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“I am just borrowing water but I will return it in an hour” How Balinese Farmers negotiate their daily use of irrigation water.

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ABSTRACT: Rice cultivation in Bali cannot be separated from the traditional irrigation societies called *subak*. *Subak* are socio-religious organisations responsible for irrigation management and religious activities within a defined geographical area. Every *subak* has clearly defined rules that have developed over a long time period. They have been codified in a set of laws called “*awig-awig*”. These laws regulate rights and duties among the members of the *subak*. Such rights and duties include public obligations, regulations concerning land and water use, legal transactions of land transfer, and collective religious ceremonies. The *awig-awig* are implemented and enforced through a system including fines.

Nevertheless, in addition to the formal regulations, the farmers’ every day decisions are also based on informal regulations and unwritten rules.

To understand these informal decisions and unwritten rules one has to analyse the complex social networks in Balinese culture. They include kinship relations through repeated virilocal residence¹, obligations that are part of a Balinese hamlet and customary village, and temple congregations which are linked to several temples with specific functions. These networks provide a powerful basis for solidarity, social control and collective action.

Even though a *subak* organisation does not correspond to the social units of the village strong social cohesion and control is carried from the hamlet into the *subak*.

This paper presents a case study of five *subak* in Badung regency, Bali. They share a common permanent weir. The authors explore how irrigation water is negotiated by the farmers and the heads of the *subak*. Formal and informal institutions which determine water management are analysed. It is argued that the formal *subak* regulations, although clear and strict, are only used as a final arbiter. The laws are seldom enforced. This provides freedom for the farmers to make decisions outside the formal regulations, adjusting to constantly changing situations. On the whole this freedom is used responsibly. It does not jeopardise the irrigation management by opening the door to free riding or non-conformance. Indeed, often it optimises the distribution of irrigation water. The authors seek to explain this phenomenon by referring to the social, cultural, and religious values within which the farmers make their decisions.

INTRODUCTION

Balinese rice cultivation is famed all over the world for their efficient use of irrigation water. A major role in setting up and maintaining this system play the traditional irrigation societies called *subak*. They are the backbone of Balinese rice cultivation. The *subak* system has grown over a thousand years, constantly adjusting to changing situations and strongly interlinked with Bali’s natural, social, cultural and religious environment. The *subak* can be described as a mixture of different units:

- a. It is a *technological* unit including a main water inlet and a complex system of collectively owned

¹ In virilocal residence sons stay in the father’s compound uniting the men of a given patrilineal group.

irrigation canals which secure equal access to irrigation water to all the *subak* members. The water shares are determined by a combination of area sizes and mutual agreements, and technically implemented with fixed proportional flow division structures.

- b. It is a **physical** unit. The boundaries of a *subak* are defined by all the rice fields which receive water from the *subak* irrigation infrastructure. The rice fields are also part of the nearest customary village. Yet, the *subak* does not correspond to the social unit of the village (Bray, 1994).
- c. It is a **social** unit comprising all farmers who cultivate land within the *subak* boundaries and receive water from the *subak* irrigation infrastructure. The farmers live in the surrounding villages.
- d. It is a **legal** unit given the status of customary law societies with clearly defined rules and regulations written down in a law book called “*awig-awig*” (Dinas PU, 1997)². This set of laws regulates rights and duties among the members. It includes public obligations, regulations concerning land and water use, legal transactions of land transfers, collective religious ceremonies, and sanctions when breaking the *subak* laws. The *awig-awig* of *subak* has been passed down orally over generations. Nowadays, however, most *subak* have a written version at their disposal.
- e. It is a **religious** unit including ceremonies on the individual level, the *subak* level, and the inter-*subak* level. The ceremonies vary in scale, involvement and duration. The ceremonies ask for protection against pests and diseases, and honour god for letting human beings work the land. The most elaborated ones involve all *subak* who receive water from the same crater lake. (Lansing, 1991; Pitana, 1993; ADB, 1997; Sutawan, 2000).

However, the *subak* is just one of the three major public corporations of a Balinese village (*desa adat*) (Geertz, 1980 and Warren, 1986). To understand the complex social networks farmers live in one has to include the hamlet (*banjar*), the customary village (*desa adat*) and the temple congregations (*pemaksan*) into the discussion. These are further influenced by kinship groups (*dadia*). Each farmer is member of a different set of these corporate groups. Social cohesion and control underlies all these groups and thus is carried into the rice field.

