

PART II
A SOCIO-ECONOMIC APPRAISAL OF SELECTED
COASTAL FISHERFOLK COMMUNITIES
IN NIAS ISLAND, INDONESIA

*(based on a report prepared in 1990
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1. INTRODUCTION

The population of Nias Island, according to the census figures of 1986 is 527,758. A breakdown of the population by subdistrict is given in Table I.

Table I
Subdistrictwise population

<i>Subdistrict</i>	<i>POPULATION</i>		
	<i>Male</i>	<i>Female</i>	<i>Total</i>
Gunung Sitoli	41 661	41 361	83 022
Tuhemberua	22 555	23 518	46 073
Lahewa	16 948	17 137	34 085
Alasa	17 306	17 900	35 206
Gido	33 424	34 770	68 194
Idano Gawo	20 843	21 142	41 985
Lahusa	10466	11091	21557
Gomo	16 825	18 321	35 146
Teluk Dalam	30 657	32 694	63 351
Lolowau	21 321	22 088	43 409
Mandrehe	19 333	20 706	40 039
Sirombu	7 584	8 107	15 691
TOTAL	258,923	268,835	527,758
Percentage	49.06	50.94	100.00

The fishing villages are scattered and, in some cases, isolated.

Public amenities, such as fresh water, electricity supply, dispensaries, and roads, are non-existent in many fishing villages. Primary schools are generally found in all fishing villages.

The census of fisheries conducted in 1986 showed that there are 2657 households with 2214 full-time fishermen and 443 part-time fishermen. The number of fishing households is reported to be stagnant. The subdistrictwise distribution of households is given in Table II.

Table
Subdistrictwise distribution of fishing households

<i>Subdistrict</i>	<i>Full-time</i>	<i>Part-time</i>	<i>Total</i>
Gunung Sitoli	426	52	478
Tuhemberua	418	61	479
Gido	97	48	145
Idano Gawo	116	39	155
Alasa	36	9	45
Lahewa	401	51	452
Teluk Dalam	302	56	358
Lahusa	124	20	144
Sirombu	243	32	275
Lolowau	51	75	126
TOTAL	2214	443	2657

The number of persons employed in ancillary activities is estimated at about 900 and is believed to be increasing in the fields of handling and marketing, fishing craft construction and services.

The estimated breakdown of employment in ancillary activities is given in Table III.

Table III
Employment in ancillary activities

Activity	No. of persons employed (estimated)
Ice making	10
Processing	20
Engine repairs	10
Fish-curing	60
Boatbuilding	100
Marketing	700
TOTAL	900

Apart from the main population concentrations around the district capital, Gunung Sitoli, and Teluk Dalam in the south, most of the inhabitants live in villages in the hilly interior of the island. Agriculture is the most important source of income for most of the population. The cultivation of rice, yams, cassava and other vegetables, and the raising of livestock, such as pigs and chickens, is the basis of their livelihood. Cash crops, such as rubber, coconut, cloves and *nilem* leaves (source of the aromatic oil, *patchouli*) are becoming increasingly important as links develop between the island economy and the outside world.

Christianity was introduced by the Dutch who first settled in the island in the 17th Century. It now forms the religion of 80 per cent of the inhabitants. The remaining population is Muslim. Most of the latter live in the coastal areas and the fisherfolk on the island are predominantly adherents of Islam*.

Marine fisheries has generally been relatively marginal to the economy of the island. The preferred source of protein for the majority of the population is pork and chicken augmented by freshwater fish and game hunted in the forests of the island. Marine fish only supplements the usual diet. Consumption of fish on the island, at about 10 kg/person/year, is well below the average for the rest of North Sumatera, which stands at over 17.5 kg.

The agricultural orientation of traditional Nihai culture and the difference in religion between fisherfolk and the Christian majority, has apparently led to the fisherfolk becoming a distinct community living on the fringes of the mainstream of Nihai society.

2. BOBP ACTIVITIES IN NIAS

In 1988, the Directorate General of Fisheries of Indonesia requested the Bay of Bengal Programme (BOBP) to investigate possible technological improvements in small-scale fisheries in Nias.

Initial observations of the island's fisheries led to identification of the potential for the introduction of motorized small-scale fishing craft with a better operational range and improved carrying capacity. A subproject was prepared with the objective of raising the incomes of small-scale fisherfolk through the design and demonstration of improved outrigger canoes. The designs for the outrigger canoes were based on designs developed in the Pacific and in Sri Lanka. A range of sizes from 6 to 9 m were considered appropriate for the conditions in Nias and were subsequently built by local carpenters on the island. Extensive technical trials were carried out and modifications made as required.

Technical feasibility was eventually established for two larger canoes powered by inboard diesel engines. A smaller, 6 m canoe, using a petrol long-tail outboard motor, later converted to an inboard installation, encountered technical problems and was abandoned as unfeasible. Commercial fishing trials carried out by local fishermen are still underway to establish the economic feasibility of the two remaining craft and their suitability for use by small-scale fishermen.

* Estimate based on District Fisheries Services Statistics (1986).

Based on results up to date, the new canoes appear to have a significant impact on fisherfolk's earnings and their fishing performance has been satisfactory. The use of an improved technology of this type, however, inevitably involves higher levels of investment than those required for traditional fisheries on Nias. Changes in working patterns and organization by small-scale fisherfolk would be entailed if they were to utilize such a craft successfully. Skills in engine maintenance would need to be developed in those fisherfolk with no previous experience of engines. Further, while the canoes seem to be operating successfully in one area on the north-east coast of the island, it is yet to be established whether the same craft would prove to be feasible in other locations.

3. SOCIO-ECONOMIC APPRAISAL OF NIAS FISHERFOLK COMMUNITIES

Except for some anthropological studies of coastal Nias communities, which were inaccessible due to language problems, no information or data specifically relating to fisherfolk communities in Nias is available. In order to decide on a suitable strategy and approach for continuing demonstrations of the craft, and to assist in identifying suitable locations for such trials, however, some information regarding the socio-economic context of fisherfolk communities was required.

