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Traditional Raised-Floor Granary and Rice Production Cycle in Bali: Past, Present, and Future of Balinese Agriculture

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Additional information is available at the end of the chapter

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Abstract

A granary can represent a certain set of farming activities reflecting cultural and regional characteristics, and also be associated with symbolic meanings. The traditional raised-floor rice granary in Bali, Indonesia, called a *Lumbung*, only survives in specific areas of the island today. What is the factor underlying its survival and disappearance? The results of the author's field research in Bali from 2006 to 2011 indicate that this is connected with the survival of local rice production, which was Bali's traditional rice before being overtaken by the highly productive normal rice—introduced in the 1960s and 1970s. Today, local rice is cultivated only in a few specific areas such as Tabanan prefecture, where not only *Lumbungs* but also a set of traditional farming customs are still used. In addition, a clear conceptual connection between *Lumbungs* and local rice is observed. Such that local rice is exclusively offered in a *Lumbung* to the goddess Dewi Suri. Such practices suggest that the introduction and spread of the new normal rice not only changed the type of rice cultivated but also led to the decrease of traditional or “real” farming practices among local farmers, as represented by the decline of the *Lumbung*.

Keywords: Granary, Crop production cycle, Cultural identity, Agricultural landscape, Paddy rice farming, Ethnohistory

1. Introduction: *Lumbung* (raised-floor granary) and rice production cycle in Bali

This chapter discusses the *Lumbung*, a Balinese traditional raised-floor rice granary, and its relationship with the production cycle of rice and local farmers' perceptions of it. The author

uses ethnohistorical research and proposes a measure for the proper preservation of the *Lumbung* as a symbol for the promotion of agriculture in the future.

Architecture is the materialization of the function of a human activity space and thus represents certain set of human activities reflecting cultural and regional characteristics. Therefore, traditional architecture can be associated with not only practical activities but also symbolic meanings including the concept of sacredness and taboo and cultural identity. In the preservation of traditional architecture, we must therefore take a holistic view of both the practical and symbolic aspects of traditional structures in the mental landscape of local populations.

Among the various types of architecture, granaries are among the most commonly seen constructions. Food storage facilities emerged in the very early stages of human history and played a fundamental role in everyday landscapes [1]. The style of a granary not only reflects the subsistence strategy of each society but also the characteristics of its culture. Granaries have also been symbolic objects or stages for ceremonies and thus concern the human mental landscape.

Many ethnographic researchers have become interested in traditional granaries and their past functions and symbolism. For example, in Japanese scholarship, research has been mainly conducted in subtropical islands, such as [2–5] Amami and Okinawa Islands, Japan. These studies noted that sacredness or display of political power or wealth is associated with traditional granaries. Accordingly, a granary could be an instrument for connecting the economical and daily act of storing food with sacredness and politics. On the other hand, the perspectives of those studies tended to be limited to granaries themselves; the relationships of granaries to the overall routine associated with subsistence have not been sufficiently discussed. This ethnographic study on Bali focuses on this aspect of traditional granaries.

Bali has a traditional raised-floor granary for rice. Previously, granaries were called by several names depending on their size, as will be explained below. However, the number of granaries remaining today is much smaller, and size distinctions have been lost; therefore, in this chapter, traditional Balinese granaries are referred to as *Lumbungs*, which is now the most commonly used term in modern Bali.

Rice farming is vital in Balinese culture, and the *Lumbung* has played a significant role in Balinese life; however, the tradition now only survives in limited places. Here, the author would like to discuss the role of the *Lumbung* in the Balinese rice production cycle and the factors underlying its survival and gradual disappearance, using data obtained from field work carried out from 2006 to 2011. The *Lumbung* can be an important cultural symbol for Bali and useful for reviving agricultural practices. Thus, understanding local people's perceptions of the *Lumbung* is important for the future planning of the Balinese agricultural landscape.

2. Background of the research: the history of *Lumbung*

Bali is a province of Indonesia and is located to the east of Java. It has a population of 3.89 million (as of 2010), covering 5633 km² (**Figure 1**). Because of its location near the equator, its

year-round temperatures range between 23 and 31°C, and the average annual rainfall is around 2000 mm in the province capital, Denpasar. It has a tropical humid climate with a dry season from April to November and a wet season from December to March [6–8]. The island is divided into eight prefectures (*Kabupaten*) inheriting the regional divisions from the Klungkung dynasty and the seven small kingdoms from the seventeenth to eighteenth centuries [6]. 93.18% of its population is Hindu and referred to as “Balinese Hindu” [6], and the *Bali Aga* and *Bali Mula* communities comprise the minorities [6]. The author’s ethnographical studies target the Balinese Hindu population.



Figure 1. The map of Bali and locations of field research areas.

The *Lumbung*, the theme of this research, is a Balinese traditional raised-floor rice granary with a gable roof. Today, such granaries are only used in a few specific areas, mainly in Tabanan prefecture; however, a few decades ago, they were common sights in the Balinese agricultural landscape.

Covarrubias [9], a Mexican painter who lived in Bali in the 1930s, documented various aspects of the contemporary Balinese culture. Among them, he mentioned the raised-floor granary, noting that it was called by different names according to its size, such as *Lumbung*, *Glebeg*, *Djineng*, *Kelumpu*, and *Kelingkin*, in order of importance. According to Covarrubias, “a granary symbolized the economic status of a family,” and the structure is “similar to a yam house in Melanesia” with a thatched gable roof and four pillars attached with rat guards [9: pp. 107] (translated by Hosoya). He also recorded certain taboos associated with granaries, such as that against speaking while bringing out rice in the daytime and the condition that a person entering a granary be mentally and physically healthy and not chew betel nuts. Covarrubias’s description suggests that granaries were a common part of the Balinese landscape.

