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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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4 Description of the research area

Maluku province in eastern Indonesia is known as the province of a thou - sand islands. In fact there are 1,027 islands, covering about 10% of the entire area of the province and occupied by about 1.8 million people (1990 census). Central Maluku, includes two administrative districts, Kabupaten Maluku Tengah and Kotamadya Ambon. It is located at 2°50'-3°50' South Latitude and 126°55'-128°45' East Longitude. The total area of central Maluku is 284,308 km^2, consisting of 255,090 km^2 of sea and 29,218 km^2 of land. The major islands of the area are Seram, Buru, Ambon, the Lease Islands (Haruku, Sa - parua and Nusa Laut) and the Bandas.

Many of these islands are very small and surrounded by productive coral reefs. The productive base on the islands is limited by geomorphologic fac - tors (steep slopes) and most settlements and farming activities are concen - trated along the strip of relatively flat coastal land. The majority of families living in the small Maluku coastal communities gain at least a portion of their living from exploitation of marine resources such as reef fish, pelagic fish, shellfish and sea cucumbers (Hualopu 1996). Fisheries resources are exploited throughout the islands, but exploitation in some places is regulated through *sasi*, a traditional local resource management system.

4.1 Socio-political history of central Maluku

Villages organized under local government are believed to have formed in the Neolithic approximately 4500 years ago (de Jonge and van Dijk 1995). From this period archaeologists have determined that canoes, gardening tools and simple stone axes were in use. Evidence of the building of a *Baileo*, the tra - ditional community house, familiar in *adat* culture, dates back to the first century A.D. (see also Cooley 1962). At this time there was already trade be - tween central Maluku and China and other areas of Southeast Asia. The local religion was animist (Holleman 1923).

Trade heralded the introduction of iron and bronze in Maluku approximately 2500 years ago (de Jonge and van Dijk 1995). It was in this time that labour specialisation led to a hierarchical social structure with leaders, free people and slaves. Art from this period is called Dongson style, but recent findings suggest it might originate from even before the Iron Age.

The political structure of Central Maluku over the period of 1000-1500 A.D. has been characterized as 'patrician republican' with an aristocratic ruling class. The original inhabitants generally referred to as Alifuru lived in mountain villages. Organized in tribal groups (*uku*) consisting of clans (*lumah tau* or *soa*), the most important leaders were the chieftain or king (*latu*), the heads of the *uku*, and the *mauwin*, a shaman mediating between the people, nature and the world of ancestors and spirits (von Benda-Beckmann *et al*. 1995). Each village was occupied by a number of clans with a patrilineal descent system. The village-based groups of clans related by geographical proximity or kinship, were grouped together as *soa* under a leader called the *kepala soa* (see also Holleman 1923). The *soa* were in turn organized into small kingdoms (*negeri lama*) led by a great leader (*tamaela umi haha*).

In Maluku, the period between the 15 th and 17 th century was full of turmoil and dramatic political, economic and religious change (von Benda-Beckmann *et al*. 1995). Around 1500 the traditional economy of Maluku was based on subsistence agriculture and fishing. Sago was important both as food and as a trade item. The clove trade in Maluku was mainly in hands of the Hindu-Javanese Majapahit kingdom, but soon Maluku was to be the battlefield where foreign powers struggled for control over the region's natural resources, particularly spices (Knaap 1981).

FIGURE 4.1 – Cloves drying on the street in Maluku.

At this time Muslim Arab traders arrived in northern Maluku. Their influence led to the establishment of Islamic kingdoms in the 15th century. Islamic laws were incorporated into *adat* law and Arabic words were incorporated

into local language. As the Majapahit hegemony declined, four powerful Islamic kingdoms emerged in north Maluku. Islam moved south into central Maluku, in particular to Hitu, a seaport on the north of Ambon Island. On Ambon, a union of nine *negeri* (*patasiwa*) dominated the Leitimur peninsula, while a union of five *negeri* (*patalima*) was established in the Leihitu section of the island. On Haruku Island, Saparua and Nusa Laut powerful *negeri* also emerged to dominate island life and establish kingdoms that competed with one another.