The subproject therefore proposed the implementation of a socio-economic appraisal of the fisherfolk communities to collect information which would assist in the planning of activities for the subproject itself and for any eventual extension phase of the activity if the initial trials proved to be successful.

The specific questions to be answered by the appraisal were

- How did small-scale fisherfolk view their problems, needs and potential, both in fisheries and other aspects of their livelihoods?
- What conditions in fisherfolk communities might hinder or assist the introduction of new technology of the sort being developed by the subproject?
- How did conditions of fisherfolk communities differ in different areas of Nias and which areas would be most suitable for the introduction of new fishing technology?
- What was the general socio-economic condition of fisherfolk and what measures would be required to enable them to gain access to new technology?

It was also decided to limit the appraisal to matters directly related to the requirements of the fishing technology subproject, as a more general and in-depth study of the socio-economic conditions of fisherfolk communities on the island was beyond the scope of **BOBP** activities there.

Based on these critical questions and the requirements of the subproject, these immediate objectives were developed for the appraisal

- To obtain a picture of the socio-economic conditions of a sample of Nias fisherfolk communities.
- To obtain a profile of the problems, needs and aspirations of small-scale fisherfolk, in respect of both fisheries and other sectors.
- To identify existing economic activities and the potential for others in the coastal areas of Nias.
- **To obtain a profile of formal and non-formal institutions in fisherfolk communities.**
- **To identify fisherfolk communities amongst whom further trials, demonstrations and the introduction of improved outrigger canoes might be feasible.**

The methodology and design of the appraisal, selection of the eleven target villages – Ladara, Botolakha, Afia, Sisarahili Gomo, Fowa, Bozihona, Hilinamoniha, Teluk Dalam Pasar, Lagundhi, Hilinamazihona and Sirombu situated in seven subdistricts – and the implementation of the appraisal in two phases from October 1989 to January 1990 are set out in Appendix III.

4. FINDINGS OF THE SOCIO-ECONOMIC APPRAISAL

The following is a general analysis of the findings of the socio-economic appraisal. Specific information and findings in respect of each village are reviewed in Appendix IV.

4.1 Definition of fisherfolk communities

The information gathered during the course of the appraisal shows that the term ‘fisherfolk communities’ as used in Nias needs some clarification.

The term ‘fisherfolk community’ almost always refers to a section, often proportionally quite small, of a larger village in which farmers with small-holdings of agricultural and plantation land are usually the majority. There appear to be relatively few coastal villages which can be described as predominantly fisherfolk villages. On the other hand, some fishing activity seems to take place in most coastal villages and the fisherfolk community in such villages generally constitutes a fairly distinct group. In only one of the eleven coastal communities investigated (Hilinamazihona, in Lolowau subdistrict) did the number of fisherfolk turn out to be so small as to be of very marginal importance within the village.

The term ‘fisherfolk communities’ used here therefore refers only to those sections of coastal communities in Nias where people earn a proportion of their livelihood from fishing.

4.2 Typology of fisherfolk communities

The factors mentioned above also have a bearing when attempting to formulate a typology for Nias fisherfolk communities. Various factors relating to fisheries and fishing practice, which could be identified to distinguish fisherfolk in different areas of the island, do not seem to have as significant a bearing on the socio-economic conditions of these communities as two factors relating to shore-based activities. In the simplest terms, the most important factors influencing the socio-economic conditions of Nias fisherfolk communities seem to be

- access to agricultural land, and
- access to markets for fisheries produce.

Agricultural work is the principal alternative, or supplement, to fishing as a source of income for people living in coastal communities in Nias. Even among those who regard themselves as ‘fisherfolk’, ownership of agricultural land is apparently considered important security for the household. Thus, access to land seems to play an important role in determining the socio-economic conditions of fisherfolk communities.

Access to markets for fisheries produce is an important factor in any community producing a highly perishable product like fish. In a relatively remote area like Nias, it plays a determining role in the standard of livelihood fisherfolk are able to gain from fishing. Access to markets may vary within a community according to the type of fisheries produce available. Thus, high value products, such as lobster and shrimp, always seem to find a market outlet, however remote the location, perhaps because the volumes handled are relatively small. For most Nias fisherfolk, and most fisheries produce, however, access to markets is strongly influenced by location and communications and this appears to play a decisive role in determining the socio-economic conditions of fisherfolk.

On this basis the target villages can be classified as below

ACCESS TO LAND	ACCESS TO MARKETS	
	<i>Good access</i>	<i>Limited access</i>
<i>Land available</i>	Botolakha Afia Sisarahili Gomo Fowa	Bozihona Lagundhi Hilinamazihona
<i>Limited land available</i>	Ladara	Hilinamoniha Teluk Dalam Pasar Sirombu

Communities on the northeastern coast of the island are generally at an advantage as they have ready access to a good market for fresh fish in Gunung Sitoli and its surroundings and also have land for agricultural activities.

Interestingly, access to land does not as yet seem greatly affected by population density in this area. Although the density of coastal villages in Gunung Sitoli, Tuhemberua and Gido subdistricts is much higher than elsewhere in Nias, there still appears to be space for the expansion of cultivation. Ladara village, however, represents something of an anomaly; it is an exceptionally small community with very limited land area.

Among the villages covered by the appraisal in the south and west of Nias, the pattern of land ownership is less clear. In Hilinamoniha, due to the geographical location of the village and the local topography, very little land suitable for agriculture is available. The indications are that other villages along the southeastern coast face similar problems. Teluk Dalam Pasar is a semi-urban community within Teluk Dalam town and the lack of land is therefore not surprising. In Sirombu, the location of the fisherfolk community within a relatively large settlement may restrict the availability of land, but fisherfolk here also seem to represent a more 'specialized' fisherfolk community compared to others on the island. Thus, the lack of land ownership among Sirombu fisherfolk may reflect a lack of interest in agriculture rather than lack of access to land.

