# Fisheries co-management, the role of local institutions and decentralisation in Southeast Asia : with specific reference to marine sasi in Central Maluku, Indonesia

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# 5 Case-study: Desa Nolloth, Saparua Island*

This chapter describes the situation in Nolloth, one of the 6 case-study villag es in the period 1997-98. This case was selected as it is most illustrative for a fully functioning *sasi* system. The description of the case conforms to the Institutional Analysis Framework (see Chapter 2) and provides an elaborate description of the local marine management system including the contextual variables.

## 5.1 Physical, biological and technical attributes

Nolloth village is situated on northeastern Saparua Island, one of the Lease Islands (Figure 1 and 5.1). Before the Dutch colonization, the people of Nol - loth originally lived in the hills, organised in a clan structure ( *marga*). Two groups of *margas* (*uku lua* with two clans and *uku lima* with five) descended from the hills and settled on the coast where the village of Nolloth lies today.

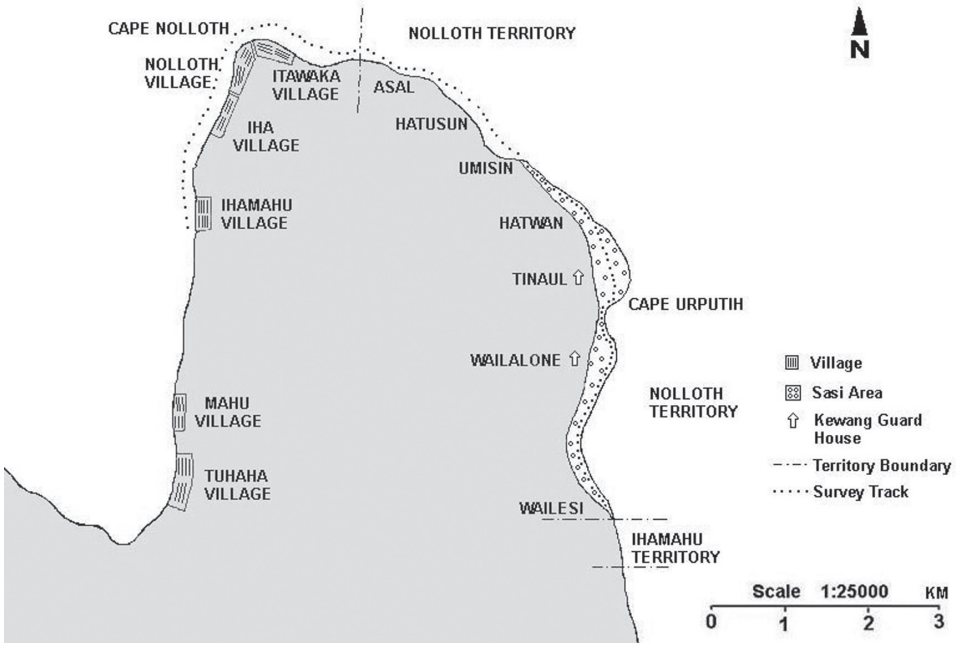


**FIGURE 5.1 – Sketch map marine territory Nolloth (features not necessarily to scale)**

*Based on: Novaczek, I., I.H.T. Harkes, J. Sopacua, and M.D.D. Tatuhey (2001). *An Institutional Analysis of Sasi Laut in Maluku, Indonesia.* Technical Report No. 59, Chp 10. ICLARM, Manila.

### 5.1.1 Physical environment

Nolloth has a relatively large (27 ha) land and sea territory (*petuanan*) compared to other villages (Antariksa *et al*. 1993). Stories vary, but it seems that at one time the reigning *raja* of Nolloth collaborated with the Dutch and in return acquired more extensive marine and land rights than other villages. The land is divided among the *uku lua* and *uku lima*. Each of the two groups maintains its identity and each has traditional leaders who mediate land disputes and manage certain natural resources in their territories.

The forest garden area straddles the northeastern cape of Saparua Island (Figure 5.1), south of the village of Itawaka. The main marine territory lies along a 6-7 km stretch on the eastern side of the cape. South of Nolloth's village territory lies the shore claimed by Ihamahu (just a few hundred meters), then a stretch claimed by Itawaka and finally the village marine territories of Ulath and Ouw. The villages of Iha and Tuhaha have no claims on this coast.

The marine *sasi* area is about 2.5 km long, lying on the east side of the island, approximately one hour by small boat from the village. The area is wave exposed and fringed by a narrow reef dominated by massive and soft corals and interspersed with sandy patches (Andamari *et al*. 1993).

### 5.1.2 Biological characteristics

In 1997-98, the majority of fishers (60%) targeted pelagic fish only, others both reef and pelagics (33%). Fourteen fish species were recorded as commonly caught, i.e. eight pelagic and six reef fish. In addition, men collected several large shellfish species, while women collected mainly small shellfish. The fishers preferred the more profitable pelagic fishery to coral reef fishing because inshore reefs were already depleted.

Most fishing took place in the open sea and not in the *sasi* area. Fishers perceived that the general condition of the marine environment had drastically declined over the past 15 years, and they expected resources to decline further in the future (for more details see Table 5.4). In Nolloth, the main causes for resource decline identified were household waste and industrial pollution. The number of motorboats has also increased and subsequently, more oil spills into the sea.

Nearly all fishers also perceived significantly reduced fish catches. Blamed for resource depletion were the increasing numbers of vessels from outside of Lease and the use of modern gear, such as Fish Aggregating Devices (FADs or *rumpons*), fine mesh lift nets (*bagans*), nylon gill nets, and blast fishing. Since the 1980s, the number of motorized boats, modern gears, FADs and lift nets had increased markedly around the Lease Islands. Fishers complained that pelagics no longer came to the shore because FADs in offshore waters had disturbed their migratory routes.

Most fishers agreed that fishing was different compared to the past. They had to paddle further and further in trying to keep their fish-catches stable. Nearly all fishers (93%) reported reduced catches and a subsequent decline in income. In the late 1990s, the prices of fish had become so high, that lower yields still provided an acceptable income. But the price increases were not expected to make up for the increased input of time and labour for long. In current times with increased financial needs for education and 'luxury' commodities such as TVs, in combination with increasing prices for boats, engines and nets, fishers found it more and more difficult to cover their expenses and make a living.

### 5.1.3 Attributes of the sasi area

Under marine *sasi* the harvest of top shells (*Trochus niloticus*) and sea cucumbers was regulated within a specific part of the sea. In the *sasi* area different zones were recognized (Fig. 5.1). The stretch called Tinaul (between Wailalone and Hatwan) was the richest fishing area for top shells, while sandy patches were key sea cucumber areas. A seaward fringe is where a restriction on the use of gill nets was enforced. These three zones in the *sasi* area were open and closed at the same time. The *sasi* products were harvested only during open season, which was proclaimed at intervals as short as a few months or as long as three years. In the *sasi* area spear fishing, the use of nets, swimming and diving were not allowed during the closed season. Only fishers who were village residents were allowed to fish using hook and line.

Sea cucumbers caught include *Teripang nanas* (green coloured sea-cucumber) and *Teripang susu* (black and white ones). The latter attain huge sizes and are taken from deep water (>30m). In the past they were harvested by Madurese compressor divers from Java, but over the years are being collected more and more by local divers.

The top shells are found around 1-5 m deep at low tide, among the corals and rocks. Depending on the size and abundance of the top shells, *sasi* could be closed for up to several years. The optimal closure is three years. In three years the animal matures and its shell reaches prime condition (Zerner and Thorburn, *forthcoming*). The minimum size for harvested top shells in Nolloth was four fingers (6 cm) and after the harvest the remaining small shells were left to grow.

Biological surveys indicated that Nolloth had better than average living coral cover compared to other areas in Saparua. During the opening of *sasi*, spear-fishers had access to the *sasi* area and fishers reported that the fishing in the *sasi* area was better than elsewhere. They believed that the ban on gill netting and destructive gears in the *sasi* area helped to preserve the living coral reef and allowed the fish to grow. In fact, the *sasi* areas of Nolloth and Ihamahu were the only places surveyed by the research team in 1997 where top

shells could be found at all. Top shell yields dropped precipitously through the 1980s (Evans *et al.* 1997). The 1998 harvest of almost 500 kg of top shell from the *sasi* area revealed that management under the new village head, who was committed to waiting at least two years between harvests, had allowed the resource to recover.