In the course of the expansion of clove production from Ternate, via Hoamoal on Seram to the central Maluku islands in the early 16th century, immigrant groups, coming from the northern Maluku islands and Java settled along the coast (von Benda-Beckmann *et al.* 1995), (see also Fig. 1). The 16th century saw Portuguese traders entering Maluku and engaging in the political rivalries of the native kingdoms. They built a fortress at Hitu on Ambon in 1515. In this period Catholic missionaries made Ambon the centre of Catholic evangelical activity. The Portuguese were followed by the Dutch who dominated and eventually defeated the Ambonese kingdoms.

By the 17th century the Dutch were firmly established as a trading power in Maluku, with their Dutch East Indies Company (VOC) backed up by naval fleets. After the Dutch defeated the Portuguese a period followed of warfare among Dutch, British and the Maluku population, wherein the Dutch ultimately prevailed. Yet, the 'spice wars' punctuated by local uprisings continued off and on into the 20th century. With the defeat of the Portuguese, Roman Catholicism disappeared and the settlements and villages in central Maluku eventually became either Islamic or Protestant (von Benda-Beckmann *et al.* 1995).

The Dutch colonial rule led to poverty and social disruption, and when in 1796 the British reappeared, complete lack of local support forced the Dutch to give up their ruling power (Riedel 1886). The early 1800s was a period of relative isolation for Maluku and inter-island contact was mostly via Buginese and Makassar traders from Sulawesi and Java (Fox 1996). At this time the Chinese also began to play a major role in local trade. However, in 1817 the British were again defeated and the Dutch established their provincial capital in Ambon.

The creation of an economic monopoly on clove production in Maluku entailed enforced production quotas, the imposition of population relocations, and radical interventions into existing patterns of social and political structure. Villagers were forcibly relocated on the coast and settled within newly created territorial units managed by individuals occupying Dutch created administrative roles (Chauvel 1990 in Zerner 1994b). There was serious local resistance led by Thomas Matualesi – better known as Pattimura – of Saparua Island in 1817, which ended in defeat for the local troops in 1823. Under sub-

FIGURE 4.2 – Dutch governor Dirk Fock visits Ambon in 1927 (photo: Elsevier).

sequent Dutch rule, Maluku children were schooled in the Dutch language and advances were made in converting the local population to Protestantism. The Christians then came to be favoured by the Dutch, rising to occupy administrative positions in the government.

It was not until 1920 that 'Sarekat Ambon', the first indigenous political party, was formed to advance the welfare of Ambonese people. Its leader, A.J. Patty, promoted independence. Although he himself was subsequently exiled from Maluku, his work resulted in the opening up of government to include traditional leaders in the governmental council, the 'Ambonraad'. The Sarekat Ambon party was finally banned by the Dutch in 1939.

During World War II (1942-1945), Maluku was occupied by Japanese forces and ruled by a military governor based in Ambon. People lived in fear of the brutality of Japanese occupying forces. All political parties were banned and the function of traditional (*adat*) government discouraged. Maluku was cut off from the outside world and the period is remembered as one of extreme hardship.

On 17 August 1945 the Republic of Indonesia proclaimed its independence from the Dutch colonial rule. Sukarno was the first president. In 1950, after the abolishment of the federal state and subsequent incorporation of the 'autonomous' East Indonesia into the republic of Indonesia, on the 25th of April contenders proclaimed the Republic of South Maluku (Republik Maluku Selatan – RMS) with J.H. Manuhutu as its first president. Within months an invasion of Sukarno's armed forces violently forced the government to leave. The RMS still has a government in exile in the Netherlands.

The Dutch, with a degree of local support, attempted to retain control over Maluku but this uprising was finally defeated by Indonesia's military, after a period of struggle that lasted up to 1952. In 1952, central Maluku was granted official status as an autonomous administrative regency of Indonesia, and in 1957 Maluku gained the status of a province with its own parliament. The years 1955-65 were ones of political unrest at the national level that involved a number of prominent Maluku politicians. It was also a period of rapid development and poverty alleviation as the First Long Term Development Plan covering 25 years, was implemented.