It is clear, however, that fisherfolk communities in this part of Nias face greater difficulties than those along the northeastern coast. Access to good markets for fresh fish seems to be particularly problematical. Even in Teluk Dalam, a relatively large town, the marketing situation for fish is not favourable to fisherfolk. Prices are reported as fluctuating considerably and it is often difficult to find buyers. The main difference in the fish marketing situation between Gunung Sitoli and Teluk Dalam seems to be the more limited export of fish from Teluk Dalam. In Gunung Sitoli, the export of certain species of fish to the Sumateran mainland port of Sibolga creates enough space for local small-scale fishermen to find a ready market for their catch. In Teluk Dalam, this is not the case. While some lobster is exported on a very small-scale, almost all fish caught by local fishermen appear to be sold locally. The lack of commercial ice production or storage facilities and, thus, of any possibility of preserving fresh fish is the main obstacle to enabling greater export of fish from the area.

4.3 *Socio-economic conditions of Nias fisherfolk communities*

Some important features of Nias fisherfolk communities are described below. While some of these features may be common to most of the communities investigated, others are more area- or village-specific.

4.3.1 LOW EARNINGS

Very few of the fisherfolk households interviewed during the course of the appraisal seem to have yearly earnings of more than 900,000 Rp/year. The average earnings from fishing seem to be in the region of 650,000 Rp/year. Income from agriculture is reported to average approximately 200,000 Rp/year, but this does not take account of food grown for household consumption, which probably constitutes the bulk of 'income' from agriculture. An average total annual income of about 850,000 **Rp/year (US \$ 460) per household** would appear to be a reasonable estimate.

The range of incomes reported from fisherfolk households in Sisarahili Gomo (Gunung Sitoli) (12 respondents); Bozihona (Idano Gawo) (8 respondents); Hilinamoniha (Teluk Dalam) (20 respondents); and Sirombu (Sirombu) (14 respondents) was from Rp 250,000 to Rp 1,500,000.

These figures can be compared with data collected in 1987-88 during field enquiries in Langkat District on the Malacca Straits coast of North Sumatera. The latter indicate that earnings of between 1,000,000 and 1,500,000 Rp/year seem to be the norm for fisherfolk engaged in shrimp fishing using trammel gillnets, which is the mainstay of the east coast fisheries. It seems that in Nias only fisherfolk close to Gunung Sitoli, along the northeastern coast, can earn incomes approaching these levels; elsewhere the earnings are often significantly lower.

While such information is mainly indicative and difficult to verify, it is clear that household earnings of Nias fisherfolk are comparatively low. The prices obtained for fish catches in Nias are considerably lower for many species compared to those obtained by fisherfolk on the Malacca Straits coast of North Sumatera. The channels for transporting potentially high-value fish to consumer centres on mainland Sumatera are also not yet well developed. Prices for many agricultural commodities too seem to be relatively low on the island.

Comparison of reported earnings and expenditure shows that very little surplus is generated within most villages and that, as a consequence, a large proportion of households live at little more than subsistence level.

4.3.2 LIMITED ACCESS TO CREDIT

Contact of fisherfolk and farmers in coastal communities with formal banking institutions seems to be almost non-existent. Previous credit programmes aimed at fisherfolk have been implemented on a very small-scale in Nias and have, apparently, not performed well in terms of either impact or repayment. Familiarity with banking procedures and facilities among fisherfolk is very limited. Savings activities, whether formal or informal, are also uncommon. Informal credit sources also seem to be very restricted, with very few, or no, fish buyers involved in the provision of credit for fishing activities by traditional fisherfolk.

Correspondingly, indebtedness was not reported to be a major problem and was only mentioned at all in a very few cases. Any indebtedness which occurs seems to be for purposes of consumption and does not appear to lead to obligations which affect the control fisherfolk have over their catches, as is the case in many other parts of Indonesia.

4.3.3 LIMITED DIVERSIFICATION OF ECONOMIC ACTIVITY

Beyond fishing and extensive agriculture, there is little diversification of enterprise in the coastal communities investigated. Besides fishing, the cultivation of small holdings of food and cash crops provides most households with their only sources of livelihood. While some expansion and diversification is taking place in the types of cash crops grown in a few locations, most communities seem to have had little exposure to new alternatives.

In fishing, there is a general awareness of the 'traditional' nature of current fisheries practices. These are often compared with unspecified 'modern methods'. There appears, however, to be little diversification or experimentation with new techniques and little impetus to try out new activities.

4.3.4 LIMITED INVESTMENT IN PRODUCTION

With almost no access to credit, with limited surpluses for reinvestment and with little awareness of alternatives, the investment in production is very low. In agriculture, inputs for the improvement of productivity, such as fertilizers, pesticides or improved varieties, are rare, as is awareness of the possibilities for their use. The activities of a more organized agrobusiness sector are just beginning to make themselves felt in Nias, but have as yet had little impact on practices at village level.

Fishing activities are generally carried out at a very low level of investment and require a minimum input of capital and technology. The slightly larger scale operations being carried out from a few centres do not involve many traditional fisherfolk and have not had any appreciable impact on their fishing practices.

4.3.5 LIMITED CONTACTS WITH, OR ACCESS TO, GOVERNMENT SERVICES

The familiarity of villagers in coastal communities with government services and programmes is extremely restricted. Contacts with extension staff, or officials beyond very local level, seldom take place. Local government resources for carrying out activities in the field are few and this contributes to the fisherfolk's lack of familiarity with officialdom.

In some cases, particularly among farmers, respondents showed some knowledge of existing extension services, but access remains difficult.