In the following sections a case study is presented. Five *subak* have been explored and set into a social context which transcends the *subak* dimension. The water management is analysed by taking the social, religious and physical dimensions into account in which a Balinese farmer lives.

CASE STUDY

Five *subak* in the regency Badung which share a common dam have been investigated. The five *subak* are organised in a recently established *subak* federation called *subak-gede*. Approximately 2'000 farmers are cultivating a total of 740ha rice fields which are fed by the irrigation infrastructure of the *subak-gede*. Most of the farmers live in one of the hamlets in the nearby villages.

The water is distributed from the primary canal to the secondary canals into the *subak* territory which are subdivided again into tertiary (sub-group territory) and quaternary canals (farmers' single field). Most of the canals' technical set up is based on a continuous flow principle (Horst, 1998). Only the diversion weirs to the *subak* territories have gates which can manipulate the flow of water. These gates are operated by a government agency upon *subak*'s requests but generally stay open.

All the *subak* practice synchronised planting and crop rotation³ to reduce pest infestation and disease pressure. Also, in most of the five *subak* a relatively strict regime of which varieties can be planted is exercised. *Subak* heads usually meet once every planting season to discuss planting schedules and crop rotation patterns.

² The *subak* are formally recognised by the Bali Provincial regulation No. 02/PD/DPRD/1972: “*Subak* are customary law societies with socio-agrarian-religious nature which were established a long time ago and evolved continuously as landholding organisations which distribute water in a defined irrigation area.”

³ The crop rotation practiced in this area, depending on the availability of water is 2-4 times rice and 1 time another crop (*palawija*).

FORMAL AND INFORMAL WATER NEGOTIATIONS

It is the *subak* head's responsibility to make sure that all *subak* members receive a fair share of water for the cultivation of their rice fields. If there is not enough water, he may ask to borrow water from other *subak* which get their water from the same primary canal or from *subak* further upstream. Theoretically he would have to contact the government agency which then issues a formal letter for the gate operators. In practice, the *subak* heads of the five *subak* negotiate water needs amongst each other without contacting the agency before. The formal procedure is regarded as impolite and would imply that there is a problem between the *subak* heads.

As mentioned previously fixed proportional flow division structures divert the water into the single rice fields. The water share received by each member determines his rights and duties within the *subak*. This reflects the foundation of water management that has evolved over a long time and is mutually agreed on by all members (Sutawan, 2000). Theoretically, the farmers are not allowed to manipulate these division structures. In reality, manipulation takes place. This is especially the case in the early stages of the rice plant where water is the crucial variable. By closing other farmers' inlets and half of the weir just after the individual inlet (*tembuku*), the flow of water into the field is increased. However, there is a socially regulated strict distinction between water stealing and water "borrowing". The manipulation of the water flow is labelled as "borrowing" as long as the farmer stays next to his water inlet and returns the flow to normal before going home. This allows every passing farmer to directly negotiate the water borrowing with the borrowing farmer. The borrowing farmer can explain why he has to borrow water and the other farmers can remind him that he shouldn't borrow water too long. This is not necessarily done verbally. Just seeing the borrowing farmer is enough to remind him of the shame attached to stealing water. If the water flow is not returned to normal a farmer will be accused of stealing water. Sanctions for stealing water are graded. Yet, only in severe cases will the *subak* head be asked to speak out sanctions. Problems are usually solved on the spot.

Without sounding too idealistic one can say that Balinese irrigation management in the study area is working with little disturbance through uncooperative farmers. Why is this? What makes the Balinese irrigation system so unique? An answer could be found in the social networks in which Balinese live. These networks are on the one hand autonomous and on the other hand they intersect, creating a subtle interrelatedness between people and places (agriculture, living, ritual). The next section looks at the different networks farmers belong to in the study site.

THE BANJAR AND THE DESA ADAT

The most important corporate institution in relation to social organisation is the hamlet called *banjar*. It is subordinate to the customary village (*desa adat*). The strength of the *banjar* as an institution in both traditional and modern Bali is tied up with the Balinese notion that the *banjar* is a moral community in which every member has the same responsibility towards the group. Serious violation of *banjar* regulations is harshly responded to by social marginalisation and can even lead to expulsion from one's household (Leeman, 1993). Hence, Balinese are strongly bound to their *banjar*. Not without reason Balinese say that to live outside the *banjar* is death. Most routine fines are small and more a reminder of the shame (*lek*) attached to non-compliance. It is interesting that the Balinese word for fine (*dosa*) also includes a dimension of sin (Warren, 1986). The *banjar* has no connection with the *subak*, but the farmers of the same *banjar* are often members of the same *subak* and carry their social relations into the rice fields.