FIGURE 4.3 – The first president of the RMS, J.H. Manuhutu (Photo: Moluks Historisch Museum)

The coup d'état of 1965 resulted in the takeover by Major General Suharto, whose leadership remained intact up until 1998. The Suharto era was characterized by tight control over politics and a highly centralized form of administration, both of which had a powerful influence on political life and economic development in Maluku. The influence and power of the governing party came to be felt at all levels, right down into the smallest villages (Dauvergne 1997). In 1974, Law No. 5, was passed defining a new regional government structure. This was followed by Law No. 5, 1979 which decreed that all village governments must be redesigned to follow a defined structure which did not accommodate traditional (*adat*) institutions such as *sasi* and the *kewang* (traditional law enforcers). The indigenous people of Maluku were thrown into confusion over whether to uphold their traditional laws and institutions, conform to the new edict or seek some compromise between the two. That confusion, and the wide array of responses at the village level, is still evident in Maluku today.

The 1970s were also a time of particularly rapid economic change. Maluku experienced an average economic growth of 12.8% a year, compared to an average of 8.9% in 1983-88 and 6.7% in 1988-93 (Anonymous 1994). Much of this economic progress was the result of direct government assistance. Also, from a predominantly agricultural economy Maluku gradually shifted to an economy where industry is important. In 1970, 71% of the GDRP was from agriculture and fisheries and only 1.6% from industry. In 1993 agriculture and fisheries provided 32% of GDRP (industry 19%).

4.2 History of *sasi* in Maluku

In some Maluku communities, control over the land and marine territory (*petuanan*) and its resources is vested in a social institution with a code of conduct, rules and regulations known as *sasi* (Volker 1925, Ellen 1978, Kriekhoff 1991). *Sasi* is not simply an institution designed to regulate resource use, it also has a significant cultural role: 'It is an encompassing body of meaningful relations between people, the natural environment and gods, ancestors and spirits' (von Benda-Beckmann *et al.* 1995). Although the origins of *sasi*

are lost in the mists of time, local legend speaks of *sasi* being in place in the 14th century and perhaps earlier (Topatimasang 1997). Others maintain that *sasi* developed in the 16th century in response to the needs of clove traders (Kissya 1994), but it was almost certainly based on older *adat* tradition that aimed to protect and control exploitation of natural resources (von Benda-Beckmann *et al.* 1995).

The 'spice wars' of the 1600-1900s had the effect of stimulating militancy as well as mobility in Maluku people and fostered fierce attachment of the people to their territories (Chauvel 1981). This could have been positive in terms of reinforcing *adat*. On the other hand, however, the battles were ultimately lost, many of the bravest killed, and the sovereignty of local leaders abolished. In some cases wholesale slaughter (as happened in Banda) and forced removals, alienated people from their territories. In general,*adat* culture is believed to have reached its zenith in the mid-1600s and the pattern since then has been one of decline, although with periods of resurgence (Cooley 1962).

The introduction of the Islam and Christianity and the establishment of a trade monopoly in cloves were of decisive influence for further development of *sasi*. During the occupation and Christianization of Maluku by the Dutch, *sasi* was at first discouraged along with other 'pagan superstitions and rituals' (von Benda-Beckmann *et al.* 1995). However, the institution was subsequently revived and revised by the Dutch to control and maximize harvests of valuable spice crops, regulate land tenure and provide a means of social control (von Benda-Beckmann *et al.* 1995). In the revised form, the emphasis on spiritual aspects declined, while economic aspects of *sasi* came to the fore. During this period and into the 1900s, native Mollucans were often resentful rather than supportive of the Dutch style of *sasi* as it represented the imposition of Dutch ethics and was often a burden on poorer members of society (Zerner 1994a). Under Dutch influence, what had been purely an *adat* institution became integrated to some extent with the village leadership supported by the colonial government. At a later point, the church also came to have a role in *sasi*, changing the institution further into one in which religious, government and *adat* leaders worked together.