### 5.1.4 Fisheries technology

In 1997, there were an estimated 400 fishers in Nolloth. Most fishers were involved in the pelagic fishery in the open sea using their small outrigger boats (*perahus*) or they worked as crew on pole and line boats. The majority (70%) of fishers in our sample owned their own small boats; only a few (7%) had a motorboat. The fishers in Nolloth mainly used hand-lines and nets that were 50-150 m long. Most common was a type of net called *giob*, which has quarter inch mesh and catches *tuing-tuing* (*Cypselurus* spp.). Also very common were very fine mesh nets called *siru* and *tanggu* (1-2 mm mesh) and *komu* nets (4.5 cm mesh). Relatively few fishers had other types of nets, such as *lalosi* nets (4 cm mesh), *lema* nets (6 cm mesh), and 'sardine' nets. Of our sample, 23% of the fishers interviewed owned no gear at all. Often they leased, borrowed or rented equipment, or they worked on the boats of other fishermen. According to the people, whether a fisher owned gear and the type of gear reflected a person's willingness to make an effort. The coast near Nolloth is wave-exposed and not fit for lift nets. Therefore, in contrast to the non-*sasi* villages in our study (see Novaczek *et al.* 2001), lift nets had a relatively small impact on the local inshore fishery.

### 5.1.5 Artisanal and small commercial fishers

The artisanal and small scale fishing grounds include the village marine territory of Nolloth and neighbouring villages of Itawaka, Ouw and Ulath, as well as waters as far away as Nusa Laut, southern Seram and the Banda Islands (see Figure 1). Fishers did not necessarily go to sea every day; it depended on weather and what other work was to be done on land. If fishing close to home, fishers went to sea several times a day to spend a couple of hours fishing each trip. If heading further out, they could be gone for 24 hours or more.

Catches varied greatly depending on gear type, species, weather and season. For the inshore pelagic fishery, the year went like this: Jan-April moderate seas and catches small; May-Sept huge waves, can hardly fish at all; October-December seas calm, catches large. On a good trip, a small-scale net fisher working with several helpers could bring two to four baskets of fish to shore. Depending on the species and size, a basket could hold 50-150 fish. The catch was divided up according to long established tradition, with one third going to the owner of the boat and net, and two thirds going to the other crew of up to four fishers. If the fish was landed at Nolloth each man got his share of fresh fish. If landed elsewhere and sold, they split the money. The boat/gear

owner covered any expenses (gas for the motor, repairs). His profit was in the order of 30,000-50,000 Rp per fishing trip (12-20 USD, early 1997 rate).

Costs for net fishers rose dramatically in the late 1990s. The price of some types of netting, nylon line and buoys increased two to five-fold. Nets can last ten years but must be repaired three to four times a year. Before the currency crisis pushed prices up in 1998, a longboat suitable for net fishing cost 5.5 million Rp (± 2200 USD) and a motor 1.3 million Rp (± 520 USD).

In spite of the increased difficulty in catching fish, most fishers saw no reason for concern. The trend in fishing was still towards intensification and fishing techniques increased both in number and in effectiveness (smaller mesh sizes, change to nylon nets). Rather than limiting their fishing, fishers competed over the fish and had a wish to have faster boats. The younger generation was still optimistic and interested to take up fishing. They explained that they would fish using the same techniques as used by older people from whom they learned it, but 'with some improvements towards the modern methods.'

### 5.1.6 Large-scale commercial fishers

In 1997, there were seven large-scale, motorized pole and line boats operating out of Nolloth. Each boat employed 25-30 local fishers who learned 'on the job'. Their income was significantly higher than that of the artisanal fishers who, with their small outrigger boats, would get at most 20 kg/day. Just one of the boats was owned by a family from Nolloth; the others were owned by Ambonese and Tulehu businessmen who had been active in the area since the 1980s. According to the village head, the commercial fishers preferred to operate from Nolloth because these crews were skilled and honest. The boats spent Saturday night and Sunday in Nolloth. On Sunday night they would leave again to pick up baitfish in Pia or Tuhaha, or buy them directly from the lift nets and seiners near Ambon or another island.

The economic benefits from the large-scale pole and line fishery were significant. The village did not collect any formal fees from the boats, but accepted 'voluntary' contributions. The boat owner gave one share of the total catch to the church in Nolloth, half a share to local widows and orphans, and half a share to the village government and others who had been helpful. The total added up to Rp 50,000-200,000 a month (20-80 USD, early 1997 exchange rate). All in all, the fishery brought in about Rp 50 million a month (± 20,000 USD), including the wages for about 150 fishers who worked on the boats.

## 5.2 Attributes of the community and fishers

As of 1997, the middle-sized village of Nolloth had 2546 inhabitants divided over 530 households. The average household size was about 5 persons. The village was 100% Christian with no recent history of in or out-migration. There was no tourism; the visitors that did arrive usually visited relatives or came to observe the *sasi* rituals.

Village facilities included electricity, three elementary schools, two gas stations, a food market, a drug store, and a banking service from the KUD. Many residents had a television. The village also had an open storm drain system and there were both private and community wells with some water being brought in from a spring in Itawaka. Additional water-wells were being developed. The nearest health centre was in Ihamahu, a neighbouring village within walking distance.

Transportation to the village was good. The village had hard top roads and there were frequent public minibuses connecting Nolloth with Saparua Kota, the largest town centre on the island. Also speedboats took passengers and trade goods directly from Nolloth to the urban centers of Ambon, and to Masohi on Seram. Communication links were limited to a radio connection and there was no telephone.

### 5.2.1 Employment

The village depended mainly on agriculture and fisheries. Fishing was a full-time job for 40% of the villagers while another 30% fished part-time. There had been a slight shift from farming to fishing due to increased revenues from fishing (higher fish prices).

From 1979 to 1997, the number of small shopkeepers had increased to 18. There were a few artisans who made furniture and several who worked in housing construction. As a result of the new government structure, the number of government employees had tripled from 16 to 44 persons.

### 5.2.2 Village government

According to the village head, three main political bodies reigned the village: the village head himself, the village officials and the co-operative (KUD) of which the manager was an important *adat* leader – the *tuan negeri*. In Nolloth, the church minister was also a noted person. Among these authorities there was close collaboration concerning village matters and they were mutually supportive.

**TABLE 5.1 – Village leaders up to 1998**

| Village leaders in Nolloth | |
|---|---|
| 1995 – | Pieter Huliselan |
| 1987 – 1995 | Arnold Matatula |
| 1979 – 1987 | Abner Selano |
| 1971 – 1979 | Niclas Matatula |
| no date | Jonatan Selano |
| no date | Yusuf Huliselan |

In Nolloth there was a large overlap between traditional and modern village institutions. The LMD consisted mainly of clan leaders (*kepala soas*) from the former *saniri negeri*. After the installation of the formal village structure in 1979, it became possible to elect a village head not from the *raja* clan. This sometimes led to problems. For example, in 1987 Arnold Matatula became the new village head (Table 5.1). He was also the treasurer and when problems arose with village finances, he lost people's trust. Therefore, people were glad that in November 1995, Pieter Huliselan returned from Ambon to become the new village head. Being from the *raja* clan he had a legitimate claim on this position. Yet, after his 'election' he did not automatically have the traditional authority connected with *adat*. To also acknowledge him as the *kepala adat* (head of the *adat*), the *tuan negeri* of the village had to perform

**FIGURE 5.2 – The mother of the village headman Oma Huliselan with Semmy Littik of the research team**

a traditional ceremony. Because of his high legitimacy, Huliselan had a very strong position in the village.

### 5.2.3 Village finances

The village was financially supported through a national government program administered by the sub-district office (*Kecamatan*). After submission of an annual proposal, the village would get a Rp 6.5 million grant (± 2600 USD, early 1997 exchange rate). One part of the grant was given to the PKK (women's group), a second part was reserved for additional livelihood projects, but the largest share was used for village development such as a fresh water supply, the rehabilitation of the village market and renovation of the village museum. The schools were supported mostly by community effort. The village economy received additional support from relatives who lived elsewhere (e.g. the Netherlands) and from renting out marine resource harvesting rights (*sasi*).

### 5.2.4 Village organisations

In Nolloth the usual village organisations were installed and to a more or less extent active. In 1997, the PKK was awaiting the arrival of village head's wife before they would start any activities. The church organisations were also in place, but the *Pelwata* was only attended by a small number of women because the program did not meet the needs of ordinary women (who were also too busy to attend). As with the PKK, the women were not actively recruited and most village women did not know what the organisations actually did, so interest to join was low. On the other hand, the youth organisation of the church was relatively well attended and active in the village, e.g. cleaning up, helping the *kewang* etc. All organisations were quite conscientious in carrying out their programs.

Some women organized themselves in the ARISAN saving-group which was said to act independently from the village government. Savings were used for small-scale trade (bread, sago) or to buy food. The 22 members of another saving group, TAKESRA, were saving Rp 1000 monthly to gain capital for a kiosk or sago trade. The village had an IDT program and from 1996-1997 about 60 people had benefited from this project that granted subsidies to, amongst others, process and sell sago. Compared to the PKK and church organisations, the ARISAN, TAKESRA and IDT groups were more relevant to the poorer villagers because they provided economic benefits.