4.3.6 LACK OF ORGANIZED MARKETING CHANNELS

Even in those villages where access to centres of commercial activity is relatively easy, it was noticeable that contacts between village-level production and more extensive marketing channels seem to be at the initiative of the producer alone. There appears to be little penetration to village level by the marketing network in Nias. While organized collection of produce is developing in a few areas, it is still relatively in its infancy. The mechanisms which do exist seem to deal mainly with such agricultural commodities as rubber and spices.

A common complaint by fisherfolk is that they lack a 'buyer' for their catches. The need for an individual or collective body to establish links between the village and outside markets is frequently cited as a priority issue.

4.3.7 OWNERSHIP OF THE MEANS OF PRODUCTION

Most households own at least one means of livelihood, either land or fishing craft and gear. Rental of either of these is very rare. While working, as agricultural labour is frequently an additional source of income for fishing households, the incidence of labour for hire in fishing is restricted to a few larger fishing centres. Most fishing activities are owner-operated. Where craft need more than one crew, family members seem to be the most common source for additional crew, although there is some operation of craft on a share basis. In such cases, on traditional non-motorized craft, catches are usually shared fifty-fifty.

4.3.8 EDUCATIONAL LEVELS

The larger towns in Nias, notably Gunung Sitoli, play an important role as centres for secondary education, meeting these needs of the entire island. As a result, relative proximity to these centres seems to be an important factor in fisherfolk's access to education. Communities on the northeastern coastal strip in Tuhemberua, Gunung Sitoli and Gido subdistricts have easier access to schools and invest more in educating their children than elsewhere on the island. While most villages have access to primary schools, children from more remote villages appear to be less likely to continue their schooling beyond primary level. The quite considerable amounts sometimes spent on schooling by households near Gunung Sitoli and Teluk Dalam perhaps indicate an enhanced awareness of the opportunities offered by better education.

Among the older generation in fisherfolk communities, educational levels are considerably lower. Illiteracy is not uncommon, even in the age range 20-40.

4.4 *Problems, resources and solutions as seen by fisherfolk*

While the above description of the principal factors affecting the socio-economic conditions of fisherfolk in Nias is the result of a combination of observations by the coordinator of the survey and BOBP staff, comparison with existing data, and discussions with fisherfolk, this section on problems, resources and possible solutions is based entirely on the views expressed by fisherfolk. It can therefore be regarded as presenting the fisherfolk's view of their conditions and priorities. Inevitably, there is some overlap between the two sections.

Inquiries into the problems, potential and hopes of fisherfolk were carried out in two parts during the course of the appraisal. Respondents were initially encouraged to talk very generally about problems and opportunities which they saw as affecting their communities and their own households. Responses to this part of the interview gives a reasonably good picture of the fisherfolk's own priorities, as they were free to bring up those matters which were of relevance to them.

Subsequently, discussion focussed on specific fisheries issues in order to elicit more detailed responses on such matters as fisheries problems and resources, and problems, potential and solutions in respect of fisheries practices, marketing and motorization.

The analysis below concentrates first on perceptions which seem to be general to the villages investigated and then reviews any other important points mentioned by fisherfolk from specific villages or areas.

Three priority issues seem to be recognised by fisherfolk in all the villages investigated.

4.4.1 LACK OF FINANCIAL ASSETS

In general terms, most respondents regard the lack of financial resources at their disposal as an important constraint. This is expressed in various terms. Most commonly, fisherfolk refer to their lack of assets which would enable them to take up new or improved activities, either in agriculture, fishing or small-scale trading. Others simply complain of low earnings and difficulty in meeting day-to-day expenses for themselves and their households.

Given the low earnings reported, these concerns can be regarded as valid and a primary constraint on development at the village level.

It would appear that the lack of capital is seen as more of a problem by fisherfolk than by farmers. Among farmers, awareness of the use of inputs such as fertilizer and pesticides, which would require increased capital, seems to be surprisingly low. By contrast, fishermen seem to be quite familiar with a range of options, requiring some increase in capital investment, to improve their fisheries

enterprises. While they may not be aware of details, such as the specific types of fishing gear which might improve their performance, they are familiar with alternative technologies in general terms. Interestingly, there is almost no realization of the linkage between lack of financial resources and access to credit. Awareness of the credit option, either from formal or informal sources, is extremely limited except where some previous government credit schemes have been implemented.

4.4.2 AVAILABILITY OF APPROPRIATE FISHING TECHNOLOGY

A majority of the fisherfolk interviewed during the appraisal complained of the limitations of the fishing technology at their disposal. This is often perceived as being at the root of their low earnings from fishing, poor catches and inability to exploit the fisheries resources fully. This problem is very often defined by using the formulation 'We're only traditional fishermen'. 'Traditional methods' are frequently directly contrasted with 'modern' methods, particularly when discussing fishing gear and motorization.

The technical area most frequently referred to as a problem is that of fishing methods. Ideas concerning possible alternatives in this field, are, however, characteristically vague. Suggestions from fisherfolk tend to concentrate on obtaining unspecified 'modern' fishing gear or merely greater quantities of fishing gear, reflecting a general lack of exposure to, or knowledge about, specific alternative fishing techniques or technologies.

Fisherfolk are more familiar with motorization as a technical option, with many fishermen having clear ideas about specific types of engines which could be used for improved fishing operations. In spite of their greater familiarity with outboard engines, there is a marginal preference for inboard diesel motorization, judging from fishermen's responses. In some areas this can be attributed to unfavourable past experience with the former, while in others it may be due to observation of larger craft operating in the area. The durability and fuel economy of diesel engines are quite widely recognized as positive features.

An interesting feature of the comments of fisherfolk regarding technical options is the relative lack of reference to new or improved craft. Even when they talk about engines which are considerably larger than those existing craft could carry, little mention is made of the need for larger or newer types of fishing boats. Only in Afia village does the suggested introduction of newer, larger craft assume any significance. In a few other villages, such as Fowa, Bozihona, Hilinamoniha and Sirombu, this issue is accorded relatively low priority.