In the period 1880-1893 Dutch Resident Riedel attempted to abolish *sasi*. He wanted to break the power of *kewang* leaders over the spice trade and abolish the *kewang*'s rights to enforce *sasi* rules, which he considered exploitative of the local producers. In spite of his efforts, the *sasi* institution continued to survive and evolve in many villages, and in 1921 the Dutch actually supported *sasi* once more by formalizing the institution with the decree called 'Het recht van *sasi* in de Molukken' (the rights of *sasi* in Maluku).

During World War II, the period of occupation by the Japanese represented an extreme threat to all *adat* institutions. Lack of appropriate ceremonial

cloth and other goods meant that *adat* rituals could not be performed according to tradition, so that in this period many substitutions were made (Cooley 1962). Indonesian independence involved civil war in Maluku, a time when many leaders were lost and clans scattered. Integration into the new nation of Indonesia meant a further blow to local indigenous language and culture because Indonesian Malay became the language of compulsory schooling. Subsequent decades of civil strife and political turmoil at local and national levels doubtless continued to challenge the strength of local culture. In more recent decades, cultural change has intensified as economic development proceeded. By the 1960s there was a confident prediction (Cooley 1962) that *sasi* was doomed to disappear 'in the very near future'. But although weakened over time, *sasi* never disappeared.

The aim of *sasi* and its function in resource management and conservation has been debated (Pannell 1997). Zerner (1994a) argues that, although there may be spin-off benefits in terms of resource sustainability, *sasi* is essentially an institution for managing social interactions and mediating tenure disputes or maximizing economic returns, rather than a resource conservation and management institution *per se*. On the other hand, *sasi* clearly was performing a conservation function in the 1920s when the use of poisons in the fishery was banned under *sasi* rules (Volker 1925). In the 1990s, *sasi* again underwent change, with a renewed emphasis on conservation aspects (Zerner 1994a).

The application of *sasi* to marine resources may have never been as widespread as *sasi* on land crops. Zerner and Thorburn (*forthcoming*) have speculated that in its original form, marine *sasi* was applied only to pelagic fish, with the objective of protecting migratory fish from disturbance so as to maximize harvests for local consumption. In the decades following the 1930s, the emerging international markets for top shell and sea cucumber appear to have prompted the development of additional types of marine access prohibitions and related ceremonies in places such as the Kei Islands in southern Maluku (Zerner and Thorburn, forthcoming). Similar rules are evident in central Maluku today and appear to date back at least to the 1960s.

There is another *adat* institution linked to *sasi*, the *Latupati*, a traditional gathering of leaders at the island-wide level. The *Latupati* in the Lease Islands (i.e. Saparua, Nusa Laut and Haruku) has been effectively dormant since the passage of the legislation on village governments in 1979. However, a revitalized *Latupati* may have potential as a regional resource management body. In 1996 the first Haruku Island *Latupati* meeting in 20 years was held as a consequence of the efforts of NGOs interested in developing marine resource management capacity at the island and regional levels. Subsequently, NGO interventions have also led to the revival of the *Latupati* on Nusa Laut Island in 1998. On Saparua, there is also a *Latupati* but it was used only as a

venue for planning of annual social events. In resource management under *adat sasi,* there is close collaboration among the *Tiga Tungku,* i.e. *adat* leaders, village government and religious leaders.

4.3 Village level socio-political context

The following general overview of the socio-political context in rural, coastal villages of central Maluku is based on the results of the six case studies carried out on Saparua, Haruku and Ambon Islands and described in our research report (Novaczek *et al*. 2001). Of these cases, Nolloth village is presented in the following chapter. All study sites were Christian villages. Therefore some of the findings, especially the role of the church in society, do not pertain to social structure in Muslim villages.

4.3.1 Traditional village government structure

Prior to the enactment of the local government law (Law No.5, 1979) villages in Maluku were led by a hereditary chief or *raja*. Although now considered part of the 'traditional' structure, the position of *raja* was in fact not part of the indigenous *adat* social structure, but a construction of Dutch colonial leaders. When the Dutch consolidated their power in Maluku and forced the hill-dwelling people to settle in coastal villages, they appointed the village leader, i.e. the *raja*. Previous to this, the clan groups living in the hills were led by warrior chiefs (*kapitan*).