This standing of granaries in Bali appears to have continued into the 1960s. The book edited by Miyamoto [10], conducted as part of the “Rice Farming Culture in Southeast Asia” project, is a good authority on Bali during this period, with rather detailed descriptions of granaries as a part of rice farming culture. Ishikawa [11], as a member of the same project, recorded the

classifications for granaries in Sesetan village, south of the capital city Denpasar. According to him, granaries that stocked more than 800 rice sheaves (10–11 kg/bundle) were called *Keling*, those holding more than 200 sheaves were called *Djineng*, and those holding more than 100 sheaves were called *Kelumpu*. Ishikawa also described the granaries as having gable roofs thatched with *Alang-alang/lalang* (a kind of reed) grass and noted that some granaries had an additional floor beneath the raised floor for a workshop space, which was sometimes surrounded by a bamboo mat that served as a wall. There were also several rules regarding these granaries; for instance, they were always constructed near the kitchen in the southern part of a house complex, and when there were two wives in a household, they could have separate kitchens but had to share one granary. It is also reported cases in Pantjur village in Lombok Island, an island east of the main Bali Island, where granaries were also classified by the size: The larger ones were the *Lumbung*, and smaller ones were the *Sambi*. In case of the *Lumbung*, an additional floor was built beneath the raised floor as a workshop space [11]. When one household had both the larger and smaller granaries, the two may be connected by an extended roof, and the in-between space could be used as a cowshed. These records in [11] show that granaries in the 1960s were still a common part of the Balinese landscape and also a fundamental part of daily life.

However, in 1980s, it appears that the situation started to change, namely *Lumbung* seems to have become out of use except a particular region. In Kagami's discussion [12] of the contemporary Bali house complex, he observed that "... today, more and more families process and sell rice directly from the field, and [traditional] granaries are falling out of use even if a family owns one" (translated by Hosoya). On the other hand, Nagafuchi [13] observed that the *Mantenin* ceremony for raised-floor granaries was still regularly practiced in the Wongayagede village, Tabanan prefecture, indicating regular use of granaries. These studies show that by the late 1980s, the raised-floor granary had become a disappearing tradition except in the specific area of Tabanan prefecture, where it continued being a part of the everyday landscape and was still actively used. This 1980s pattern is basically what can be observed today, and Tabanan prefecture is the main area of *Lumbung* survival.

These records on raised-floor granaries in Bali indicated that a remarkable shift occurred in the use and popularity of granaries in the 1970s and 1980s. What was the change? Why did the raised-floor granary disappear in most areas in Bali, and why did it survive in specific areas such as Tabanan prefecture? To answer these questions, the study of the present state of the *Lumbung* and its cultural background, with a comparative view of the areas where it has survived and disappeared, would be useful. This will also provide a clue to understanding the significance of the *Lumbung* in the Balinese agricultural landscape today. To this end, the author carried out a field research in Balinese farming villages.

3. Field research (2006–2011)

The field research was conducted from 2006 to 2011, and the detailed results have been published elsewhere [1, 14–18]. The research method involved interviewing farming families on the *Lumbung* and observing agricultural activities/ceremonies concerning the *Lumbung*. The

interviewees were mainly comprised of *Lumbung* owners in Tabanan, Gianyar, and Karangasem prefectures, but for comparative study, farmers without *Lumbungs* in Karangasem prefecture were also interviewed. Detailed information on the interviewees is shown in **Table 1**. Names of the interviewees are given as initials to protect their privacy. The spellings of village names are based on those in the “Bali Street Atlas, 2005/2006 edition” (Periplus Editions).

Prefecture (Kabupaten)	Village (Desa)	Informants			Cultivated rice	No. of <i>Lumbung</i>
Tabanan	Babahan	BB1	Men (75 and 40 years old)	Land owner	Local 1*/year, normal 1/year, <i>Keten</i>	1
		GN1	Man (62 years old); Woman (53 years old)	Land owner	Local 1–2/year, normal 2/year, <i>Keten</i>	14
	Jati Luwih	GN2	Man (86 years old)	Land owner	Local 1–2/year, normal 1/year, <i>Injin, Keten</i>	1
		JT1	Woman (38 years old)	Land owner	Local 1/year, normal 1/year, <i>Injin, Keten</i>	3
		JT2	Woman (30s?)	Land owner	Local 1/year, normal 1/year, <i>Injin, Keten</i>	2
		JT3	Woman (60 years old)	Land owner	Local 1/year, normal 1/year	5
		JT4	Man (27 years old)	Land owner	Local 1/year, normal 1/year	4
	Kesambi	KS1	Woman (55 years old)	Land owner	Local 2/year, normal 1/year	1
	Penebel	PN1	Woman (75 years old); Man (46 years old)	Land owner**	Local 1/year, normal 1/year	1
	Senganan	SG1	Man (80 years old)	Land owner	Local 1/year, normal 1/year	1
		SG2	Men (42 years old & 36 years old)	Land owner	Local 1/Year, normal 2/year, <i>Keten</i>	3
	Wongayagede	WG1	Man (45 years old)	Land owner	Local 2/year, <i>Injin</i> 2/year	1

