, 2014)

3.6 Kemak's *Uma Lulik*

The ethnic group Kemak is distributed in a different mountain area from that of Mambai. The houses are also composed of *Uma Lulik* and *Uma Tidor*. The roof of *Uma Tidor* and different heights of floors are supported by different column groups. Underneath the high stilts floor are living space, kitchen, and dining room. The space lifted by stilts is separated into three sections with their own shallow rectangular-like floor. The rule of entering upwards and exiting downwards from two terminals of the space has to be strictly followed. In the middle is the holy space with stove. Platforms are lifted around the three spaces for rest, sleep or storage. (Fig.11)

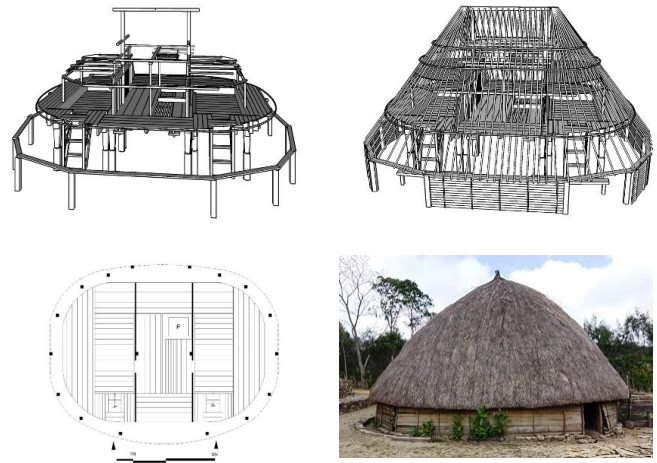


Fig.11 *Uma Lulik* of Kemak (Chen, 2014)

3.7 Bekais's *Uma Lulik*

The ethnic group Bekais on the mountain has a small range and little population. The house, also combination of *Uma Lulik* and *Uma Tidor*, is similar to that of Kemak, except for the smaller scale. The holy house lifted by stilts is separated into two sections and is entered upwards and exited downwards from the two terminals. The holy space with stove is set in the centre. The space underneath the floor is too low and too small to be used. Ridge, roof, and floors of different heights are supported by different column groups. (Fig.12)

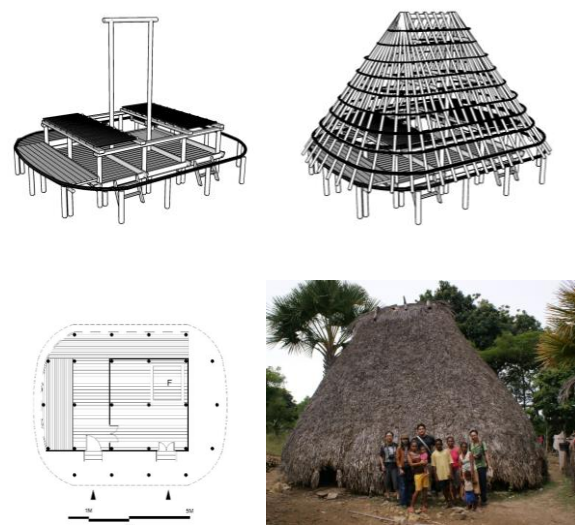


Fig.12 *Uma Lulik* of Bekais (Chen, 2012)

3.8 Summary

The scales of the conical huts described above are very different, with the smallest *Uma Lulik* from Atoni and the largest from Mambai. All of the seven ethnic groups in this study are both builders and users of conical hut but belong to different language groups. Makassae and Bunaq belong to Papuan Language groups. Atoni, Weimua, Mambai, Kemak and Bekais belong to Austronesian Language groups. The builders of conical huts on Timor Island can be ethnic groups of various language groups.