While the hamlet is in charge of the secular and visible realm (*sekala*), the customary village is in charge of the magic-religious realm and the relationship between the human beings and the invisible (*niskala*) (Leeman, 1993).⁴ The customary village is linked to a temple congregation (*pemaksan*) and figures as the spatial aspect. The *desa adat*, thus, is not only a social system, but a sacred space, based on the Balinese belief that the world and everything on it belongs to the Gods. All members of the village have to fulfil their religious duties in the temple congregation. Although the *banjar* is the strongest corporate group, farmers of one *desa adat* will be connected with each other because they share the same sacred space and have the same duties towards this space. Also, the *desa adat* often includes the rice fields of the adjacent *subak*. In this case certain *subak* ceremonies will be held in one of the village temples (*pura puseh*) and the *subak* temples have a ritual relationship with the village temple. Farmers who cultivate rice in a *subak* outside their own *desa adat* have automatically a ritual

⁴ Sekala means tangible, able to be perceived by the senses. Niskala means intangible or occult.

connection to a village temple other than their own. Table 1 shows the represented *banjar* and *desa adat* by farmers of a few *munduk* (sub-*subak* group) of two *subak*. Farmers who cultivate fields in a *subak* represent as many as 13 *banjar* and up to 4 *desa adat*. Table 2 shows the physical and religious dimensions of *subak* in the case study area: the physical relationship of the *subak* to the customary village, the *banjar* that relate to the village and the village temple which plays a spiritual role for the *subak*.

Table 1. Represented *banjar* and *desa adat* in two *subak*

<i>subak</i>	<i>munduk</i>	no of farmers	<i>banjar</i> represented	<i>desa adat</i> represented
Subak D	GH	41	5	1
Subak T	BD	31	10	3
	Ti	42	13	4
	Li	29	9	2
<i>Subak T</i>	<i>Average</i>	<i>32.4</i>	<i>9.2</i>	<i>3</i>

Table 2. Physical and religious Dimensions

<i>subak</i>	belonging to customary village	no of <i>banjar</i>	village temple related to <i>subak</i>
Subak D	Desa Adat Kapal	16	Pura Puseh Kapal
Subak T	Desa Adat Kapal	16	Pura Puseh Kapal
Subak B	Desa Adat Kapal	16	Pura Puseh Kapal
Subak SP	Desa Adat Anggungan	3	Pura Puseh Anggungan
Subak A	Desa Adat Tegal	25	Pura Aban

THE DADIA

The last important social group is the *dadia*. It is the patrilineal descent and inheritance groups with virilocal residence where sons stay in their parents' house after marrying. *Dadias* trace themselves back to a common ancestor and are ritual units which share family temples at different levels of the *dadia*. At the hamlet level *dadias* often are more than just ritual units. They can act as collective working groups for various social and economic tasks. They can be the framework for informal and social interaction, and can be used as political unit within the hamlet. The amount of *dadias* in one hamlet can vary from one to several. However, Balinese feel morally obliged towards the *dadia*. Table 3 shows the different *dadias* within one *banjar* in which some farmer of the case study live.

Table 3. *Dadia* represented in *banjar* Umahanyar⁵

<i>Dadia</i>	head of family	location of family temple	place of origin
Arya Bang Penatih	7	Bj Umahanyar/Ds Anggungan	Ds Penatih
Pasek Gading Wani	14	Bj Umahanyar/Ds Anggungan	Ds Gading Wani/Ds Binoh Ubung
Pasek Gelgel	13	Bj Umahanyar/Ds Anggungan	Ds Ubung/Ds Gelgel
Kesatria Dalem	10	Bj Tegal/Ds Darma Saba	Klungkung
Tektek	15	Ds Peguyangan	Ds Peguyangan
Pasek Ngukuhin	1	Bj Gede/Ds Anggungan	Ds Anggungan
Pande	3	Bj Gede/Ds Anggungan	Ds Tatasan
Pasek Bendesa Mas	3	Bj Sibang Kaja/Ds Sibang	Ds Sibang
Total			
<i>8 different Dadia</i>	<i>66 Head of Family</i>		

⁵ It has to be noted that the number of *dadia* represented in the *banjar* shown in table 3 is particularly high because it is a "new" *banjar* (Umah Anyar). Members of this *banjar* have migrated from several villages and created a *banjar* 120 years ago. Older *banjar* generally include fewer kinship groups.