Prefecture (Kabupaten)	Village (Desa)	Informants		Cultivated rice		No. of Lumbung		
Gianyar	Gubug	WG2	Woman (60s?)	Land owner	Local, <i>Injin</i>	2		
		GB1	Woman (80 years old)	Land owner	Normal 3/year	2		
		GB2	Woman (60s?)	Land owner	Normal 2/year	1		
		SD1	Man (55 years old)	Land owner	Normal 2/year	2		
	Sebatu	SB1	Man (45 years old)	land owner	Local 2/year, <i>Injin, Keten</i>	3		
		Karangasem	Ababi	AB1	Woman (65 years old)	Land owner**	Normal 2–3/year	1
				Jasi	JS1	Man (50 years old)	Land owner	Normal 3/year
			Selat	Jasi	JS2	Woman (50s?)	Tenant	Normal
JS3	Man (64 years old)				Tenant	Normal	none	
Selat	SL1	Man (60 years old)		Tenant	Local 1/year, normal 2/year. <i>Injin, Keten</i>	none		
	SL2	Man (70 years old)		Land owner	Local, normal, <i>Injin, Keten</i>	none (1 <i>Tukub</i>)		
	SL3	Woman (43 years old)	Land owner	Normal 2/year, <i>Keten</i>	1			

*The number indicates harvest number within 1 year shifting.

**Not farming his/herself.

*The number indicates harvest number within 1 year shifting.

**Not farming his/herself.

Table 1. Backgrounds of informants.

3.1. Survival of the *Lumbung* and its relationship to rice type

The results of the field research suggested the high possibility that the survival of the *Lumbung* is strongly tied to the type of rice cultivated. Here, I introduce the present status of the *Lumbung* as observed through the fieldwork and then demonstrate that its relationship with cultivated rice is the key to explaining why *Lumbungs* have survived in specific areas of modern Bali while disappearing in other areas.

3.1.1. *Lumbung* today

As previously mentioned, the author interviewed primarily households that owned *Lumbungs*, with a few exceptions for comparative purposes. Accordingly, the research area was limited to Tabanan, Gianyar, and Karangasem prefectures. It must be noted that in other areas, namely the majority of Bali farming lands, *Lumbungs* no longer exist.

The surviving *Lumbungs* observed by the author have either four or six posts but exhibit no notable differences in size corresponding to those recorded in historical documents such as [9, 11]. However, interviewee GN1 explained that *Lumbungs* with six posts were built when abundant rice harvests were expected and paddy fields were large, so the difference in the number of posts may be a relic of the diversity of the *Lumbung* sizes.

The *Lumbung* roof was traditionally thatched by *Alang-alang* grass, as described by [9, 11], and some old *Lumbungs* still retain this traditional style of roofing (**Figure 2**). However, over the last several decades, almost all farmers have chosen metal roofs to replace thatched ones when rebuilding roofs (**Figure 3**), mainly because of the cost: While a thatched roof costs 3–5 million rupia, a metal roof costs only 0.8 million rupia (GB1, SD1, in the interview in 2007). It is also difficult today to find *Alang-alang* grass or to employ workers capable of thatching. At the same time, many interviewees cited the advantages of metal roofs over thatched ones, such as more durability (JT3, GN1), more effective for keeping off rats (JT3, SB1), and better for drying stored rice (SB1). Metal roofs therefore appear to be a positive introduction.



Figure 2. Traditional style of *Lumbung*.



Figure 3. *Lumbung* with a metal roof.

Most *Lumbungs* have a second floor beneath the raised floor (**Figure 4**), as reported in [11] in 1960s. The second floor is used for various purposes (as an eating space, a resting space, a meeting space with a guest, and so on), but many interviewees (PN1, GB1, SD1, SL3, GN1, etc.) said that it was used for preparation for *Lumbung*-related ceremonies. Indeed, the author observed this ceremonial usage and was also often invited into the space for interviews or dining.



Figure 4. Utilization of the second floor beneath the raised-floor of a *Lumbung*.

Some *Lumbungs*, in particular, the ones that have rather recently been renovated, are decorated, sometimes quite elaborately, with carvings and coloring (**Figure 5**) (eg., PN1 renovated 16 years ago; GN2, 3 months ago; BB2, 2 years ago). Decoration, the means of which vary, is normally done by a family member, but it also can be done by an architect (BB1). According to GN2, the purpose of decoration is “showing off.”



Figure 5. Decorated *Lumbung*.

In Wongayagede village, Tabanan prefecture, the shape of *Lumbungs* is quite characteristic. *Lumbungs* observed by the author in this village and the nearby Tengkidak and Penatahan villages were uniformly bell-shaped with a red tile roof (**Figure 6**). In Tengkidak village, there was a metal-roofed *Lumbung*, which was also bell-shaped. The author could not determine the origin of this specific *Lumbung* shape despite interviewing several farmers, but the shape resembles that of typical Balinese temples, suggesting some possible connection. It is reported [13, 19] that Wongayagede village was a special village in a religious context, as village

residents were in charge of managing ceremonies at Luhur Batukau Temple located in the north of the village, at the foot of Batukau Mountain. In the village, *Injin*, black rice specially used to make ceremonial cakes, was also intensively produced [15].



Figure 6. *Lumbung* of Wangayagede village.