The village cooperative (KUD) in Nolloth was a*Manderinti* (highest level) and primarily occupied with the clove and nutmeg trade. Roughly a third of the adults in the village were members. They got a monthly payment from the KUD and a yearly bonus. The amount depended on the profitability of KUD enterprises (several shops and a speedboat). The annual turnover was Rp 70

million per year (± 30,000 USD, 1996 rate). Of this, the KUD donated Rp 1 to 2 million yearly to the church and the village government.

### 5.2.5 Role of women

Some women were working in the village organisations, often as treasurer or in other 'female related tasks', but they were not found in the LMD or LKMD. So, despite their active role in income generating activities, women were excluded from most village affairs: 10% of our survey respondents considered women to be completely outside of decision-making processes. Women's public activities in the village were usually related to what they do in the household, i.e. they provided the refreshments at village meetings and traditional ceremonies. Women expressed reluctance to take concerns directly to village leaders. They would be more inclined to deal with their clan leader or try to approach government through the PKK or the village head's wife.

Many women were involved in cottage-scale businesses related to food processing (sago,[1] bread, smoked fish) and the trade of fish and agricultural products. In the 1990s, when the clove monopoly caused a severe reduction in income from cloves, pressure on marine resources and the number of women involved in fish trading [2] increased tremendously. The women also harvested shellfish, small fish, and octopus from intertidal and shallow inshore waters. This was strictly a food fishery. The shellfishery intensified over the years and for the women it was becoming harder to find large shellfish as well as certain species.

The women were worried about the decline in marine resources because they depended on shellfish for food, and on the fishery for household income. To the women, *sasi* – just like most village matter – was a 'government affair'. They had no voice in decision-making around *sasi*, nor did they attend the *sasi* rituals. Women interviewed did express the need to be involved in decision-making around marine resource management. Yet, they thought that since their fishery was for food and not profit, the men in charge would not take their concerns seriously.

### 5.2.6 Fisher profile

Of the 30 fishers surveyed, 93% were born in Nolloth and the same percentage had only elementary education. On average fishers in the sample were 47 years old. The respondents had an average of 6.6 household members, i.e. more than the overall village average. No women were interviewed.

1 The sago processed in Nolloth is imported from Seram, and the end product is sold in Ambon.
2 The women involved in the fish trade are usually those living next to the shore in Nolloth and Itawaka where fish are landed.

On an average, fishers had been active in this profession for 27 years. They generally spent more than 8 hours per day at sea (most common was 7-10 hrs daily), which was second highest from our sample villages. The fishers expressed great personal satisfaction in their chosen career, but only 18% (still twice as high as the other villages) wanted their children to become fishers. Most (61%) wanted them to be government staff. Only three of our respondents belonged to a fishers' group and membership in other village organisations was also low. All of them said that *sasi* was very important.

The principal part of their income (81%) was from fishing. Other income came from land crops (peanuts, coconuts, spices etc.). About a third (27%) had income that was sent from a distant family member. Children who left Nolloth to find work elsewhere would often provide the family with an external income of on average Rp 264,000 per year (105 USD, early 1997 rate).

The economic indicator of the fishers sample was made up of adding scores for land ownership, boat ownership, type of house and fishing gear. Most fishers (83%) were landowners and almost half (47%) had permanent housing (cement with zinc roof). For Nolloth the average economic score was 8.1 (with a standard error of 0.35), which was in the lower third of the 27 villages investigated. When TV ownership was factored in, the economic score became 8.5 – the lowest of the case-study villages (see Appendix 3 in Novaczek *et al.* 2001).

## 5.3 Market attributes

Most artisanal fishers in Nolloth sold their catches directly to consumers or to small traders; a few (17% of sample) dealt with wholesalers. Most fishers (97%) said it was them or their wives who set the sale price. The majority (70%) sold their fish in Nolloth or elsewhere on Saparua Island (17%). The key factor in choosing point of sale was the price. Prices varied, but in 1997, mid-sized fish (*komu*, *lema*) would sell for 1000-2000 Rp each, while smaller species (sardines) could fetch 250 Rp.

Compared to fishers in other case study villages, Nolloth fishers sold a relatively high percentage of their catch; only 13% was used for family consumption. Eight fishers said they did not eat any of the fish they caught, and none ate more than half of their catch. The shellfish and fish gathered by women, in contrast, were not sold but used for family consumption.

The small-scale fish trade was mainly in hands of village women, called *papalele*, many of whom were wives of fishermen. The female fish vendors bought and sold all kinds and sizes of fish, both in fresh and smoked form. Post harvest processing of fish was limited to smoking. None of the vendors

had access to ice. The price of fish depended on various factors: weather conditions, the amount of fish in the market, the size of the trader network, and the auction price of fish set by the fish brokers who handled the commercial catches. The profit of the retailer could approach 150-200%.

The fish vendors sold mostly in the local village market or in other villages on Saparua Island, including Saparua town. The remainder ended up in urban centres like Masohi, Tulehu and Ambon city. Fish were taken to the market using public transportation. The women never travelled to or from a market empty handed and often dealt in sago and vegetables as well as fish. Fish that could not be sold fresh before noon that day was smoked and either went into the stock needed for a long distance trading trip or was peddled door-to-door in the village in the late afternoon.

Compared to the other case study villages on Saparua and Haruku, the wide range of markets enjoyed by Nolloth traders was exceptional. The fish vendors used their long experience and a strategy of flexibility to find the best place to sell fish for the best price. They gathered information on city market prices from bus and speedboat drivers and from people freshly arrived home from the city. The ones that chose a district or provincial market for their sales did this because: 1) the price was higher than on the local markets, 2) they were easily accessible, and 3) they could sell fish together with other commodities.

### 5.3.1 Commercial large-scale fish trade

Financial control over the pole and line fish trade was mainly in the hands of Chinese Indonesians. The pole and line boats typically went out twice a week on 3-day trips, unloading fish at cold stores in Tulehu and Masohi.

The pole and line boats targeted pelagic fish, especially skipjack. Fishing took place throughout central and northern Maluku. Prices of fish were increasing: in February 1998 the price given to Nolloth fishers for export quality fish almost doubled. These trends were directly related to the availability of fish and to market structures. More details on the commercial fishery and on the commercial fish trade can be found in Chapter 5 of Novaczek *et al.* (2001).

### 5.3.2 Trade in top shell and sea cucumber

Under village head Huliselan, there was a harvest of sea cucumbers and top shells from the *sasi* area every two years. There was a large market demand for sea cucumbers by Chinese traders as well as by Butonese and Javanese fishers who travelled around the Maluku seas. The KUD, which paid for the harvesting rights, sold both sea cucumbers and top shells to Chinese-Indonesian traders in Ambon.

*Trochus niloticus* is a protected species under national law and trade in top shells is therefore illegal. As a result, all shells must be sold to certain traders who have government permits to handle cultivated top shells and use this as a cover for trading wild shells. The profits enjoyed by those in control of this trade monopoly are significant (see also Zerner and Thorburn, *forthcoming*). On the international market the price is paid in US dollars. The traders however, paid the villagers in Indonesian rupiahs and so benefited from the plunging exchange rates. Profits at the village level were therefore far below what they could have been if the controlled harvest of top shells in *sasi* areas had been legal and villagers had direct access to the foreign market.

## 5.4 *Sasi* institutional and organisational arrangements

Nolloth was one of the villages where *sasi* was still strong. Here, the practice of *sasi* dates back at least to the colonial period (Huliselan 1996,*pers. comm.*). The two main objectives of *sasi* were said to be protection of the harvest and theft control. *Sasi* rules in Nolloth, whether implemented by *kewang*, church or the village government, are based on*adat* or customary law. In the absence of a formal and legal mandate to manage the marine village territory, *adat* provides village authorities with the legitimacy to undertake resource management and collect resource rents, both within and outside of*sasi* (Hualopu 1991). The *adat* rules are in effect the constitutional rules of the *sasi* institution. Under *adat* law, the rights, authority and obligations of the *kewang* are defined, as well as the boundaries of the village territory and the marine *sasi* area. The rights of villagers to enter common property areas and utilize natural resources are recognized and supported. Some of these *de facto* rules and customs were written down, while others were not like the decision-making process (see for Nolloth *sasi* rules Appendix 6, in Novaczek *et al.* 2001).

In Nolloth, the traditional *sasi* institution (*sasi adat*) was complemented with a type of *sasi* controlled by the church (*sasi gereja*) that was applied on coconuts. These arrangements too were not written down.