The *dadia* represents another dimension of social and ritual importance for the farmers. Cooperation, solidarity and social control are major components of *dadia* networks (Howe, 1989).

THE PEMAKSAN

All these corporate groups while originated in agriculture (*subak*), neighbourhood (*banjar*), or kinship (*dadia*) are closely intertwined with religious activities. This omnipresence of religion in Bali is best manifested in the Balinese temple system. It can be argued that there is no aspect of Balinese life which is not formalized in a temple congregation (*pemaksan*). All Balinese are members of several temple congregations (*pemaksan*), each corresponding to a given aspect of his or her social life.

All these socio-religious corporative units find common ground in the Balinese philosophy “*Tri Hita Karana*”. *Tri Hita Karana* can be translated as the three sources of prosperity, including a spiritual network system consisting of (1) God as the creator and main power of the universe, (2) the human beings as managers of the earth, and (3) nature (water, land, air) as a place where prosperity can be found. Only by attaining a balance of these three sources can happiness and welfare, both materially and spiritually, be achieved (Pitana, 2005, Sutawan N., 2004, Arifin, 1996).

SUMMARY

Every farmer in the study site lives within three major corporate groups – the *subak*, the *banjar* and the *pemaksan*. These groups are non-coordinate which means their membership does not coincide. But they overlap and intersect. Every farmer will be a member of a *subak* together with other farmers from other hamlets, kinship groups and temple congregations. The farmers of any temple congregation will come from several *banjar* and different *subaks*. The farmers of one *banjar* will be members of different, sometimes several *subak* and *pemaksan*. Normally all farmers of a *banjar* will belong together to one temple congregation, but they will belong to it with farmers from other *banjar*. They are organised within it through the *pemaksan* and not through the *banjar*. Around these three major groups are several other groups clustered which again are non-coordinate. One can find large family groups (*dadia*) within one *banjar*, joined by other family members who live in other *banjar*. This complex network of different, non-coordinate groups with different memberships creates a network of solidarity and social control. Memberships of the different groups are never the same, but farmers meet other farmers in different groups.⁶ This social interdependence is mirrored in water management where shame is still a major component and social control is guaranteed.

CONCLUSION

This paper has put water management within a socio-religious context. Every Balinese farmer lives within a network of relationships linking him in different ways to neighbourhood groups (*banjar*), customary villages (*desa adat*), rice fields (*subak*), large patrilineal descent groups (*dadia*) and temple congregations (*pemaksan*). Moreover, in every religious ceremony, Balinese are constantly reminded of the basic philosophy of *Tri Hita Karana* which spans over all these corporate groups seeking to maintain the harmonious relationship between nature, the people and the creator. This complex social network is an important part of daily life. Social control, solidarity and behavioural rules are part of all these corporate groups. This influences the way in which farmers manage their daily water needs in the rice fields. Sanctions for stealing water are hardly ever applied. In most cases water stealing issues are solved on the spot relying on shame (*lek*) attached to being caught. However, borrowing water is regularly done by farmers. It is a commonly applied informal institution accepted by the farming community, but not formalised in the *subak* law (*awig-awig*). Actually, the acceptance of borrowing water gives the *subak* heads and the farmers the necessary flexibility to instantly respond to water stresses. Formal avenues or strict regulations hinder spontaneity. Informal arrangements and formal regulations complement each other and strengthen the system. Social, cultural, and religious values bind the farmers in a way that the social consequences for non-compliance seem unbearable. The formal *subak* regulations are the final arbiter.

As Hughes (2001) puts it: “To learn from the Balinese case of sustainability in an applicable sense... is simply to realise that other cultures might simultaneously create ecologically sustainable economic systems with attitudes and public rituals and decision-making processes that express and support them.”

⁶ See also Geertz, C. (1980). *Negara: The Theatre State in Nineteenth-Century Bali*.

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