Several regulations and taboos associated with *Lumbungs* were recorded in [9, 11], as was shown in Section 2, but many of them are now obsolete.

It is reported in [11] that the *Lumbung* had to be in the south part relative to the house complex. Some farmers mentioned that today, it must be constructed in the south (PN1, JT2, and JT3) or in the south or west (KS1). However, many farmers claim, “It can be constructed anywhere there is space” (GB1, SD1, JT4, SG1, SG2, AB1). Therefore, this condition seems to be gradually losing importance. Indeed, BB1 reported, “Once, it had to be in the south, but it doesn’t matter now.” Some interviewees also said that the door of a *Lumbung* must face south or west (JT3, JT4, SG2, AB1).

None of the *Lumbung*-related taboos recorded by Covarrubias [9] were mentioned by the interviewees. Instead, most of them mentioned the same two taboos: “Women on their period cannot enter a *Lumbung*” and “Rice cannot be taken out from a *Lumbung* on particular days.” These “particular days” varied by interviewee, such as specific days of a week, a day of a ceremony, or the day of the new moon/full moon. Other taboos mentioned by interviewees were as follows: “Rice cannot be taken out repeatedly on the same day, and no one can look inside the *Lumbung* on a day rice is taken out” (GN2), and “Anyone can put rice into a *Lumbung*, but only the owner couple can take rice out; even a child of the couple cannot do that” (JT2). Other interviewees denied the existence of any taboo (PN1, AB1).

In terms of the symbolism associated with the *Lumbung*, normally, some rice sheaves placed in the *Lumbung* are carefully separated from the rice for consumption by placing them on a beam, in a basket, or else, as an offering for Dewi Sri, the goddess of rice. In some cases, the offering rice is replaced regularly with new rice, but in others, it stays unchanged for several decades. The detail is explained in the next section, as it is connected with the issue of the rice types. Furthermore, a ceremony for rice harvest and storage called *Mantenin* is still regularly held in particular areas, mainly in Tabanan prefecture. Although the original concept of *Mantenin* seems to be a celebration of rice granaries in general, it seems to be rather exclusively associated with the *Lumbung*. This notion is also explained below.

3.1.2. The *Lumbung* and cultivated rice

Next, we discuss how the type of cultivated rice and the survival of *Lumbung* are related according to the field research results.

Paddy field rice cultivation was introduced in Bali through the Dong Son culture, which spread across Southeast Asia around the fifth to third centuries BC [7]. Paddy field rice became the staple food of the islanders, and paddy fields were reported to occupy 17% of the island’s area in the 1960s [20]. Today, rice is still the fundamental food in Bali, and a meal is not considered “proper” without rice [15]. Tubers, which are eaten as staple foods in many other tropical regions, and bread, which was introduced through Western cultures, are also eaten but are treated as merely snacks. Rice is also considered the best of all crops [6]. In the author’s interview, many interviewees said that “rice is the food of human beings, but tubers are for pigs” (such as JT1, JT3, WG1, SD1, JS1, JS2 SL2, SL3).

In present-day Bali, two types of rice are cultivated. One is the traditional “local rice (*Padi Bali*)” in red and white variations, and the other is the more recently introduced normal rice (*Beras*).” Along with these, the black rice *Injin* and red and white *Ketan* varieties for making ceremonial cakes are also cultivated (for detail, see [14]). Normal rice was introduced as a part of the BIMAS (*Bimbingan Massal* = group instruction) and IMMAS (*Intensifikasi Massal* = group intensification) Programs promoted by the Indonesian government in 1960s and 1970s [21]. Today, normal rice production is prevalent in Bali because of its higher yields than local rice and is promoted by the government, but in certain areas, local rice continues to be regularly cultivated. In present-day Bali, rice can normally be harvested 2–3 times a year, and in many

cases, local rice farmers cultivate both local rice and normal rice in rotation within 1 year (see **Table 1**). Yet, some farmers still only cultivate local rice.

Tabanan prefecture is a representative and well-known area of local rice farming, and most of these also cultivate normal rice. Among the author's interviewees, only the farmers of Wongayagede village cultivated local rice but not normal rice. In addition, the field research revealed villages in other prefectures that also regularly cultivated local rice, namely Sabato village in Gianyar prefecture and Selat and Ababi villages in Karangasem prefecture. In case of the villages in Karangasem, only specific households of the villages continued exclusive local rice cultivation. Among these, a household in Sabato and one in Selat cultivated local rice only, but other households produced local rice and normal rice.

In general, those regions of continued local rice cultivation seem to originally have had high yields of rice because of rich water sources. On the other hand, the areas that have now completely turned to normal rice cultivation seem to have had lower rice production. Before the introduction of normal rice, the current yields of 2–3 rice harvests per year were impossible except in especially productive areas such as Tabanan prefecture. In other areas, farmers rotated cultivation of rice and dry field crops such as tubers and peanuts. It is recorded in [20] that in the 1960s, rotating cultivation was practiced in 70% of Bali's farmlands. According to the author's interviews with farmers, local rice cultivation is still maintained in the few areas where multiple rice harvests were possible even before the introduction of normal rice introduction, whereas in the rotating-cultivation areas, which comprise the majority of Balinese farmlands, the introduction of normal rice now enables several rice harvests a year. In these areas, rotating cultivation with dry field crops is still conducted as needed.