On land, *sasi* defines what areas belong to which families and thus manages the resources as a private property system under constitutional rules. The sea, on the other hand, by its nature is seen as a common property resource with defined access rights in the *sasi* area. Within the village territory, local residents and their non-resident children have rights of access and withdrawal for all living marine resources except those under *sasi* or other village regulation (see Table 5.2). *Adat* allows *sasi* authorities (the *kewang* and village government) to exclude outsiders from fishing in the village territory, or at least require that they ask permission and/or pay for access rights.

Collective-choice rules under *sasi* concern what types of activities may be controlled in the village, define a process and confer authority on certain leaders to resolve land and resource disputes. These rules also define the structure of marine *sasi* as an institution that regulates access and withdrawal rights in the marine *sasi* area. Examples of collective-choice rules are that the responsibility for patrolling the *sasi* area lies with the *kewang*, or that sanctions for stealing *sasi* resources are applied by the village head and the police.

**TABLE 5.2 – Products whose harvest times are determined under land sasi**

| **Land sasi operational rules** |
|---|
| During closed *sasi* it is prohibited to:<br>• Harvest coconuts ( *kelapa*), pineapple, mango, durian, jackfruit, banana, nutmeg, areca nuts, and kanari nuts;<br>• Cut sugar palm, and to cut sago leaves for roof construction; and<br>• Cut fruit trees and harvest young fruits. |

Various sets of operational *sasi* regulations control the harvest of certain commercially important marine resources and terrestrial crops. These operational *sasi* rules were written down.

**TABLE 5.3 – Operational rules on marine products**

| **Marine sasi operational rules** |
|---|
| During closed *sasi* it is prohibited to:<br>• Harvest sea cucumber, top shell ( *Trochus niloticus*), *Turbo* spp, and *caping-caping* shells in the *sasi* area;<br>• Swim in the *sasi* area (except when given permission);<br>• Use gillnets and poisons in the *sasi* area at any time; and<br>• Take sand, coral and rocks (except when given permission). |
| **Non-sasi fisheries rules in the village territory** |
| • Outsiders (non-residents) must have permission to fish in the village territory.<br>• The harvest of sea cucumbers and top shells outside the *sasi* area is regulated.<br>• Gillnets can be used only with a permit from the village head.<br>• Blast-fishing and the use of poisons is prohibited in the village territory. |

Some rules were rather specific: The harvest of coral and large rocks was limited to what is needed to build a house, with a maximum of $2m^3$ per person. However, even though most people knew that these rules existed, there was confusion over exactly where the rules were applicable. Some rules were embedded in formal government rules. For example, for larger amounts of coral, according to the village government, a permit from the sub-district level was required. However, when asked about coral harvesting, the sub-district office declared that they would never grant a permit because officially it was prohibited to harvest any coral at all (!).

In other cases the operational rules could be overruled by the village head, who has the authority to make decisions based on constitutional rules (*adat*). In emergencies, when individuals asked to open *sasi* on their own land, permission was usually granted to harvest some products. For marine *sasi*, a communal resource, individuals could not be granted access rights. However, in exceptional cases the prohibitions on diving and harvesting were lifted. Two occasions may illustrate this. First, in 1997, a research team from the Department of Fisheries in Jakarta was allowed to harvest top shells for an aquaculture project. Later, an ICLARM-Hualopu research team was allowed to enter the *sasi* area to carry out a biological survey. However, this was only possible under the supervision of the *kewang* and after permission from the village head.

In addition to the official *sasi* area, a part of the village marine territory north of Umisini (Figure 5.1) was also managed for top shells and sea cucumber. The ban on net fishing, diving and swimming was not exercised here. After the *sasi* harvest was complete and if the KUD had agreed to it, Butonese or Madurese divers were usually permitted to enter after having paid a fee to the village head.

Aside from the *sasi* rules, other formal operational rules existed. Gill net fishing, for example, was allowed only after explicit permission from the village head and the payment of a Rp 100,000 fee. Blast fishing and the use of poisons were banned. These regulations were applied to all villagers and outsiders.

### 5.4.1 Marine *sasi*: the players

Decision-making was carried out by those who according to *adat* had the mandate to do this i.e. the *raja* (who was also village head), the *tuan negeri* (who also happened to be the head of the KUD) and the *kewang*. Marine *sasi* was operationalised by the *kewang* in close collaboration with the village government. Both the *kewang* and the government were recognized by villagers as fundamentally *adat*-based organisations.

Because marine *sasi* in Nolloth had evolved into an institution for collecting resource rents for the village government, it was the village head who held the key decision-making role. Although he conferred with other authorities, it was really he who decided when and how often the *sasi* area would be opened. Also, if thieves were apprehended it was the village head who imposed and collected the fine and who decided whether to turn the offender over to the police.

The *kewang*'s main role was to patrol the area but they did not have the mandate to punish offenders (see below). The *kewang* also monitored the size of the shellfish and sea cucumbers in the *sasi* area. When the products under *sasi* were big enough to be harvested, the *kewang* members informed the

head of the *kewang* who reported to the village head. In a meeting with the harvesters (in this case the KUD), the traditional authorities, and the church minister, a date was set to open the season.

Although the church played a part in land *sasi* and prayers accompanied marine *sasi* ceremonies, the minister was not among the decision-makers or enforcers for marine *sasi*. As villagers explained, fish is too important to be under church *sasi* because an infringement of the rules would be punished by God and this would be too hard on people who are dependent on fish for food.

The KUD had no decision-making role, but had an economic interest, especially when it organized the harvest and division of the catch. The KUD officials and the members (to a lesser extent) shared in the catch/revenues. The common villagers played no active role in *sasi* and were merely recipients of the indirect benefits derived from *sasi*.

*Sasi* was clearly a village-based institution. Outside organisations were not involved in *sasi* or decision-making. The police only interfered on request of the village head.

### 5.4.2 Ceremonies for marine *sasi*

The decision to close *sasi* was made by the village head and the head of the *kewang*. To close *sasi*, the *kewang* gathered in the house of the *pakter* (*kewang* leader), then they went to the village head's house and from there to the *Baileo* or community house. At each street corner, a *kewang* member blew the sea-shell, while the head of the *kewang* announced the *sasi* regulations (specific products and places). After the*sasi* signs (palm fronds tied to a stick) were put up, the ceremony was proclaimed over and *sasi* was closed.

When *sasi* was opened, there was a communal prayer in the office of the village government where they awaited the arrival of the attendants for '*buka sasi*'. The real ceremony to open marine *sasi* took place at the sea-shore near the *sasi* area. With the village officials and *kewang* in attendance, the *tuan negeri* made a speech explaining how important *sasi* is and how the *kewang* are responsible for guarding the area. This was followed by a prayer by the minister. All the players (village government, traditional and religious leaders, and the *kewang*) then went out to sea, where the minister prayed again for a rich harvest. The village head uttered an invocation in the traditional language and then sprinkled fresh water over the sea as a symbolic gesture. *Sasi* was declared open. Skin-divers, hired through the village cooperative, harvested at least three top shells and there was a break during which everyone rested and ate a traditional feast (*patita*) provided by whomever had won the auction for harvest rights. Then the divers continued their work (see Figure 5.3-5.14).