The *raja* governed together with administrative and legislative councils (*saniri*) whose members were the clan leaders. The *raja*'s powers under this system were not absolute. He (or occasionally she) was obliged to consult with the village council. Other hereditary functionaries included a war leader (*kapitan*), persons responsible for communicating government decisions to the people (*marinyo*), keepers of sacred knowledge (*tuan negeri*) and other adat leaders (*tuan tanah*). There were also the hereditary leaders (*kepala kewang*) of groups responsible for enforcing social and resource management regulations called the *kewang*. The *kewang* applied and enforced *sasi* rules on both land and sea within the village territory.

4.3.2 Modern village government structure

Each of Indonesia's provinces is administered by a provincial government, which in turn is divided into districts called either *Kabupaten* or, if urban, *Kotamadya*. Below the districts are the sub-district government offices or *Kecamatan*. Government decrees, guidelines and programs are passed down through this structure to the local administrative units which are called *desa*. Each *desa* is governed by a *kepala desa* or village head, together with his staff, and may comprise one or several villages. Villages that are smaller than 2000 inhabitants are usually not independent but have the status of *dusun* under

the larger unit (*desa*). The village head and his government office may therefore be many kilometres away. *Dusun*s are represented in the *desa* government through their local leaders (*kepala dusun*).

Through the issuing of Law No. 5, 1974, provincial government structures throughout Indonesia were redesigned following the above national model. The same was done for village governments through Law No. 5, 1979. In the implementation of the latter law, traditional political structures in the villages were abolished. The hereditary *raja* was replaced by an elected village head, the *kepala desa*. Smaller villages lost their independent status and became *dusuns* of larger *desas*. The village councils were replaced by bodies known as the LMD and LKMD (see below). An RT group (*Rumah Tangga*), the lowest level in the government structure, consists of a cluster of neighbouring households. There was no place in the new structure for the *kewang*, nor was any replacement developed to take over the function of resource management.

The LMD (*Lembaga Masyarakat Desa*) is the formal village legislative body occupied with decision-making and development of regulations. It has 10 to 15 members presided over by the village head and the village secretary and is divided into sections, i.e. village development, government administration and community affairs, each of which has a chief. The LMD reports to the sub-district government level. The decisions and regulations of the LMD are executed by the LKMD (*Lembaga Ketahanan Masyarakat Desa*), which is the administrative body of the village government. As we found out from our interviews, in many cases LMD members are in fact selected from among traditional authorities (i.e. *adat* and clan leaders). The extent to which the current government overlaps with the previous, traditional village council varies, yet, there was no village where traditional authorities were not represented at all.

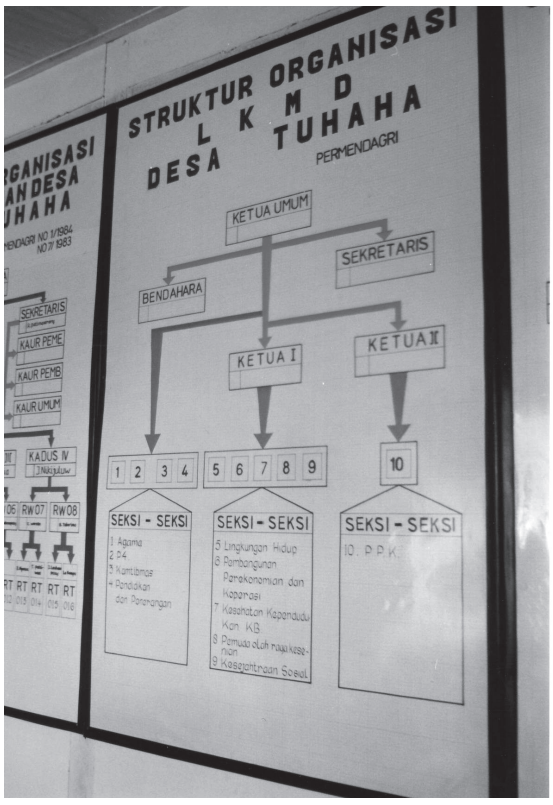

FIGURE 4.4 – Village government structure Tuhaha

Although a dominant force, the formal village government is only one of three key elements generally rec-

ognized in Maluku villages. These three key institutions are called the *Tiga Tungku*, or three hearthstones: the government, the church (or in Muslim villages the mosque) and *adat* or traditional authorities. In some villages, teachers are also important and may displace *adat* leaders in the *Tiga Tungku*.