The author's field research surveyed 24 households (**Table 1**), and among them, 19 owned *Lumbungs*. The 19 households can be categorized into three groups by their rice cultivation patterns: (1) cultivating local rice only; (2) cultivating local rice and normal rice alternately within one year; and (3) cultivating normal rice only. Among these groups, there seem to be characteristic differences in the ways the *Lumbungs* are used. These provide a clue to understanding the significance of the *Lumbung* in Balinese farming.

Three households in Wongayagede of Tabanan and Sebatu of Gianyar (WB1, WB2, SB1) fit into category 1. Remarkably, their *Lumbungs* were extremely well-maintained with frequent reconstructions positively introducing new material for better rice storage, such as tiled roofs and concrete walls, as well as new decorative designs. In SB1's case, it is notable that a new *Lumbung*, in addition to an existing two, was created only 15 years ago, which rarely occurs today. The interviewee said that the new *Lumbung* was needed: "Because we have too much rice production, two *Lumbungs* were not enough to store it." The older two *Lumbangs* were passed on to their first son, whereas the new one was given to their second son. Formerly, Balinese custom dictated that when a son became independent and had his own family, he received a new granary even if he continued living in his old household with its own raised-floor granary [11]. However, today, the custom seems to have almost disappeared because of the shrinking number of *Lumbungs*, and new ones are rarely constructed. However, in the case of SB1, the old custom was still followed in part.

The majority of the surveyed households (11) fit into category 2 and were all in Tabanan prefecture. The noticeable feature of *Lumbung* usage in these households was that although they cultivated both local and normal rice within one year in most cases, the *Lumbungs* were used exclusively to store local rice. Normal rice was stored elsewhere, such as in the main residence or in a storage shed without a raised-floor or not constructed in the traditional style. KS1 from the Kesambi village was the exception and stored both types of rice in the *Lumbung*, explaining “We have only a small paddy field, and the rice production is not very high, so we store everything in the *Lumbung*” (KS1). The most common explanation for the different storage spaces for different types of rice was the difference in harvesting methods: Local rice is picked the head, which are bundled into sheaves for storage (**Figure 7**), whereas normal rice is cut at the bottom of the stalks and threshed in the field (**Figure 8,9**), with the grains stored in sacks. Normal rice sacks are generally heavy (20–30 kg) and difficult to carry up a raised-floor *Lumbung*, which could be one reason why only local rice is stored in the *Lumbungs*. However, this cannot explain why both types of storage are maintained despite the high maintenance costs of *Lumbungs*, rather than storing both local and normal rice in new sheds. This raises the possibility of a perceptual connection between the *Lumbung* and local rice, rather than a logistical necessity.



Figure 7. Harvesting local rice.



Figure 8. Harvesting normal rice.



Figure 9. Normal rice threshing in the field.

Five households fall into category 3, that is, only cultivating normal rice. Of these, three were in the South Tabanan villages of Gubug and Sudimara, and one each was in the villages of Ababi and Selat in Karangasem. In fact, these were rather exceptional cases since the majority of farmers in Bali who cultivate only normal rice do not own *Lumbungs*. In these cases of category 3, the *Lumbungs* were generally old and poorly maintained. In the case of SL3 in Selat village, the *Lumbung* was not used at all. In the author's 2008 interview, SL3 said "When we switched to normal rice 10 years ago, we stopped storing new harvests in the *Lumbung*. Then, 3 years ago, we used up all the remaining local rice storage in the *Lumbung*, and it has been empty since then. But we keep it because it was passed down from our ancestors, so we do not dare destroy it." However, when the author made a second visit in 2011, SL3's *Lumbung* had been replaced by a small shop (*Warun*) run by the family. In other cases of category 3, *Lumbungs* were still used for storing normal rice, but this use did not appear to be out of necessity. Some interviewees provided explanations: "Because I got it from my mother, I maintain it" (AB1) and "As a *Lumbung* is precious, I will use it until it breaks" (SD1). These responses indicate that *Lumbungs* are relics for them to maintain for the sake of tradition rather than daily use. This conceptual shift regarding the *Lumbung* seems to have occurred when normal rice was introduced, as most obviously evident in the case of SL3. The cases in category 3 again show the conceptual connection between local rice and the *Lumbung*.

For the comparative study, the author also interviewed some households without *Lumbung* in Karangasem prefecture. In the case of SL2 of Selat village, the household cultivated both local and normal rice in a year, and they stored local rice in a storage facility called a *Tukub*, which is another traditional facility with a bamboo-thatched roof, an attic to store rice in, and a ground floor for storing other objects. SL2 had owned it for more than 65 years. The family used to own a *Lumbung* as well, but it was demolished with the introduction of normal rice cultivation in 1970s. In three cases from Jasi village (JS1, JS2, and JS3), the interviewees were exclusively normal rice farmers and had no memories of the *Lumbung*.

In summary, these examples show that the *Lumbung* is evidently connected with local rice cultivation and plays an active role only in local rice production areas. According to the author's research, all households still cultivating traditional local rice own a *Lumbung* (categories 1 and 2), and these *Lumbungs* are not just maintained but actively used, with regular maintenance and refurbishing. Some *Lumbungs* are even elaborately decorated or remodeled with new materials and structures. In households cultivating only local rice (category 1), *Lumbungs* are used the most intensively, and even new ones are being constructed. Farmers cultivating both local rice and normal rice (category 2) commonly store only local rice in *Lumbungs*, whereas normal rice is stored elsewhere, which demonstrates an obvious connection between the *Lumbung* and local rice. In contrast, in category 3, that is, those no longer cultivating local rice, *Lumbungs* seem to be treated as relics or mementos rather than essential parts of the agricultural routine; consequently, maintenance or refurbishment is rarely performed.