**FIGURE 5.3 – Traditional authorities and kewang members go to the *sasi* area for the opening ritual**

**FIGURE 5.4 – People arrive at the *sasi* area (see fig. 5.1 for situation)**

**FIGURE 5.5 – People gather on the beach**

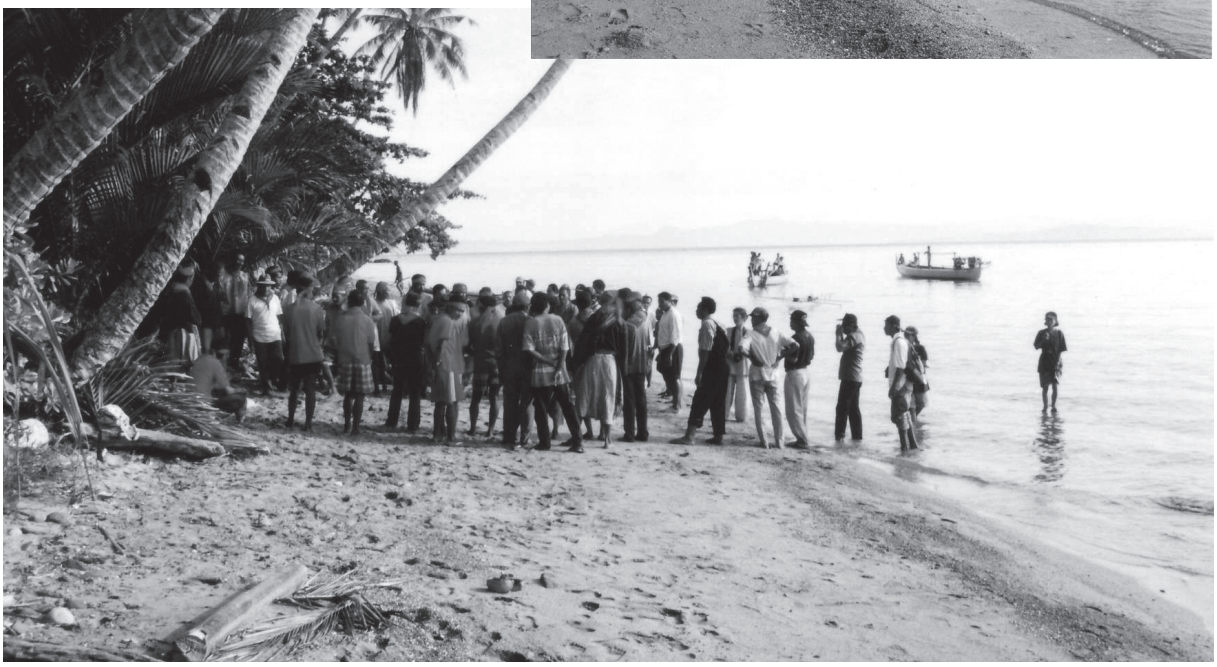

**FIGURE 5.6 – Kewang members await the ritual**

**FIGURE 5.7 – The traditional authorities pronounce the opening of *sasi***

**FIGURE 5.8 – Then there are prayers**

**FIGURE 5.9 – The village head utters ceremonial words and sprinkles water over the sea**

**FIGURE 5.10 – The first diver enters the water and comes up with the first Trochus shell**

**FIGURE 5.11 – Then other divers may enter the water**

**FIGURE 5.12 – Processing of the Trochus shells**

**FIGURE 5.13 – People gather on the beach where the food is prepared**


**FIGURE 5.14 – The ritual ends with a feast**

### 5.4.3 The harvest

In the past, *sasi* on top shells was opened every three years and all villagers who wanted to could participate in the harvest. Top shell was valued as a food source. In the late 1960s, top shells became a commercially interesting commodity and in 1968, the harvest was brought under government control. Later, in 1978, the village government, with consent of the people, decided to sell the right to the *sasi* harvest to outsiders in order support the village administration. The result was that common villagers saw their rights of access and extraction being exchanged for a system where they would get only indirect benefits.

Profits from top shell and sea cucumber can be attractive. However, during the 1980s, a former village head opened*sasi* every six months. The result was that the harvest dropped dramatically from 1200 kg in 1988, to only 50 kg in 1994 (Evans *et al*.1997). In 1995, with the new village head Huliselan, they went back to a longer closed season (appr. 2 years). *Sasi* was closed throughout 1995 and opened near the end of 1996 and again in January 1998.

Formerly, the right to harvest in the *sasi* area was sold to the highest bidder. This could be an outsider (e.g. Chinese traders from Ambon) or a local who hired clan-members and friends to dive for the top shells. It also happened that a villager was 'sponsored' by a Chinese trader to buy the rights. Common villagers without connections were excluded from the harvest. However, resistance against this style of business grew and the villagers objected to the sale of harvest rights to outsiders. To have more control over the harvest and more benefits for the villagers, in 1995 after his installation, village head Huliselan decided to arrange the harvest and sale of top shell through the village cooperative (KUD).

The harvesting was done by selected KUD members (skin divers). In 1998, they received Rp 5000 per kg of shells, which is about third of the final sale price. Once the harvesters and other expenses had been paid, the profits were split evenly between the village government and the KUD. The village head then contributed a part to the church and the *kewang*. The money for the village treasury was meant to redistribute the benefits to the village population in the form of development projects.

The total revenues from marine *sasi* can be considerable. The price per kilo (3-5 large shells) in 1996 was Rp 14,000 (6 USD, 1996 rate) and in 1997 Rp17,000 (7 USD, early 1997 rate). Before the currency crisis, that meant that a 1000 kg harvest could yield about Rp 14 million or up to 6000 USD gross returns. In January 1998, *sasi* was officially opened again. The total catch of 460 kg of top shells and 67 kg of sea cucumber was larger than in former years, but lower than expected. Previously, the divers had reckoned that a harvest of over a 1000 kg was feasible, but when they entered the shal-

lows, most of the large shells were gone. Villagers believe the top shells were probably stolen during the Christmas activities in the village. The catch was sold for Rp 19,500/kg for the high quality shells (300kg) and Rp 9,500/kg for the rest. The total yield was approximately 7.3 million Rupiah, which was with the 1998 exchange rate only 730 USD.

Since trade in sea cucumber had proven lucrative as well, the village head was studying the feasibility of sea-cucumber culture at Tinauw in the *sasi* area. The villagers were planning to have a holding area of stakes, planks and nets, feed the young ones with mangrove leaves and harvest every six months.

### 5.4.4 Enforcement

Enforcement of *sasi* on land crops has traditionally been in hands of the *kewang*. Traditionally, Nolloth had two *kewangs* (one from each clan group). Each had a leader – or head of the *kewang* – and both were under the authority of a man called the *pakter*. The 40 *kewang* members were selected from particular families. The *kewang* had one secretary, one treasurer, and two *marinyo* (news-bearers).

When informed of an offence, the *kewang* would immediately go and try to make an arrest. They tried to be fair in their approach and not cause bad feelings (and so maintain their legitimate position). When a thief was caught, the fine money went to the *kewang*. Every villager was obliged to report *sasi* violations to the elders or the *kewang*. However, cases that concerned family and friends were complicated matters and often went unreported. Villagers themselves played no role in enforcement.

Where there was a difficult problem with a persistent violator of land *sasi*, the *kewang* would ask the village head to help with enforcement or punishment. In the past, people were publicly sentenced and would serve as an example. For instance, they could be made to wear a sign around their neck that said 'Do not do what I did'. Later, offenders could be forced to work in the village (road construction, cleaning of the village) or would face corporal punishment at the hands of the village head. Serious offenders and especially outsiders were not prosecuted locally, but reported to the police in Saparua Kota.

The marine *sasi* area was guarded by the *kewang* members who stayed in their two guardhouses. They took turns in guarding the area. Armed with knives and bamboo sticks they patrolled along the beach. However, the *kewang* lacked equipment such as motorboats, communication devices and modern weapons. Also, the remoteness of the *sasi* area made it hard to control. In the case of thefts of top shells from the *sasi* area, the village head imposed large cash fines directly. Since the proceeds of *sasi* went to the village, the village head felt this was his responsibility although it was the *kewang* who guarded

the area. Just before the time of our study, Butonese intruders were caught in the marine *sasi* area and punished to serve as an example.

Enforcement based on *adat* was supplemented by the power of the church. The role of the church was mainly to perform the prayers for *sasi* to facilitate religious sanctions. In the past, thieves have been known to give themselves up to the church when overcome with fear of spiritual sanctions.

Where, as in Nolloth, the village head plays a key role in enforcement of marine *sasi*, his legitimacy is crucial. If the person is not trustworthy or not from the royal clan (*raja*), his position as enforcer is weak. Such was the case with a former village head. During his term, intrusion into the *sasi* area was more common than was the case under Huliselan. This was in part because he himself neglected the rules. When he opened *sasi* too often, depleting the resource for what appeared to be personal gain, he undermined the *kewang* and, thus, *sasi*. However, before *sasi* could collapse, this leader was replaced by Huliselan, a *raja* who had a strong position in the village and was very strict. His legitimacy allowed him to enforce the regulations and he passed the news to neighbouring villages that he was determined to deal with offenders vigorously.

### 5.4.5 Compliance

Every month the *kewang* caught one or two locals who were stealing coconuts from the village gardens. These were usually poorer villagers or people that indulged in greed. As income was said to depend for a large part on the personal efforts of people, those who steal were usually considered 'just lazy'. Thefts from the marine *sasi* area also occurred. Within six months there had been two cases of intercepted thefts of top shells from the *sasi* area by outsiders (none by Nolloth villagers). In addition, there was the unconfirmed suspicion of a major theft of top shells over the Christmas holidays of 1997, just before *sasi* was opened. It is likely that such thefts were most common in the six months leading up to a harvest, when the top shells were relatively large and plentiful.

### 5.4.6 Significance of sasi and local knowledge

At the time of our study, the *sasi* knowledge base shared by the head of the *kewang* and village elders was still strong. Common villagers had general knowledge of *sasi* and conformed to the regulations, but detailed knowledge was exclusive to *adat* elders. Village head Huliselan, who grew up in Ambon, was initiated into the *sasi* rituals by his predecessor and the head of the *kewang*. The latter shared only such knowledge as was appropriate. He was very careful to guard his knowledge because it was sacred. At the same time, the head of the *kewang* and other village elders expressed concern that they would not live long enough to pass on the knowledge to suitable descendents. The son of the head of the *kewang*, for instance, seemed not interested in the in-

formation and thus was not ready to receive it. To keep the tradition alive, it is essential that knowledge is passed on to the younger generation.