During discussions with fishermen in several villages while following up the appraisal, a general lack of familiarity with alternative types of small craft was apparent. Many stated that craft for offshore fishing had to be at least 2-3 t to be able to operate in open ocean conditions. While the relative unseaworthiness of existing motorized craft in Nias may explain this perception, the need for education on the importance of boat design and construction, as well as motorization, to improve fishing operations, is indicated.

4.4.3 DIMINISHING/LOW CATCHES AND FISHERIES RESOURCES

Fisherfolk in all the villages investigated express concern in varying degrees over the diminishing catches of small-scale operators. In some areas, notably on the northeastern coast, reasons for the changes in catch rates are not stated very specifically. It is often not very clear from their responses as to whether they are concerned about poor catches in general or about changes in the size of their catches. In all the villages in the southern half of the island, however, fisherfolk respondents are much clearer in voicing their worries about a progressive reduction in catches.

Most fishermen who attempt to explain these changes blame larger craft from 'outside' for intruding into areas generally perceived as being the fishing grounds of local craft. Again, it is fisherfolk in the southern part of the island, in particular, who identify this cause. The 'outside' craft referred to seem to be mainly purse-seiners and trawlers from Sibolga which are known to operate in the area. It is perhaps noteworthy that interaction with handliners, which are known to constitute a significant proportion of the Sibolga fleet, is not mentioned as a problem in the context of the appraisal. Independent discussions with fishermen on the northeast coast, however, have indicated that there is considerable interaction with handliners from the mainland.

A significant proportion of the respondents also blame overfishing by small-scale fishermen themselves for the state of local fisheries resources. This is particularly true of villages on the southern

coast of the island. In Sirombu, on the west coast, a few people also suggest that changes in catches may be due to natural, environmental changes.

Few recommendations are made by fisherfolk concerning management or control of these interactions. In one case, involving fisherfolk working with the subproject and, therefore, in close contact with local fisheries authorities, intervention was requested by the former to control apparently illegal fishing activities by craft from outside Nias. Fisherfolk in Sirombu also recommended intervention by the government to control illegal trawling in the area. The general reaction to such problems on the part of fisherfolk, however, seems to be to seek alternative resources themselves in other areas; hence, the importance attached by them to motorization to enable them to exploit new fishing areas.

There is a general feeling among fisherfolk that resources in most known fishing grounds have declined over the last five to ten years. Fish is still generally available, but fisherfolk indicate that considerably more time is required to take the same catch.

A very disparate range of species is listed for further exploitation. The list is, generally, limited to species already present in significant quantities in local catches. If there is any trend in references to resources for expanded exploitation, it seems to be towards rock fish of various kinds, particularly snapper species, in the southern part of the island. Sharks also seem to be regarded as having potential.

Other important issues with a more local focus brought out by fisherfolk are discussed below.

4.4.4 AGRICULTURAL PRODUCTION

An absolute lack of agricultural land was specifically mentioned as an important problem in only one village, Hilinamoniha, in Teluk Dalam subdistrict. This reflects the geographical location of this village on the southeastern coast, where rocky calciferous uplands, immediately behind the shoreline, limit the area available for agriculture. The identification of this problem may also be influenced by difficulties faced by fisherfolk in regard to fishing operations. Local conditions make the beaching of craft very difficult and limit the size of craft which can be used from the village. The lack of alternative income-generating opportunities may be more acutely felt in these circumstances.

Problems linked with agricultural production were otherwise given priority only in Botolakha village, in Tuhemberua subdistrict reflecting the predominance of agriculture as the principal income-generating activity in that village. Farmers and fishermen in the village emphasize the need for improved access to agricultural inputs such as pesticides, fertilizers, better agricultural equipment and the need for irrigation.

Potential for agricultural development is seen as important in Botolakha, Fowa, Bozihona and Lagundhi.

4.4.5 COMMUNICATIONS AND TRANSPORT

While poor communications seem to be a major drawback in many coastal communities, poor access was listed as an important difficulty, and then only by a few respondents in the single most remote village, Bozihona in Idano Gawo subdistrict.

4.4.6 PRICE INSTABILITY OF FISH

Problems in marketing seem to be fairly widespread on the island, although not all villages investigated listed marketing as a priority issue. Fluctuations in prices appear to affect most communities during periods when large catches are landed. The only area that, according to fisherfolk, is partly immune from this problem is the area north of Gunung Sitoli, where there are regular connections with the district town and the fisherfolk themselves often take their catches to the central market, thereby obtaining the best possible prices for their produce.

Elsewhere, particularly in Teluk Dalam Pasar, Lagundhi and Sirombu, price instability is an important problem and indicates the very localized nature of the market for fish almost everywhere outside Gunung Sitoli.

4.4.7 NEED FOR ESTABLISHMENT OF A MARKETING ORGANIZATION FOR FISHERFOLK

Identification of a need for some kind of fisherfolk organization or cooperative to regulate the marketing of fish and ensure stable prices for fisherfolk does not correspond directly with the identification of price instability as an issue. In Afia, near Gunung Sitoli, fishermen suggest the formation of a cooperative to ensure better prices for fish. In contrast, fisherfolk in villages in the southern part of the island see the cooperative as a means of obtaining a guaranteed buyer for catches as well as stabilizing prices.

There does not appear to be any feeling that fisherfolk require such organizations for purposes of representation, in spite of the fact that participation by fisherfolk in village institutions is often very limited. This is further discussed in the subsequent section on institutions.

4.4.8 AVAILABILITY OF ICE

Lack of ice is mentioned as an issue in only two villages, Lagundhi and Sirombu. This may reflect, to some extent, an awareness in these two communities of offshore fisheries resources, the exploitation of which would require the use of ice.

4.4.9 FISH PROCESSING

The improvement of fish processing facilities and techniques is suggested only in two communities: in Lagundhi, where it represents one of the most important solutions suggested, and in Sirombu, where it is regarded as a minor priority.