Therefore, the survival of the *Lumbung* seems closely related to the survival of local rice production. This view is reasonable from a historical perspective as well as the introduction

of normal rice in the 1970s and 1980s coincides with the gradual decline in the popularity of the *Lumbung*.

Next, we discuss the fundamental difference between local rice and normal rice production routines and their connection to the *Lumbung*.

3.2. Comparison of production routines of local rice and normal rice

It has already been mentioned that the harvesting methods of local rice and normal rice clearly differed, and other conspicuous differences also distinguished their production and processing routines.

First, the tools used in their production were typically different. The most obvious difference was in the harvesting tools. To harvest local rice, a traditional handmade picker called an *Anggapan* (**Figure 10**) was used. It is a tool with a hand-sized wooden body and an attached metal edge. Their shapes varied as they were made by the farmers themselves. In contrast, mass-produced sickles (*Arit*) were used for normal rice harvest. Thus, traditional tools and the production techniques were exclusively related to local rice. In addition, local rice was threshed and dehusked with a traditional mortar (large mortar: *Katungan*, small mortar: *Lesung*) and pestle (*Luu*) until 30–40 years ago (according to interviews with PN1, SL1, BB1, KS1, SB1, SL2). Stored local rice sheaves were brought out part by part for several days' use and threshed and dehusked near a *Lumbung*. However, this work has now been almost completely replaced by mechanical threshing and dehusking by a machine owned by the village. The shift to this method occurred 30–40 years ago, at the same time as the introduction of normal rice, and indeed, some interviewees concurred that machine threshing and dehusking were introduced with normal rice (SL2, AB1).



Figure 10. Traditional handmade picker (*Anggapan*) for local rice.

Second, the organization of planting and harvesting also differed between the two rice types. On the one hand, both planting and harvesting of local rice were basically conducted on a

family basis, and normally, fewer than five people worked together in the field. Sometimes, other farmers from the village joined to help in keeping with the traditional *Gotong Royong* system, in which farmers in a village help each other, and the reward is not money but tea/snacks and a share of the harvested rice (see also [19]). Even in these cases, however, the work is still done on a small scale. On the other hand, planting and harvesting of normal rice were done by a group of tenants led by a landlord, and harvesting, in particular, was done on a large scale. Normal rice was threshed immediately after the harvest in the field, and the threshed grains were packed into sacks, so around 10 people normally worked together for this. However, the households farming both local rice and normal rice (those typically found in Tabanan prefecture) used the same harvesting method for normal rice (harvesting and threshing conducted in sequence in the field), but this work was still done on a family basis on a small scale. This shows that the difference in work organization between local rice and normal rice is not a mere reflection of different harvesting methods but rather a conceptual divide: Local rice farmers today apply the family-based working style to the introduced normal rice as well.

In connection with the work organization issue, the rhythm of annual work scheduling also seems to differ between local rice and normal rice farmers. Local rice farmers plant and harvest rice on a fixed schedule shared with other farmers in their village, whereas normal rice planting and harvesting are rather random in timing, even within a single village (for details, see [15]). In addition, several ceremonies were traditionally performed at critical stages of the rice production cycle by the whole village [15]. While these ceremonies are mostly no longer observed, the village-shared scheduling of farming routines again seems to reflect a more traditional way of farming.

In addition, the gender division in work responsibilities appeared to differ between the two types of rice, though information collected in this study on this area is still limited. Interviewee BB1 said “Rice harvesting has been the responsibility of women from the old times. But anyone can harvest normal rice.” Indeed, normal rice was normally harvested by a mixed group of men and women, according to the author’s observation, whereas almost all harvesting workers for local rice were women. Furthermore, all interviewees said that threshing and dehusking with a mortar and a pestle were exclusively women’s job, but this work division was discontinued when the threshing and dehusking machine was introduced. It is suggested that traditional gender roles could have also disappeared with the introduction of normal rice and new farming techniques.

Third, the author also conducted interviews regarding the farmers’ perceptions of the two rice types, and, again, clear differences emerged. When asked about local rice, all the interviewees gave positive comments such as “I love the taste” (JT1, JT3, SG1), “It contains a lot of vitamins” (SG2, SB1, KS1), “It is filling” (JT3), “It is not easily infected by germs” (AB1, JT3), and “It does not require much fertilizer” (AB1). It is intriguing that even AB1, who had already completely stopped producing local rice, made such comments. In contrast, the only positive, uniform comment all interviewees made about normal rice was “It can be harvested more quickly than local rice.” Obviously, local rice holds special value for Balinese farmers that normal rice does not despite the fact that normal rice production is now much more common across Bali.

Apparently reflecting this perception, many farmers who cultivate both local and normal rice (such as JT1, JT3, BB1, SL2, GN2) clearly distinguished the uses of the two types of rice: Local rice was for home consumption, and normal rice was for selling outside the community. In fact, the standard price of local rice in the market was higher than that of normal rice. According to the interviewees the author interviewed in July 2006, local rice sold at 6000–7000 rupia per kilogram, whereas normal rice sold for 4500 rupia per kilogram. Therefore, for profit, it would be better to sell local rice and eat normal rice themselves, but in reality, farmers do the opposite. This also shows the strong mental attachment to local rice among Balinese farmers. Yet, it must be also noted that some people who were not originally farmers but started farming as a business have recently begun cultivating local rice to sell for profit (such as PN1). This suggests that the perceptions of Balinese rice farming are gradually shifting.