Most villagers had little practical knowledge about *sasi*. To them, *sasi* was part of the tradition and people just 'did what the ancestors did.' What was clear to them though, is that *sasi* did have certain benefits. For example, it was mentioned that *sasi* protected the reef from being damaged by blast fishing and nets. Otniel Patty, a Nolloth fisherman explained: '*Sasi* helps to protect the area from people' and 'to keep the fish big and many'. Most villagers and all fishers interviewed agreed that *sasi* was important because it prevented people from stealing or destroying the resources. *Sasi* thus not only ensured that the products were ripe when harvested, but also that the yield was maximal. This worked for forest products and certain marine products, but was not applied to fish because 'people have to live' and a prohibition on catching fish would have been unacceptable (Otniel Patty, *pers. comm.*). In the sea, conservation in the form of *sasi* regulations was only applied on resources that were *not* essential for people's livelihood and that had a considerable market value, i.e. top shells and sea cucumbers.

To most women, marine *sasi* was less relevant than land *sasi*. The women gathered shells in the *sasi* area but there were no *sasi* rules that directly applied to the species that they harvested. Apart from the share of the top shell yield, which they got if they were KUD members, the women, since they could not work as harvesters, got no direct benefits from marine *sasi*.

From our interviews it appeared that younger respondents generally valued *sasi* and they believed that traditional village leaders should protect it. They explained that as long as the relationship between the village government and the people is good, and as long as everybody collaborates in the management and implementation of *sasi*, it would be continued. However, to keep young people involved in *sasi*, it is necessary that they understand the purpose of *sasi* and get benefits from it.

## 5.5 External institutional and organisational arrangements

The external institutional and organisational arrangements are the linkages between the village (government) and outside political organisations or government structures, and other external agencies.

### 5.5.1 Link with higher government bodies

The link with external government agencies was tenuous. Apart from the family visits from a sub-district representative, government officials were rarely encountered in the village. Neither have there been any meetings nor workshops related to marine resource management organized by higher gov-

ernment levels. The village head was meeting every three months in Saparua Kota with other village authorities to exchange information. Fisheries issues however were not discussed here. Fisheries regulations were not high priority in the village; people were more concerned about developing the fishery. Besides, there was no government assistance for monitoring and there was no patrol boat for enforcement. For the village head, the most reliable sources of information on fisheries regulations besides the radio and TV, were the Ambon-based NGO Yayasan Hualopu and friends in the university.

### 5.5.2 Links between the community and government fisheries management

The regional Fisheries Agency ( *Dinas Perikanan Tingkat II Maluku Tengah* ) was involved only in licensing the pole and line boats, which were licensed for two years at a time. The fisheries officers dealt only with the boat owners. They had no contact with the crew and did not give out information to them or make inquiries concerning the fishery.

### 5.5.3 Collaboration with other institutions

Yayasan Hualopu has carried out an extension program in Nolloth that aimed to inform people on customary laws and sustainable resource use. They also assisted with the evaluation of management activities. Before, information on marine issues and on marketing possibilities of other marine products was provided through their publication 'Marinyo'.

### 5.5.4 External economic influences

The decline in clove prices in the 1990s had a negative influence on the village economy. Consequently, fishery and the trade in top shell and sea cucumber became more important. When in February 1998 the governments' monopoly on clove was lifted, it initially had a positive impact on the clove price but later in the year this was nullified by low harvests due to a drought. In 1998, the monetary crisis played an important role of which, at the time of our research, the full effects were not yet known.

### 5.5.5 Infrastructure and development projects

There were no major constructions in or around the village. Within the village, there were small-scale development projects (infrastructure, small-enterprises). In the sea, there were plans to establish sea cucumber aquaculture.

## 5.6 Incentives to cooperate

The keys to resource management were enforcement of and compliance with fisheries rules and regulations. However, various contextual variables affected the individual's inclination to participate in and be governed by *sasi*.

### 5.6.1 Spiritual significance of sasi

Compliance and legitimacy were closely related to respect for the ancestral spirits and God. People in Nolloth believed that neglecting traditional rules or pledges resulted in illness or even death. Ceremonies were essential to win the ancestor's approval and to keep harmony, and they needed to be carried out in the proper, prescribed way and by the appropriate people. Fear and respect for the ancestor's powers therefore were profound. *Sasi* is something from the ancestors, it needs to be followed.' (Otniel Patty, *pers. comm.*).

### 5.6.2 Legitimacy

The *sasi* rules in Nolloth were the result of a collective process nested in *adat* and therefore highly legitimate. *Adat,* the traditional customary law, provided the constitutional basis of *sasi* as an institution. The village officials explained: '*Adat* is important, and *adat* cannot be changed. People acknowledge *adat* and this is their incentive to accept the rules and regulations that come with it.'

The overlap between formal and traditional village authorities in Nolloth was very high compared to other villages. The village government was therefore seen to be highly legitimate. The legitimacy conferred upon the village head through his association with *sasi* and *adat* was an incentive for him to support and participate in *sasi*.

*Sasi* could and did evolve through time, as seen in Nolloth. With the increasing involvement of the church, the *sasi* institution became both more complex and even more legitimate in the eyes of the people. On the other hand, the minister also came to share the legitimacy and respect of *adat* through his association with *sasi*.

### 5.6.3 Status

There was no clear answer to the question why Nolloth still had *sasi* while it had been lost in many other villages. But although the villagers could not give an explanation for the strength of *sasi*, they felt it was important to have *sasi*. They were proud to be a *sasi* village and not in the least because of the attention of researchers, NGOs, and tourists that are attracted to the village. This pride and status accrued to all the (traditional) village officials and *kewang* members.

### 5.6.4 Economic benefits

Village leaders made decisions concerning the harvest and sale of *sasi* resources: a position that was not only prestigious, but also allowed them certain power and economic benefits. The *kewang* members earned little in the way of economic benefits, but for them the status made up for their efforts and the time they had spent guarding the *sasi* area and village.

Whereas land *sasi* benefited the individual landowners because they could keep their harvest, the profits from marine *sasi* were for the whole community and disappeared into the village treasury. The KUD, harvesters, the *kewang* and church got direct shares, but the other villagers only benefited indirectly (through village development). The money was spent at the discretion of the village government and the villagers had neither knowledge of nor control over the expenditures. However, because the village head was well respected people did not complain about the lack of transparency. Like most Mollucan villagers, Nolloth people believed that their leaders would act for the common good. This belief was an incentive to cooperate.

Most fishers interviewed, however, thought that the people should benefit from *sasi* directly. They argued that the revenues from *sasi* ought to be shared among those who are excluded from the fishery. Several respondents (Catharina Huliselan, Frederik Matatula, Augustina Lohenapessy) indicated that under the arrangement in place 'the rich benefited more than the poor.' From this it is clear that if the people do not feel they benefit, they will have less incentive to support *sasi*.

In our survey of 30 fishers, the majority (53%) disagreed with the sale of resource harvest rights to outsiders. Therefore the move by the village head to sell the harvest rights to the local KUD rather than to outsiders was politically wise. At that moment, the enforcement of *sasi* regulations was strong and compliance was high. However, if in the future the people would not support *sasi* any longer because they perceive it to be too unfair, some might encroach the area as soon as the power of the *kewang* declines.

Individual incentives to comply with *sasi* rules depended on well-being, income, fish catches and agricultural yields, in relation to economic needs. These needs included food and housing, school fees for children's education and capital to invest in alternative, additional or improved livelihood activities. In the case of fishing, fishers saw the need for new boats, engines and modern fishing gear. At moments when these needs were difficult to meet (start of school, monetary crisis, etc.), the temptation to trespass the *sasi* area increased.

### 5.6.5 Sanctions

The sanctions and enforcement by the village head and *kewang* were an important incentive for people to comply. The *kewang* was impartial and vigorous in applying the rules, and therefore respected. The *kewang*'s authority and the fear of social or religious sanctions was amplified by the involvement of the church in *sasi*. 'Even if the *kewang* is strong, the people are very clever and escape. God however is everywhere, and the presence of the church helps the people to obey the rules' (Otniel Patty, *pers. comm.*).

### 5.6.6 Social Pressure

In a small village like Nolloth it is difficult to move unseen. The 40 *kewang* members lived all around the village, the government and church representatives kept an eye on their fellow villagers, and besides, there was peer group pressure from within the church organisations. It was thus hard to commit an offence without being spotted, and the social pressure to comply with the rules was likewise strong.