4.3.3 Government related organisations

Every village has a number of government related organisations. The most relevant one with regard to the fishery is the village cooperative or KUD (*Kooperasi Unit Desa*). There are three types of KUD depending on their activities and level of autonomy, ranging from externally controlled to totally self-supporting. The KUD operates independently from the village government, but is under supervision of a head office in Ambon. Although separate from local government, the KUD is influenced by village politics. The main trade products of many KUDs are clove and to a lesser extent nutmeg. Other enterprises such as speedboats and mini-buses and small shops are also often in the hands of the KUD. For its members, the KUD has a savings and credit system and may provide access to machinery such as coconut grinders. In Nolloth the KUD plays an important role in organizing the top shell harvest and selling the yields.

FIGURE 4.5 – Announcement of PKK village program

The PKK is an abbreviation for *Pendidikan Kesejahteraan Keluarga* which means literally 'Education for the Prosperity of the Household'. It is a vehicle for the wives of the village (government) leaders to improve family life in the spheres of economy and peace through various activities, such as skill training (baking, cooking, sewing), saving money, growing medicinal plants, chicken breeding, cultivation of vegetables, dried fish and fruit trade, child-care, and the promotion of the state ideology (*Pancasila*). Membership is open but generally includes mainly teachers and civil servants. Common village women often have no time to attend or feel unwelcome in the presence of higher positioned, wealthy women.

The TAKESRA groups are small saving groups (±10 people) that particularly target low-income women. It is an initiative of the National Coordinating Agency for Family Planning (BKKBN) and is usually carried out by the village head. The members save a weekly amount and when a certain sum is reached, the group can get an additional government loan to start small businesses (chicken breeding, restaurant, etc.). Another (informal) saving program is called ARISAN. It is initiated by villagers from the lower social classes who feel disconnected from the mainstream and do not expect the government to take care of their problems. Therefore they use a revolving fund system to provide the members with some capital.

The Social Service Department of the government has set up various economic development groups including IDT and KEP. Farmers, fishers and other small business people may be assisted through the IDT, which is a national program to alleviate poverty. Each qualifying village receives a Rp 20 million loan from the government to subsidize small-scale development. Each member has to pay back the amount to the government or to the group's treasury within a year. Participants are the poor fishermen who cannot afford fishing gear. This was a pilot program in 1997 with the prospect of involving more groups over the years to come.

4.3.4 The church

Protestant Christianity was introduced to Maluku during the Dutch colonial time and the role of the Protestant Church of Maluku (GPM) is still prominent. Executives who control programs and funding form the *Synod* in Ambon. Below this is the *Klasis* office in Saparua, which covers the Lease Islands. The *Klasis* instructs the congregation level and they communicate with the local church branches. Communication from one level to the other is through meetings. To obtain funding, the village church submits a yearly program proposal to the *Synod*. In predominantly Christian villages the GPM has a strong influence on the people as well as on the government. The church generally has representatives in the LMD and thus can influence decision-making. In some cases the church motivates people to support government economic programs. There are church groups for men, women and youngsters, respectively the Pelpri, Pelwatan and Youth Wing.

4.3.5 Other organisations

The remaining *adat* organisation found in some villages is the *kewang*, which enforces *sasi* regulations. Only Haruku village has a *kewang* spun off a youth organisation (mini-*kewang*). *Kewang* structure and function is discussed together with the description of the *sasi* institution in the the case-study village Nolloth (see Chapter 5). Another social group on village level is the *Muhabet* which coordinates communal action for house construction and funerals. [1]

1 Holleman (1923) describes a similar custom of mutual help in the construction of houses and processing of sago called *Masohi*.