Related to the perception issue, ritual practices related to rice farming also seemed to be influenced by the introduction of normal rice. Bali is called the “Island of the Gods” because of the numerous ceremonies and offerings for various occasions, which are deeply rooted in Balinese daily life. There are also a number of ceremonies associated with rice farming (see [15]), though some of these, particularly village-based ceremonies, are no longer regularly practiced, as mentioned above. *Mantenin*, the ceremony for rice granaries after a new harvest, is one of the farming ceremonies still practiced with certain regularity but only in households with a traditional *Lumbung*. Furthermore, these ceremonies are observed differently among such households, depending on the types of rice they cultivate. Basically, when a family cultivates local rice, they regularly hold *Mantenin*. Even in the case of SL2, who cultivated local rice but replaced the household’s *Lumbung* with another traditional storage facility (a *Tukub*), *Mantenin* was observed, albeit on a small scale. In cases of families cultivating both local and normal rice, while *Mantenin* was observed for harvests of both types of rice, the scale of the ceremony was smaller with normal rice (JT1, GN1). In households that owned *Lumbungs* but no longer cultivated local rice, the situation varied. SD1 reported using both a *Lumbung* and a modern storehouse for normal rice and observing *Mantenin* for both storage facilities. However, the ceremony was much simpler with the modern storehouse, as the author directly observed. GB1 reported a similar situation of using a *Lumbung* for normal rice, but they had stopped holding *Mantenin*. Instead, they conducted a ceremony for the goddess Dewi Sri, who is believed to reside in the *Lumbung*, twice a year regardless of the actual harvest timings. Furthermore, in the case of SL3, who owned a *Lumbung* but did not use it, they stopped holding *Mantenin* at the same time they stopped cultivating local rice. This suggests that the regular and proper observance of *Mantenin* depended on the presence of local rice production rather than that of a *Lumbung* itself. It is noted in [6] that Balinese people did not practice farming ceremonies for cash crops despite their deeply rooted tradition of farming ceremonies. The simplified *Mantenin* for normal rice may reflect the local perception of normal rice as more like a cash crop than a subsistence one.

In addition, it is notable that the rice placed in a *Lumbung* as an offering for Dewi Sri was exclusively local rice, even when normal rice was stored in the *Lumbung*. Among those the author interviewed about the offering rice, WG1, BB1, JT1, and SB1 were local rice producers who stored only local rice in *Lumbungs*. In their cases, not only was local rice the offering but

also the offering activities seemed comparatively frequent. WB1 headed a household that cultivated local rice only, and they offered fresh rice from every harvest, or every 6 months. BB1, JT1, and SB1 grew both local and normal rice but stored only the former in a *Lumbung*. BB1 reported adding fresh rice little by little to the existing offering rice during every local rice harvest. The rice added was picked just before starting the harvest. When the amount of the offering rice become too large, the whole offering rice pile was removed from the *Lumbung* and burnt, and the ash was scattered in the paddy field. In JT1's *Lumbung*, approximately 1 kg of local rice was placed as an offering, and although the rice was not regularly replaced, it was regularly removed for the annual *Mesabe* ceremony offered at a temple and returned to the *Lumbung* after the ceremony. In SB1's *Lumbung*, five or six sheaves of local rice were placed as an offering and kept there for a "long time" (SB1) but regularly taken out as offerings for various ceremonies.

KS1 was also a local and normal rice producer and, in contrast to other such farmers, stored both types of rice together in the *Lumbung*, as mentioned above. However, although both types of rice were stored in the *Lumbung*, rice for offerings in the *Lumbung* exclusively had to be local rice. The offering rice was replaced over a period of several years.

SD1 did not produce local rice at all and stored normal rice in the *Lumbung*. Nevertheless, SD1's offering rice in the *Lumbung* was local rice, though quite an old stock. They stopped cultivating local rice in 1965, but following the will of the interviewee's father, who had died "30 years ago" (SD1), a basket of local rice was kept in the *Lumbung* as an offering "till it crumbles away" (SD1). Again, the offering rice in these different cases showed that the custom is still a part of daily life for local rice farmers but only a traditional relic for normal rice farmers.

Above all, it can be said that the introduction of normal rice not only resulted in the shift in the type of cultivated rice but also led to the erosion of traditional farming routines, tool making, work organization, gender-based labor divisions, and ritual practices. On the basis of these field research results, we now discuss the reasons for the disappearance/survival of the *Lumbung* and their meaning.

4. Discussion: what is the significance of the *Lumbung*?

The preceding discussion raises the question of the nature of connection between the *Lumbung* and local rice. The authors' field research revealed that the routine of local rice production was significantly different from that of normal rice production. Local rice was harvested by a handmade tool, the *Anggapan*, and the sheaf was dried and stored in a *Lumbung*. The work was generally done on a family basis. On the other hand, normal rice was harvested by a mass-produced *Arit*, and the grains put into sacks and stored in a non-traditional storehouse. Because normal rice harvesting and threshing were carried out together, related labor tended to be on a larger scale and commonly involved a large group of tenant farmers. In addition, traditional gender-based divisions of labor and mutual supporting systems in communities were more visible in the local rice production area. Differences between the two types of rice were also reflected in the rituals surrounding rice storage. Specifically, traditional ceremonies

and taboos were retained with the *Lumbung* but were not observed with normal rice storage facilities.