### 5.6.7 Conservation of scarce and valuable resources

Nolloth has valuable resources, i.e. top shell and sea cucumber, for which there was strong market demand. These initially provided the incentive to institutionalise and then strengthen marine *sasi* as a means of collecting resource rents. The continuing success of *sasi* in providing sustainable harvests in the face of virtual extinction of these resources in other areas was an incentive to maintain the institution. Nolloth people had already experienced the dramatic decline in harvests that follows when *sasi* is opened too often, as happened under the former village head in the 1980s. This experience has helped them appreciate the importance of careful management of the *sasi* area.

### 5.6.8 Acknowledgement of problems in the fishery

The acknowledgement of fisheries problems differed more between young and old people than between males and females. Over-fishing was a problem particularly mentioned by older fishers. Many younger fishers had limited knowledge of management issues and were not too concerned. This was also the case with women who had a strong idea that sea resources could not be depleted because they were a 'gift from God'. Therefore, although some people thought it was important to protect the resources, the idea that marine resources are infinite was still strong, and young men especially tended to think in terms of intensifying rather than managing the fishery.

### 5.6.9 Attitudes

Laziness and greed were often mentioned as a reason for people to non-comply. Most offences committed by young people involved theft of coconuts, simply because they were 'greedy'. Another reason for non-compliance was the tendency towards individualism as the result of modernization. Sever-

al respondents mentioned that people need education on natural resource management and must become aware of the fact that natural resources need to be protected. This was believed to be one way of increasing compliance.

## 5.7 Patterns of interaction

The history of *sasi* in Nolloth shows that the system is a common property regime of which the access rights and the rights of withdrawal have changed. In the late 1960s when top shells became a commercially interesting commodity, government officials realized that the *sasi* system offered an institutional and legal means to control the top shell harvest and its profits (Zerner 1995). In Nolloth in 1968, Mr. Matatula, the village-level government head issued a proclamation declaring the existence of *sasi* on top shells within community waters and asserted control over *sasi* on behalf of the local government (Matatula in Zerner 1995). Thus, from a common pool resource where, at set times, the whole community could harvest, the rights of extraction became limited to a defined group within the community (the divers appointed by the village cooperative).

The benefits were divided amongst the appointed harvesters, the KUD, and the village government. It was stressed that the benefits were for the community as a whole in the form of village development. The villagers thus benefited indirectly and some villagers benefited more than others (e.g. KUD members). Also, common villagers no longer had the rights of extraction or the rights of access. In theory, the resource was still managed as a common property, but as soon as the benefits flew to the village government, in practice, the property rights regime changed from communal property to private property. The benefits were for the community, but it was the village leader who made the decisions on how to spend the revenues for village development.

This is an important issue in the functioning of *sasi* and compliance to the *sasi* rules. In Nolloth, compliance to *sasi* and other fisheries rules depended for a large part on the position of the village leader. At first, when the former village head controlled the benefits from *sasi*, villagers complained and compliance was said to decline. However, before *sasi* could collapse, the new village head took his seat in the village government and based on his highly traditionally legitimate position and a strong *kewang* system, the *sasi* rules then were complied with.

Compliance, however, must also be seen in the light of marine resource use in general. The *sasi* area was only a small part of the total fishing area used by the fishers. Nolloth's artisanal fishers had always ventured far to sea in their small boats to catch skipjack, tuna and other pelagic species. This re-

duced pressure on the *sasi* area and also decreased any incentive to break *sasi* rules.

In the past (20 years ago and more) most fishers targeted reef fish within the village marine territory, and fish were both abundant and cheap. However, with the introduction of nylon gill nets, the area became too crowded with nets and fish were rapidly depleted. Fishers moved increasingly into the pelagic fishery. In response, the village government instituted rules to limit the use of gill nets on the inshore reef by imposing access fees. In this case, the rule was developed outside of *sasi* and applied to the entire village territory.

There was a general agreement, especially among village elders, that the depletion of the reef fish stocks was caused by over-fishing. People were becoming more environmentally aware and *sasi* was said to be important for protection of natural resources. Even so, management in the form of a closed area and regulated harvest was applied only to several sedentary species in the *sasi* area.

For the pelagic fishery, the village government followed the general policy set out by the national government – which was to try and further expand the fishery (Budiman 1982 and Hannig 1988 in Mantjoro 1996). Nolloth fishers were involved in government programs that supplied motorboats and larger nets with fine meshes. Although the village government saw the need to address the decline in the fishery, regulations limiting the number of fishers or types of gears allowed were not part of the strategy. The importance of fish as a primary source of income and food impelled the village government to opt for intensification instead of management. The results (higher yields) were 'promising'. At a meeting, the village officials explained: 'It has already become better since they became motorized and can go further to get the fish.' It thus is clear that compliance within a limited area – whether communal property or private property – is easy when there is a state governed 'open access' area where fishers have unlimited access.

## 5.8 Outcomes

### 5.8.1 Equity

*The role of fishers in management*
The role of fishers in management was seen as having improved compared to the past, but was expected to remain stable in the future (Table 5.4). Some fishers mentioned education as enabling them to partake in discussions. However, the hierarchical structure in the village kept fishers from direct involvement in decision-making and this was not likely to change in the short-term. Compared to the other villages, Nolloth had the smallest proportion of

fishers (33,3%) who actually wanted to change the fisheries rules. The majority (56,7%) agreed with the current regime.

When asked about power-sharing, 60% of fishers thought the government had most or total responsibility for fisheries management, 33% thought the people shared responsibility equally with the government, and the remaining 7% felt the community had more responsibility.

*Access to resources*
Fishers' individual access to fisheries resources had significantly declined and they expected more restrictions in future. The respondents explained that this was caused by the fact that there were more and more regulations and the requirement of permits. Over 50% of the fishers thought it was acceptable to ask for dispensation to enter the *sasi* area. This did not mean that it would be granted (because it would not), but reflected the fishers' wish to have flexibility in the application of rules.

*Distribution of means of production*
The distribution of means of production among Nolloth fishers was perceived to be much fairer compared to the past, and it was expected to improve further. Ownership of fishing gear was seen to be related to personal ambition and willingness to work. Therefore, fishers argued, everybody who wanted to could work for fishing gear etc. Besides, there were the government programs that included the fishers and helped them generate money.

*Income distribution*
When asked about the level of economic disparities between the villagers, fishers reported that conditions had remained the same. The village women distinguished three social classes: the rich, the medium (who were just able to send their children to school in Ambon), and the poor (who lived on a subsistence level). Social status was easily recognized in the housing situation of the villagers. Fishers appeared to be mostly in the middle and lower classes. Contact between the different classes seemed limited. One fisher mentioned that the drop in clove prices had positively influenced the level of economic disparities, because, although it had had a dramatic effect on Nolloth's economy, it had levelled out the incomes of people in the village. Increasing 'individualism' was mentioned as causing people to look only for their personal advancement, resulting in competition.

Although in the minds of fishers, *sasi* appeared to provide more benefits to the rich than to the poor, it was not identified as a factor contributing to economic disparity. This was probably because*sasi* applied to a limited area, and not to the larger fishery that supported most fishing families.

### 5.8.2 Efficiency

*Communal decision-making*
The degree to which fishers have been able to communally make decisions with regard to the fishery had decreased and future expectations were negative. Many fishers (77%) saw the style of decision-making in the village as being a process of common or majority agreement. The other fishers felt that the village head with village government staff made all the decisions. In fact, whether or not the people were involved in decision-making at all depended mainly on the village leader.

A number of factors may have had an effect on decision-making. It could have been that the introduction of modern fishing gears caused divisions among harvesters Also, some fishers had seen their access and harvest rights in the *sasi* area being decreased in favour of fishers who were members of the KUD. The introduction of national fisheries rules directed to the village from Jakarta possibly added to a feeling of alienation. Finally, the *soa* system, in which the community members were represented through their clan leader, had been replaced by the *dusun* system. This could have disrupted traditional decision-making units.

All in all, only 10% of the respondents felt that local groups had no role in decision-making at all. Most respondents (87%) said that outsiders had no influence in village decision-making, but all agreed that all stakeholders should be involved in decision-making.

*Ease of entry (costs)*
Entry into the fishery was perceived to be on average more difficult because of rising costs. Fishers expected costs to rise even more in the future. In Nolloth, fishing had become more expensive because people could not fish in the *sasi* area. They had to go further out to reach pelagic resources and had to buy new types of gear in order to have good catches. Increasing prices of fuel and the currency devaluation made fishing and the purchase of fishing gear and engines even more expensive.

*Control over access*
Government control over access to the fishery had increased was expected to become stronger in the future. This was especially the case where it concerned the enforcement of *sasi*. Over 50% of the fishers felt that they should be able to ask for and get harvesting rights in the closed *sasi* area if needed. Strikingly, relatively many fishers (43%) found it no problem to sell rights to outsiders. In contrast, our key informants had stated that fishers/villagers strongly objected to the sale of harvest rights to the Chinese because they wanted to keep the benefits for themselves.