4.4.10 FISHERIES EXTENSION AND TRAINING

A significant number of respondents in Afia alone mention a need for training in fishing methods to complement the introduction of new fishing gear, craft and motorization.

4.4.11 ENGINE MAINTENANCE

Sirombu is the only fishing community where fisherfolk are sufficiently familiar with motorization to raise any specific issues regarding the use of engines. Problems with maintenance seem to be paramount due to poor availability of spare parts and high costs of repairs to outboard motors.

4.4.12 LOCAL FISHERIES RESOURCES

A few specific fisheries resources are mentioned by fisherfolk as having local potential.

Potential for flying fish, along with various other small pelagic species, notably half-beaks, is mentioned in Lagundhi. Billfish are also regarded as potentially important in here and, more extensively, in Sirombu. Other large pelagic species, such as tuna and Spanish mackerel, are most extensively referred to by fisherfolk in Sirombu and Fowa.

Fisherfolk in these three communities, Fowa, Lagundhi and Sirombu, seem to have the clearest ideas regarding fish species which are commercially interesting and might be more extensively utilized. The range of fish species mentioned in these villages is also significantly greater than in other villages.

4.5 *Economic activities other than fishing*

The relatively narrow range of income-generating options open to people in the coastal communities investigated is a significant feature of the findings of the appraisal.

4.5.1 AGRICULTURE

Apart from fishing, agricultural activities are by far the most important source of income. The relative importance of agricultural earnings varies from village to village, depending mainly on the extent of agricultural land available.

In most of the villages a large proportion of fisherfolk households possess small holdings. Where feasible, as in Botolakha and Lagundhi, these plots are utilized for rice cultivation. Rice seems to be the crop of choice as it can be used for household consumption and commands a ready market on Nias, where rice is still imported from the mainland. Most land in the area, however, is suitable only for the cultivation of cash crops such as rubber, cloves, and coconut. Cocoa is a relatively recent introduction that appears to be gaining popularity.

Productivity in all agricultural production is reported to be extremely low.

Members of many fisherfolk households also seem to work as agricultural labourers on a seasonal basis. Once again, the scope for finding employment in agricultural labour appears to vary from village to village and on the size of landholdings. In Botolakha and Lagundhi, most households seem to be involved in agricultural labour on a regular basis. In most other villages, the opportunities seem to be more limited.

Agricultural work, either on family smallholdings or on land belonging to others, appears to be particularly important as a source of employment for women in fisherfolk communities.

4.5.2 TRADING

In several villages, a few small-scale fisherfolk families are also involved in trading activities. This usually takes the form of operating small stalls stocking such consumable items as cigarettes, mosquito coils and oil lamps. The preparation and sale of food is also a popular alternative. In both cases, fisherfolk along the northeastern coast, on either side of Gunung Sitoli, seem to be most involved. This may be due to the fact that the principal road in this area closely follows the coast, passing through those parts of villages where fishing communities live; the steady flow of people along this road presents better opportunities for small-scale trading and retail activities.

This is borne out to some extent by the fact that such activities are not taken up in more remote villages such as Bozihona, Hilinamoniha or Sirombu. Although Lagundhi should represent a special case, due to foreign tourists visiting the area, the findings of the appraisal seem to indicate that relatively few active fisherfolk are involved in catering to tourists or seem to regard it as an activity open to them.

4.5.3 SALE OF FISH

In several villages, fisherfolk themselves are active in transporting catches to local markets and selling them. In some locations, fish is sold by fisherfolk at, or near, their landing points. This again is a particular feature of communities along the northeast coast, where the existence of a well-travelled coastal road makes a roadside fish stall a viable proposition.

Where a larger central market is accessible, fishermen often transport fish to the market themselves, usually by cycle. Many fisherfolk in the Gunung Sitoli area choose this option, although there are also fish traders who collect fish at landing points and transport them by cycle or motorcycle to the town.

In the Gunung Sitoli area, the trade in fish seems to be in the process of developing. During the last few years, many local fish traders have changed from cycle to motorcycle to transport fish from fishing villages to the market in Gunung Sitoli and other local markets. Several of the fisherfolk contacted during the appraisal in the northeastern part of the island also seem to be in the process of becoming small-scale fish traders. While remaining active fishermen, they earn additional income by collecting the catches of other fishermen and transporting and selling the fish in Gunung Sitoli or other local markets. They often list fish sales as an alternative source of income which significantly increases the earnings of the household.

It is possible to speculate that, at least in the three more densely populated coastal subdistricts of Tuhemberua, Gunung Sitoli and Gido, from which the district town of Gunung Sitoli is accessible, an early stage of development of local fish dealers, such as frequently encountered in other areas of Indonesia, is emerging. Recent developments, such as the commencement of operation of a roll-on, roll-off ferry service from Gunung Sitoli to the mainland may give a significant boost to this nascent fish trade by making mainland markets more accessible. As yet, none of these traders appears to have taken on a role as provider of other fishing inputs or credit, but this may be the next stage in the development of the local marketing system.

Some similar developments may be taking place around Teluk Dalam in the south, but there appears to be less stimulus for such development and marketing, therefore, remains more of a problem for small-scale fisherfolk in that area.

4.6 *Formal and non-formal institutions*

There are basically three formal village level institutions in Indonesia. First, the Lembaga Musyawarah Desa (LMD), which is a general body for village consultation and decision-making. Second, the Lembaga Keamanan Masyarakat Desa (LKMD), which has a more active role in

organizing village self-help activities (*gotong royong*) and village development. Third, the PKK, or Voluntary Women's Organization, which coordinates activities among village women in a wide variety of fields ranging from health and family planning to income-generation.

In addition, for the purposes of extension activities, farmers and fishermen are organized into groups which act as receiving mechanisms for technical extension provided by the Extension Service and the various Technical Services. These groups are usually organized on the basis of profession. Thus, fishermen, either in general or using a particular fishing technology, might be grouped together, while rice farmers and rubber or clove cultivators might form separate groups.