In summary, it appears that agricultural activities associated with local and normal rice form coherent circles (**Figure 11**). All elements involved in local rice production, such as working style, utilities, and tools used, seem to be based on tradition. On the other hand, activities for normal rice production seem to be based on the concept of efficiency, positively introducing new styles of work. It is thus likely that the *Lumbung* can find a reason to exist as a part of the traditional cycle of local rice but cannot accommodate the efficiency circle of normal rice. This explains why *Lumbungs* started to disappear at the same time local rice cultivation disappeared, while their active use in local rice cultivation continues.

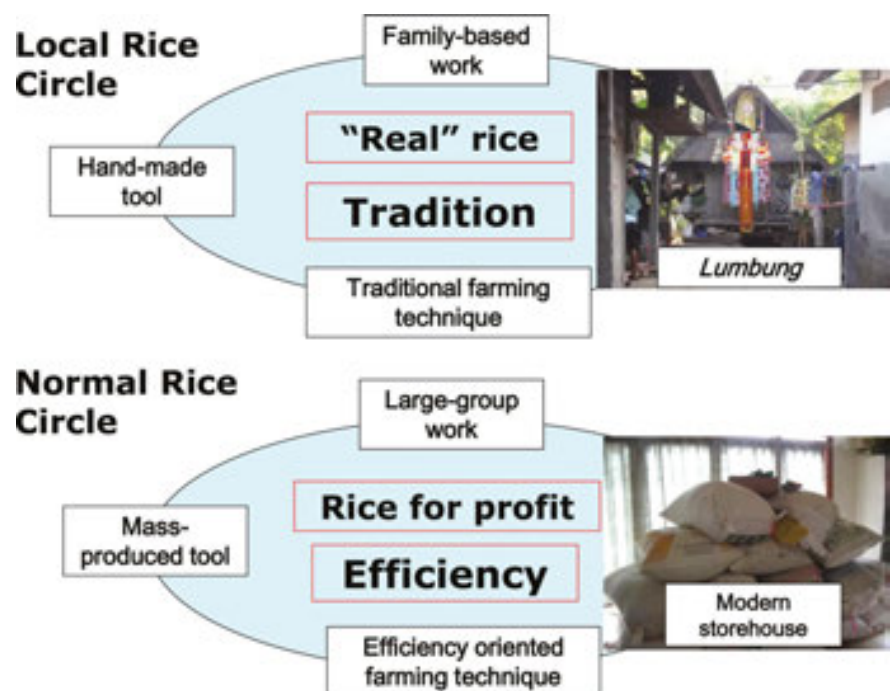


Figure 11. Conceptual circles concerning local rice and normal rice.

Moreover, it seems that each of the two coherent circles is sustained by different shifts in the mentality of Balinese people. In interviews, farmers often expressed a strong mental attachment to local rice, even those who no longer cultivated it, describing it as “tasty,” “good,” “nutritious,” and so on. Almost all the farmers said that they would like to eat local rice as much as possible. In contrast, no value was attached to normal rice other than its being “productive.” Indeed, among farmers mix-cultivating local and normal rice, many said that they saved local rice for their own consumption and sold normal rice commercially. This reflects the perception of local rice as real food and normal rice as more of a cash crop. The general consensus was that because local rice is real food, it is produced in a more “real” way using traditional facilities and tools and proper ceremonies, whereas with people do not care about normal rice and thus change their production methods for greater efficiency.

Above all, the traditional circle of local rice seems to be sustained by the Balinese people's idea of "real rice production," and the *Lumbung*, which is the most visible factor in the circle in the everyday landscape, symbolizes the idea. Therefore, if *Lumbungs* are properly protected and presented in the planning of the Balinese landscape, it can be usefully connected to the protection of Balinese farming culture and people's motivation to farm.

5. Prospects: promotion of agriculture in Bali and the *Lumbung*

In modern-day Bali, the decrease of farmlands and populations under the pressure of the tourism industry is a serious problem. To promote rice farming, it would be effective to protect local rice cultivation and *Lumbungs* as part of the whole agricultural landscape and to encourage local people to work with these to affirm their own cultural identity.

Although rice terraces in Tabanan and Gianyar are among the most popular and highly promoted sightseeing spots, *Lumbungs*, which are an indispensable factor in traditional rice farming, are not sufficiently promoted or protected. Traditional and characteristic styles of store houses also exist in other parts of the world, such as the yam house in Papua New Guinea and the *Takakura* raised-floor granary in the Amami Oshima Island, Japan [18, 22]. Because of their distinctive shapes, these store houses are heavily promoted as symbols of local culture (e.g., the miniature models are sold as souvenirs, and the models are displayed in important places such as airports of the Amami Oshima Island, the Papua New Guinean Diet Building, and sightseeing spots of those areas). On the other hand, Bali's *Lumbungs* are not as well promoted. At present, they are treated as cultural icons only in limited areas, such as the *Lumbung* display at some souvenir shops around Ubud and a new *Lumbung*-shaped hotel by the Bali Nature Land in Gunungsaridesa, Tabanan. It will be useful to promote the *Lumbung* as a Balinese cultural symbol more broadly because it can contribute much to those who consider agricultural work their own cultural identity and promote agriculture along with tourism.

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