Outside of the above-mentioned organisations, there are no informal meetings where women could discuss problems and/or other village related issues. Problems are discussed and if possible resolved within the family. As a result, women are not united outside the family structure and are not critically aware of political issues in the village.

4.4 The fishery and biological context

Sir Alfred Wallace, on his expedition to Ambon Bay in the 1850s, marvelled at the incredible diversity of coral and fish. Eastern Indonesia, including Central Maluku, is part of the global centre for coral reef biodiversity. Endangered species inhabiting this area include dolphins and whales, turtles, giant clams and some other types of molluscs including top shell *(Trochus niloticus*). A MREP survey (PSL-Unpatti 1996) revealed diverse biological communities in the intertidal, inshore reef flats and reef slopes. Except for some sheltered estuaries where mangrove forests are quite extensive, mangroves are mostly confined to narrow coastal strips. Conversion of coastal land, including mangroves, for shrimp pond development is just beginning in central Maluku (northern Seram) but conversion for housing development is already widespread.

Extensive sea-grass beds are common in central Maluku. In sea-grass beds around Saparua Island fishes sighted numbered 62 species (Wouthuyzen *et al*. in LIPI 1994a, 1994b; PSL-Unpatti 1994). Surveyors in 1991 (de Iongh *et al*. 1994) found dugong feeding tracks in sea-grass beds around the Lease island. The sea-grass beds are also a feeding ground for various turtles. Coral species diversity in the Lease region is described as high; researchers found 110 species at Pulau Pombo and 85 at Ihamahu (Antariksa *et al*. 1993; PSL-UNPATTI 1994). Surveys documenting hard coral cover (LIPI 1996) in Central Maluku locations on Seram, Ambon and the Lease Islands show that healthy coral was rare due the use of bombs and other destructive fishing methods. A more elaborate description of the biological features of Central Maluku can be found in Novaczek *et al*. (2001).

4.5 Characteristics of the fishery

In Central Maluku agricultural capacity is limited and the fisheries sector is regarded as the opportunity for economic development. Over recent years fishing efforts have been escalating. The prediction is that fishing effort will increase while, at the same time, stock assessments and data on catches are inadequate. If this continues, over-exploitation of commercially harvested resources is likely (Nikijuluw 1995).

The tiny Lease Islands hold 12.5% of the population of Maluku province and are 9-10 times more densely populated than the rest of Maluku. In general, the settlements and farming activities are concentrated along the narrow strip of relatively flat coastal land. Artisanal and small-scale commercial fisheries contribute significantly to village economies in terms of employment and income but villagers are also active in the agriculture sector. Because good farmland is limited and the population relatively dense, the fisheries sector is seen as an opportunity for economic development. The sea is a source of income as well as a source of family food (Ruhunlela *et al*. 1994a, 1994b; LIPI 1996). On average, income from fisheries in a typical village ranges from about 12 – 28% of the total income.

The fishery of Maluku mirrors that of Indonesia as a whole in that the labour force is dominated numerically by the artisanal sector. In 1991, for example, it was estimated that out of all fishing units operating in Indonesia, 92% were tiny canoes powered by paddle and/or sail. Another 6% of boats employed outboard motors and the rest were large, motorized ships (Agriculture Statistics 1993, Dept. of Agriculture, Jakarta). In Maluku province, with a population of about 2 million people, 104,600 are considered to be fishers (CBS 1995). Many more are fisher-farmers who actually show up in the government statistics as farmers.

FIGURE 4.6 – Fisherman throwing out a cast net in Hulaliu village

Artisanal fishers using fishing lines, spears, traps, hand-nets and set-nets target a mixture of reef and pelagic species (for details see Novaczek *et al*. 2001). Women in fishing families supplement catches by harvesting octopus

and shellfish from intertidal and upper subtidal areas. Utilization of coastal resources in the nearshore areas is intensive. For instance in Ameth on Nusa Laut, fishers using 21 types of fishing gear collect 73 different species of fish and shellfish from the reef flat, reef slope and inshore waters. An additional 19 species are harvested from the intertidal zone (Hualopu 1996).