Looking at the level of reported activity of formal institutions in village development, it appears that effective functioning of such organizations corresponds quite closely to the relative importance of agriculture in the community. It is significant that the communities which report 'active' village institutions include Botolakha, Lagundhi and Hilinamazihona, all of which are villages where agriculture is an important activity and important for fisherfolk households. This would appear to support, to some extent, the commonly held view in Indonesia that farmers are far easier to organize and involve in cooperative action than fisherfolk. This view is further borne out by comments from respondents concerning attempts to organize extension groups. While some groups appear to be functioning in a few villages, notably in Fowa, it is also noted in several cases that 'disagreements' prevent fisherfolk groups from functioning effectively.

In other villages, such as Sirombu and Bozihona, formal village institutions seem to be in place, but fisherfolk's participation in them appears to be very limited. The reasons for this non-involvement are not clear, but the experience of fisherfolk communities indicates that the work patterns of fisherfolk often limit their ability to participate in village meetings and other collective activities.

In the other coastal communities investigated – Ladara, Afia, Sisirahili Gomo and Hilinamoniha and Teluk Dalam Pasar – formal village institutions seem to be largely inactive, or play a very limited role in village life.

In one case, Afia, special mention is made of an informal religious group which plays an important role among fisherfolk and seems to create a certain degree of unity among fisherfolk households in the village. Religious organizations and their activities seem to play an important social role in most village communities in Nias, whether Christian or Muslim. It is known from communities other than those investigated that some Christian missionary groups have also been involved in development activities. Generally, however, religious organizations do not seem to be taking a lead in development work at village level.

In one other village, Hilinamoniha, the role of *adat*, or traditional law, is specifically identified as a potential obstacle to development activities in the village. The appraisal does not go into enough detail to be able to assess the validity of this judgement. It is known, however, that local traditions and, in particular, local power structures based on family ties and clan links are an important factor in Nias culture.

In the past, agencies involved in development activities in Nias have encountered significant problems due to conflicts and jealousies between groups within villages. Such conflicts have been known to actively interfere with development efforts.

4.7 Implications of the findings for future trials, demonstrations and introduction of improved outrigger canoes

The ultimate goal of the appraisal of fisherfolk communities in Nias was to obtain an overall picture of the factors which might influence the success of future trials, demonstration and introduction of improved outrigger canoes in Nias. The factors which can be identified fall into the following categories

- Locations;
- Facilitating participation
- Facilitating access;
- Post-harvest handling; and
- Fisheries management.

4.7.1 LOCATIONS

Three important issues should be taken into consideration when identifying locations for possible further trials and demonstration of the improved outrigger canoes designed by the project.

One is the target group. Taking 'fisherfolk' as a general term to refer to anyone involved in marine fisheries, coastal fisherfolk in Nias seem to show differing degrees of dependence on fisheries as a source of livelihood. Consequently, the potential target group for the activities of a subproject aiming to reach the small-scale fisherfolk in Nias includes fisherfolk households which are also active in agricultural activities. In many communities, it would be very difficult to differentiate 'pure' fisherfolk as a target group from the rest of the community.

If the aim of further trials and demonstrations of the new craft is to involve full-time, 'professional' fisherfolk who see themselves as committed to fisheries as a profession, several of the communities investigated could be regarded as having suitable target groups : Hilinamoniha, Teluk Dalam Pasar, Sirombu, Sisarahili Gomo, Afia, Bozihona and Lagundhi.

If, however, the activity should wish to focus on communities where options other than fisheries are limited, only the first three of these would be suitable, *i.e.* Hilinamoniha, Teluk Dalam Pasar and Sirombu.

In view of the poor communications common to most of Nias and the need for close monitoring of the trials and demonstration phase of the new craft, the relative remoteness of locations for project activities for staff involved in monitoring the project, is an important issue. The only easily accessible locations in Nias are those on the northeastern coast of the island in the immediate vicinity of Gunung Sitoli, where the District Fisheries Service is located and the airport allows easy access for project managers from outside the island. Any other area of the island can be said to suffer from severe limitations in terms of accessibility. Centres such as Teluk Dalam and Sirombu require extended trips of 4-6 hours by road. Isolated villages such as Bozihona are accessible by sea in approximately the same length of time.

If the activity is to be taken up anywhere other than along the northeast coast, near Gunung Sitoli, there are two possible alternatives. Either properly trained staff who can be largely self-sufficient in monitoring must be placed at village level, or those involved in monitoring must be prepared to devote considerable time and effort to travelling between project locations.

A third issue is that of access to fisheries resources. As little precise information is available regarding the state of fisheries resources in Nias, it is difficult to speculate about the best locations in terms of access to suitable fishing grounds.

However, based on fisherfolk's comments regarding their own familiarity with existing resources, these areas which they consider as having a wide range of pelagic and demersal resources are Teluk Dalam Pasar, Lagundhi and Sirombu. It should be noted that these correspond to areas where small-scale fisherfolk are also most familiar with motorization and that greater mobility may have led to wider contact with different resources.

4.7.2 FACILITATING PARTICIPATION

The factors which will influence the willingness or otherwise of fisherfolk to participate fully in activities of the subproject will often be extremely specific to particular villages or even individuals. Three factors identified during the course of the appraisal can, however, be said to have a general impact on the way in which any future activities should be planned.

The first is the institutional structure. The appraisal's findings indicate that most fisherfolk on Nias have very little to do with any formal government or non-governmental institutions which are involved in development work. As a result, the possibilities for organizing fisherfolk participation through the normal channels of village development institutions, such as the LMD and LKMD, seem to be limited. Likewise, the coverage and influence of mechanisms set up by government extension services are very restricted and existing extension groups are largely inactive.

Working with individuals, families or small groups seems to be a suitable alternative. In doing so, there would be a need for care, as it seems, from past experience of other agencies on Nias, that advantage accruing to small sections of the community is often resented by other sections and becomes a source of conflict. This requirement would indicate the necessity for trained staff in place at village level on a permanent basis to monitor activities. Such staff would have to be familiar with the local language and be able to fit in with the local community.