*Compliance*
Compliance with fisheries rules as perceived by our respondents was said to be relatively high (score 7.47) and had not changed significantly over time. This was contrary to the fishers in the key informant interviews who stated that compliance had become better now that there was a new village head who was trustworthy. There were no changes in compliance to be expected in the future.

### 5.8.3 Social sustainability

*Family well-being*
Generally, family well-being was moderate compared to other villages and had remained stable over the years. No changes were expected in the future.

*Income*
The actual income of people had not changed dramatically, but individuals noted an up or downward change depending on whether they had seen their catches increase (fishers with modern gear) or decline (artisanal fishers).

*Tradition of collective action*
Most fishers perceived the tradition of collective action in Nolloth to be stable over time. Many fishers rated past performance very high (score 9-10). The comments that some fishers made about this question indicated a perception that people's interests were shifting towards individual profits due to economic pressures. Still, the church and the village government collaborated closely in organizing the villagers. The decision to sell the *sasi* harvest rights to the KUD instead of to outsiders was a good example of cooperation between the leading village institutions.

*Discussion of village issues*
Discussion of village issues was perceived as being relatively high (score 8). There were no significant changes over time. From the interviews it became clear that management problems of the fishery in the village area were not publicly discussed.

*Village harmony*
Village harmony was highest compared to other villages (score 6.20) and had not changed significantly over time. Conflicts generally arose over land, sago and cloves. Alcohol abuse was also mentioned. On the village level conflicts were more apparent, especially in cases where outsiders tried to illegally harvest *sasi* products. Others, however, had the opinion that conflicts in the community were less compared to the past. An important role was played by the village head, who was perceived as legitimate and trusted by the people. Also the harvest rights and boundaries of the *sasi* area were generally accepted.

**TABLE 6.4 – Results of performance analysis in Nolloth using chi square tests (average conditions) and paired t-tests (within group differences between past-present-future).**

| Indicator | Average condition in 1997-98 on scale of 1-10 | Average change through time (statistical significance) | | Average future expected change (statistical significance) | |
|---|---|---|---|---|---|
| ***Equity*** | | | | | |
| 1 Role of fishers in management | 7.63 | 1.2667** | +13% | 0.1000ns | +1% |
| 2 Access to marine resources | 6.60 | -1.6667*** | -17% | -0.8667*** | -9% |
| 3 Fair distribution of fishing gear | 7.63 | 1.7333*** | +17% | 0.4667* | +5% |
| 4 Economic equality | 6.67 | -0.4333ns | -4% | -0.5667ns | -6% |
| ***Efficiency*** | | | | | |
| 5 Communal decision-making | 6.77 | -0.8667* | -9% | -0.5333** | -5% |
| 6 Ease of entry into the fishery | 7.20 | -1.0333* | -10% | -1.000*** | -10% |
| 7 Control over access to fishery | 7.30 | 1.1667* | +12% | 0.4000* | +4% |
| 8 Compliance with fishery rules | 7.47 | 0.4333ns | +4% | -0.5000ns | -5% |
| ***Social sustainability*** | | | | | |
| 9 Family well-being | 7.13 | 0.7333ns | +7% | 0.0333ns | +0,3% |
| 10 Income | 6.23 | -1.0667ns | -11% | -0.3667ns | -4% |
| 11 Tradition of collective action | 7.53 | -0.8333ns | -8% | -0.4667ns | -5% |
| 12 Discussion of village issues | 8.00 | 0.6667ns | +7% | 0.0333ns | +0.3% |
| 13 Community harmony | 6.20 | -1.1667ns | -12% | -0.7667* | -8% |
| ***Biological sustainability*** | | | | | |
| 14 Marine resource health | 5.63 | -3.1333*** | -31% | -1.5333*** | -15% |
| 15 Fish catch | 5.23 | -3.7667*** | -38% | -2.0333*** | -20% |

N = 30 heads of fishing households. Ns = trend not significant; * = p<0.05, ** = p<0.01, *** = P<0.001

### 5.8.4 Biological Sustainability

*State of the marine resources and fish-catches*
The general condition of the marine environment had declined drastically. In 1997-98, fishers perceived an average 31% decline over the foregoing 15 years, and they expected conditions to decline another 15% in the future (see also section 5.1).

*Fish catches*
Fish catches too had reduced drastically. The average drop noted was 38% and the fishers expect a further decline of 20% in future. In Nolloth, the main problems causing both general decline of the resources as well as declining fish-catches were said to be: 1) pollution, 2) intensification of the fishery and 3) the use of modern gear.

Nevertheless, biological surveys indicated that Nolloth had better than aver - age living coral cover compared to other Saparua shores (Chapter 3). Also, fishers reported that the fishing was better in the *sasi* area than elsewhere, suggesting that the management system did have a positive effect on the state of the inshore resource.

## 5.9 Synthesis

Nolloth is an example of a village that has been successfully integrating tra - ditional and formal government structures. Decisions were made by the vil - lage government, but with implicit consent of the villagers who trusted the government to make the right decisions for them. The village head had a powerful position, but he was legitimate, respected, and trusted not to abuse that power. The political structure theoretically allowed participation or open discussions, but the common villagers (women and the poor in particular) were effectively excluded from decision-making. In some cases they could work through clan leaders who were government officials to get their point to the village government.

Not everybody was selected to partake in the government programs that aimed to improve the livelihood of poor villagers. The ones not included felt that the village government did not address their concerns. These people, who represented the lower social classes in Nolloth, had less confidence in the village government and said that 'they took care of themselves.'

Women in the village were marginalized and have a dependent attitude. Com- munication among women seemed minimal also where it concerned village issues or problems. This was possibly a result of the village organisational structures that were hierarchical and left little space for internal discussions.

Common women had no voice and were not well represented within the women's organisations. When it came to village affairs and decision-making, the women generally showed a lack of interest.

Nolloth had a relatively strong local resource management system because it had a strong village government and an organisational structure that included traditional authorities. The village had clearly defined operational rules that were written down, executed according to accepted collective rules and based on *adat* constitutional rules. Compliance to the rules was high, not in the least because of an active and functional *kewang* system. Nolloth did face difficulties defending its territory against outsiders. In these cases the Saparua police force could be counted on to assist, but only if the *kewang* caught the offenders first.

The Nolloth form of *sasi* conferred certain economic benefits to the village in general and to the ruling elite and their associates in particular. Leaders associated with the institution were also rewarded with high social status. However, the institution cannot be said to have been inclusive or democratic. In fact, the originally common property regime had become a system with private property rights.

The village government used the financial benefits from marine *sasi* for development projects and infrastructure. The villagers thus benefited indirectly. Nevertheless, to the villagers *sasi* was meaningful, especially in regulating theft and destruction of resources. It was considered as something relevant and important to village life and 'people are used to it.' The cooperation of traditional and government authorities and the church in the context of *sasi* served as a model for cooperation in village life and contributed to social sustainability.

Fishers as a group did not participate in the development of *sasi* and other fisheries regulations, and there was mild resentment over the fact that the system of selling harvest rights seemingly benefited the rich more than the poor. The *sasi* system thus proved not very equitable, but it was still highly legitimate. On the other hand, *sasi* in Nolloth was certainly efficient: decisions were made with a minimum of fuss by a respected central authority and the rules were enforced at no cost by volunteers in the *kewang*. The biological outcomes were also positive. Despite the severe general resource degradation, the *sasi* area had relatively healthy resources. *Sasi* rules were only applied to two commercially interesting products in a small area and *sasi* therefore had little impact on the larger fishery.

Although the ladder survey indicated strongly that marine resources (and fish catches) were in decline, fishery problems in the sense of over-fishing were not generally acknowledged. Pollution and the use of modern fishing-tech-

niques were seen as having a major impact on the fishery but interventions to deal with these were not suggested. Although they needed to go further and further for their daily catch, most fishers still caught enough to cover their daily needs. The impact of the decline was also obscured by the fact that fish prices had increased and thus rewards were still good. The species caught had changed dramatically over the years. From inshore fishing on demersal fish, the fishery had become nearly fully geared towards pelagics in the open sea.

However, there were no plans for enhanced fisheries management outside of the *sasi* regulations. The sub-district, regional and provincial levels of government did not support monitoring or enforcement of fisheries regulations in Nolloth. Since *sasi* regulations were limited in scope and area of application, there was a need for more elaborate fisheries management. Collaboration between village and outside organisations such as Yaysan Hualopu were therefore deemed important. Collaborations with other institutions was found important to be developed to: 1) educate people and complement people's knowledge on the environment to facilitate resource management; 2) support a process to monitor *sasi*; and 3) to facilitate productive activities (additional income) to support *sasi*. A need was also identified for higher government levels to provide more information, suitable legislation and support.