4.5.1 The commercial fishery

Upwelling in the Banda Sea makes the central Maluku fishery a highly productive one. The resources of Central Maluku are exploited not only by the local population, but also by boats based in the city of Ambon as well as boats from Sulawesi and Java and foreign fishing vessels. Key commercial species include tuna, skipjack and a variety of small pelagics (anchovies, mackerel, sardines). The commercial lift nets (*bagan*) and seiners target the small pelagics, whereas pole and line boats typically harvest skipjack. Other commercial operators employ longlines and various sizes of gill-nets and drift nets. Live reef fish harvesters commonly employ divers using potassium cyanide.

The use of potassium cyanide as a fishing method is stimulated by the high prices offered for grouper, ornamental fish and lobster and very common in Central Maluku waters (Abrahamsz and Hetarie 1994; Geser *et al*. 1997). Blast fishing is also common, both for reef and pelagic fishes, and causes widespread damage to coral habitat (I. Novaczek *pers. obs.*). Smaller and smaller mesh sizes are also a problem and leading to conflicts between the lift net fishers who are using these nets and the hand-line sector (J. Sohouwat, Hutumuri village, *pers. comm.* 1996). Other destructive fishing methods are fish traps which are either anchored with coral or set out on top of living coral, the use of iron bars to break up corals during the low tide and *muro-ami*, in which fishers use rocks to smash coral and chase the reef fish out into a net.

Fisheries production figures over the past decades show an increase in exploitation from 59,485 tonnes in 1974 to 189,081 tonnes of fish in 1993. In 1997, total recorded landings had reached 329,147 tonnes (Anonymous 1993, 1994, and 1995). In addition, a great deal of fish catch goes unrecorded because it is trans-shipped at sea and taken directly to distant markets. Actual records of landings and local research results are at odds with the official federal optimism regarding potential for further development.

Coral reef fish are believed to be already over-fished throughout Indonesia (Anonymous 1993, 1994, 1995). A 1995 assessment estimated that small pelagic (baitfish) catches in central Maluku were already at 80-90% of the maximum sustainable yield (MSY) (Pulitbangkan 1995) and in 1998, the government research facility (LIPI) stated that both shrimp and baitfish were overfished. Because of a shortage of baitfish, the catches of larger pelagics such as skipjack have been static or declining in recent years, but even at the

reduced catch rates, skipjack are now considered to also be overfished (Nikijuluw 1995; M.S. Latukonsina, Governor of Maluku, *pers. comm.* November 1998). Policy-makers are looking to expand fish and shellfish aquaculture in an attempt to compensate for declining wild stocks.

Although there is a small minority of commercial gears in the hands of village fishers, the majority of capital-intensive gears such as lift nets, fish aggregating devices (FAD), pole and line vessels, long-liners and seiners, are in the hands of urban businessmen and large companies. For example, in 1998 the fish processing company P.T. Sumber Aneka Tata Bahari owned a fleet of 12 pole and line boats and three long-liners, plus five deep-sea FADs. They exported 250-700 tonnes of fish a month (M. Siahay, boat captain, *pers. comm.* 1998). Owners of these industrial enterprises are mostly urban Chinese Indonesians, some are from the western islands of Sulawesi or Java, and a few are foreign (from the Philippines or Japan).

FIGURE 4.7 – *Bagan* near Tuhaha village

4.5.2 Top shell and sea cucumbers

The commercial trade in top shells (*Trochus niloticus*) has been carried on since at least the 1960s and is a trade that expanded rapidly (Zerner and Thorburn, forthcoming). For example, recorded shell exports from Maluku province went from under 80,000 kg in 1987 to over 256,000 kg in 1988. Because rapid exploitation led to a crash in wild stocks, this species has subsequently been declared protected and is therefore illegal to harvest outside of aquaculture areas. In reality, however, harvesting and trade in wild shells continues.

Sea cucumbers (Class Holothuroidea) have been a trade commodity for centuries ever since Chinese, Makassar, Buginese and other wandering traders first came to Maluku (Fox 1996). Older fishers can remember when inshore sandy bottoms were thick with sea cucumbers. Today, however, the traders rarely bother to visit many of their traditional harvesting areas because the stocks have been largely fished out.