4. CONCLUSIONS

Conical hut can be considered as a basic form on Timor Island. Houses of the basic form have shared rules of constructive system and spatial layout, which is sufficient for the recognition of "consistence." Different ethnic groups, however, have different needs and imagination of conical hut, and thus develop various derived conical huts with diverse constructive system and spatial layout, which is a proof of "diversification." "Consistent yet diversified" is the essence of house type. Nevertheless, house types often have restrictions in development, so is conical hut.

4.1 Shared Rules of the Conical Huts

4.1.1. Rules of Construction

- The goal of house construction systems is to complete the conical roof.
- The radius rafter is supported at numerous points on conical top, the peripheral beams in the middle part of the conical roof, and the lowest and outer peripheral beam.
- The top of the conical roof, the conical house roofing, and floors of different heights all have their own independent supporting column groups.

4.1.2. Rules of Spatial Layout

- The centre is the holiest space.
- The secondary spatial layout surrounds the centre.
- Floors of different spaces are of different heights. The floor of central space is usually the highest, and the height reduces outwards.

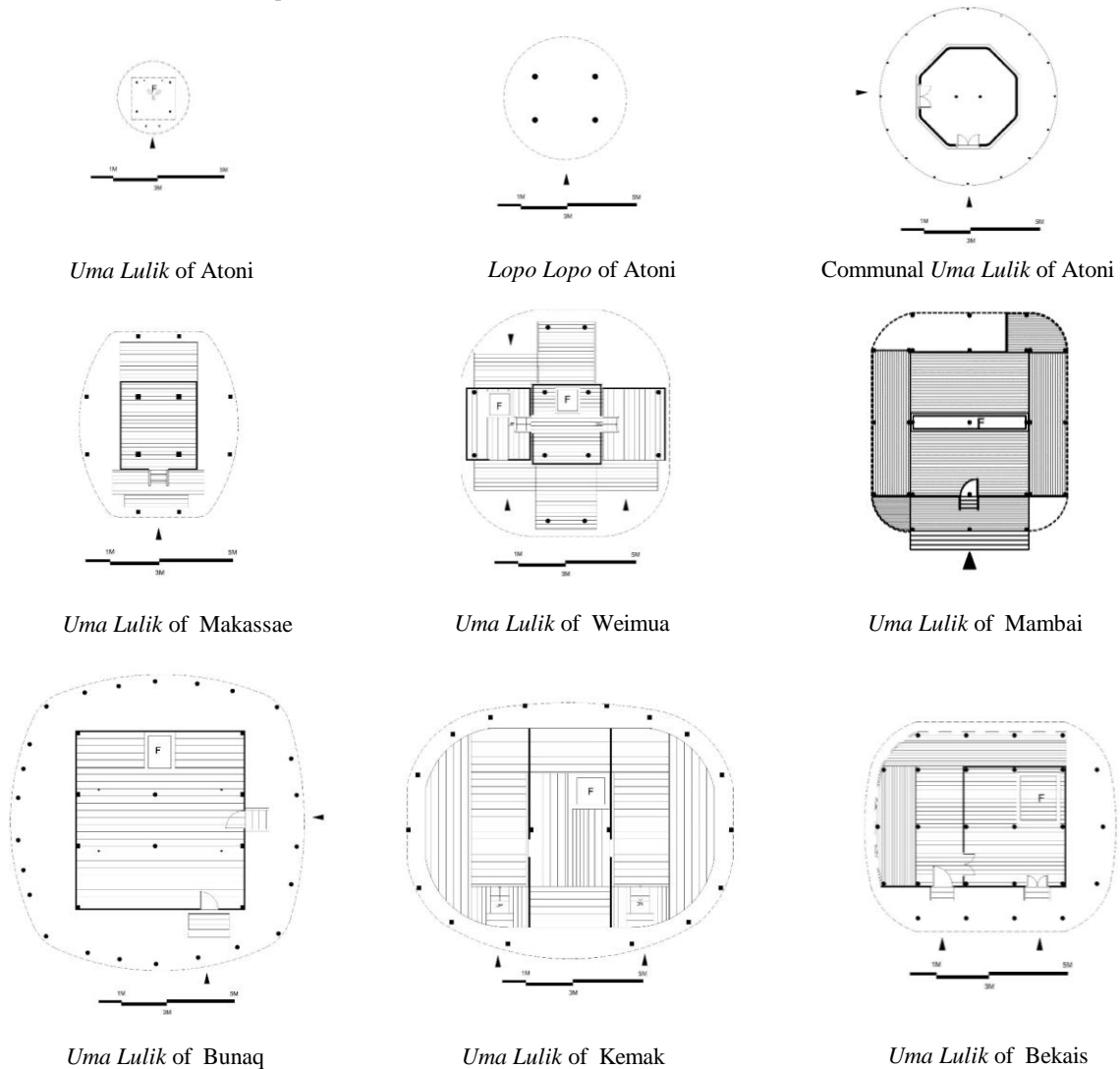


Fig.13 Plans of Conical Huts of Seven Ethnic Groups in Timor Island

4.2 Variations of the Conical Huts

4.2.1. Different Construction Systems of the Conical Roof

- a) The conical roof grows bigger and bigger, and peripheral beams of *Uma Lulik* increase from the single layer of Atoni to the four layers of Kemak. As the roof expands, special technique needs to be applied on the supporting scheme of peripheral beams. See Figures 9&11.
- b) Small conical roofs are usually supported by one post. Big-scale conical roofs, however, are usually supported by one short ridge, which is supported by two posts. This arrangement is stabler than one single post.
- c) The *Uma Lulik* plans of Atoni and Weimua are round, Mambai and Bunaq rectangular-like round, and Kemak and Bekais elliptical.

4.2.2. Diversified Spatial Layouts beneath the Conical Roofs

The spatial layouts under the conical roofs in Timor Island are illustrated in Figure 13 and described as follows:

- a) *Uma Lulik* of Atoni (private): Non-stilts space. Three side spaces surround the square central space. Stove set in the centre.
- b) *Uma Lulik* of Atoni (shared): Non-Stilts space. Central space is round and indoor. Surrounding peripheral space is half-outdoor.
- c) *Uma Lulik* of Weimua and Makassae: Stilts space with the same spatial layout. Central highest space serves as square holy space. *Uma Lulik* of Weimua has four platforms, while that of Makassae has two platforms (front and back). The upward entrances and downward exits of both are ladders connecting platforms.
- d) *Uma Lulik* of Mambai: Stilts space. Entrance and exit are the same. A special rectangular stove occupies the centre. The holy corner is the space between the stove centre and the hind wall. Both side spaces are slightly lifted.
- e) *Uma Lulik* of Bunaq: Stilts space separated into inner circle and outer circle. The inner circle is indoor, consisting two rooms, with entrance and exits both in the front room. Holy space is not precisely located in the centre. Outer circle serves as recreational or storage spaces.
- f) *Uma Lulik* of Kemak and Bekais: Stilts space. The *Uma Lulik* plans of these two ethnic groups are elliptical and covers rectangular indoor space, which is separated into three or two areas. Central area is holy space, with upward and downward ladders as entrance and exit on two terminals respectively. The stilts space of *Uma Lulik* of Kemak is higher and serves as living space, while that of Bekais not.

4.3 Limits of the Conical Huts

Conical huts cannot break through several restrictions:

- a) The roof height (including house body) cannot be developed too high due to the limited size of supporting columns for roof ridge. The higher the roof is, the larger the covered range is. Limited roof height restricts the covered area as well.
- b) The layout of conical huts includes an inner circle and an outer circle, which can be applied for diversified space use but no more, the third or fourth, peripheral circles can be added.
- c) Conical huts are independent houses. No matter how the construction systems and spatial layouts change, they are limited beneath a cone, which should be the biggest limitation.

Acknowledgements

This paper was accomplished under the research program (MOST 102-2221-E-230-016-) sponsored by the Taiwan Ministry of Science and Technology.

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