In addition, any trials or demonstrations being started in new locations should take time initially to identify suitable ways of organizing fisherfolk in the community to participate in the demonstration.

A second factor is motivation. Nias fisherfolk widely perceive a series of problems affecting traditional fisheries in Nias and see the introduction of motorized craft as an important element in overcoming some of those problems. The normal patterns of work of fisherfolk, however, are very different from those required to successfully operate a craft requiring a relatively high investment, such as the new outrigger canoes proposed for introduction. Even where fisherfolk are anxious to exploit new resources further afield, they are seldom used to longer fishing trips. In particular, they are not familiar with the necessity for sustained intensive fishing operations in order to ensure the economic viability of their fishing enterprise. Until concrete economic benefits begin to accrue to participating fisherfolk from the operation of new craft, some fisherfolk will inevitably require motivation and encouragement, backed up by repeated explanation and justification, in order to ensure that they operate the craft at the levels required for a viable demonstration.

This again would seem to indicate a need for resident field staff to act as motivators, particularly in view of the lack of any strong institutions or organized groups to exert pressure on individual operators to sustain their fishing effort during demonstrations.

The third factor is that of maintenance and share management. The current level of fishing technology used by the majority of traditional fisherfolk in Nias requires little in the way of maintenance. The shore management required here for typical fishing operations is also of a limited variety. For the conduct of traditional fishing operations, the only consumable inputs requiring routine replacement are fishing lines and hooks, bait and food for the crew for longer fishing trips.

As a result, the type of routine, preventive maintenance necessary to sustain intensive operations of a motorized craft are unfamiliar to fisherfolk. For them to learn and appreciate the need for these new work patterns would require repeated training and monitoring. This would also indicate the need for field staff to be located at village level in order to support such activities.

4.7.3 FACILITATING ACCESS

In the event of successful demonstration of the feasibility of new outrigger canoes on the island, the fisherfolk's ability to gain access to such technology will remain an important problem. Levels of savings and generation of surplus income which could be reinvested in an improved technology are very low and cannot be expected, in the short term, to cover the costs of motorized fishing craft.

Findings of the appraisal also indicate the singular lack of an active credit network in Nias, whether formal or informal. Some form of credit input would be required if the intended target group of small-scale, traditional fisherfolk on Nias are to benefit from the introduction of the new outrigger canoes.

Given the lack of credit institutions at village level, the creation of some kind of village-level mechanism to administer and distribute credit under the auspices of the project may be necessary. The setting up of village revolving funds for the purpose is one alternative. The training and preparation of fisherfolk to run such funds themselves will, however, require considerable training input. Suitable trainers would have to be trained as none are currently available in Nias.

The importance of addressing this problem at the earliest stage of any continuing programme for demonstration of the new craft cannot be overemphasized as the level of awareness concerning the use of credit is exceptionally low in Nias. The preparation in each target village of such village-based credit mechanisms at an early stage of demonstrations, would also enhance the participants' understanding of basic management and would improve their ability to manage the more intensive fishing operations required.

4.7.4 POST-HARVEST HANDLING

In many parts of Nias, post-harvest problems constitute a potentially major constraint to the success of future demonstrations of improved outrigger canoes.

In the southern and western parts of the island, the problems faced by fisherfolk in disposing of their catches might affect their motivation to increase fish production through the use of motorized

canoes. When restricted local markets are already subject to periodic gluts of fish and unstable prices, significantly increased catches from motorized craft might well depress prices further. Consequently, real benefits from the new outrigger canoes will be enjoyed by fisherfolk only if suitable marketing arrangements are made to absorb the higher volume of fish generated.

Fisherfolk in these areas themselves suggest the setting up of special organizations along cooperative lines to handle the marketing of catches. There is, however, no indication that the existence of such organizations by itself would have any real impact on the problem. For marketing cooperatives to have any impact, certain basic facilities, such as better communications, ice supply and consequent access to wider markets, would have to be available. Once such facilities are available, private traders will almost certainly extend the fish marketing network without any need for special organizations or structures. This appears to have already taken place in the area around Gunung Sitoli, where both small entrepreneurs and fisherfolk have been able to benefit from better communications with the mainland and between villages and the supply of ice from one privately owned factory in the area.

The problem for future demonstrations, however, is the lack of a sufficiently active marketing network extending to those parts of southern and western Nias where more extensive demonstrations should probably be carried out. Private buyers are unlikely to start up operations there until they can be assured of adequate fish supply. Fisherfolk may not be interested in increasing their catches until they are assured of a buyer. In this situation, active efforts will be required to attract a buyer during the early stages of further demonstrations and, perhaps, some support should be provided in matters such as ice supply and storage. The project should be prepared for a situation at the start of the trials when fisherfolk using the new canoes will be catching more fish than they can sell and a suitable buyer has not yet been attracted. Some mechanism would have to be identified to prevent such a situation having a negative effect on the fish prices for other fisherfolk in the area.

The improvement of communications and access in the southern part of the island can be regarded as a long-term process which will eventually open up better markets for small-scale fisherfolk. In the short term, marketing can be improved only if means for preserving fish can be made available. Better preservation of fish could be effected either through processing or the use of ice.

The possibilities for expanded processing of fish through drying and salting need further investigation. There is reported to be an unsatisfied local demand for dried fish which is now met by imports from the Sumatera mainland. More detailed information regarding demand, pricing and customer preferences on Nias would be required in order to assess the feasibility of fish drying as a solution to current post-harvest problems. During further demonstrations of craft, the effect of fish drying – and the consequent reduction in value – on the economic feasibility of the craft would also have to be assessed.

Only in one village, Lagundhi, is any significant mention made of processing as an option for fisherfolk; there it is one of the priority issues brought up by the fisherfolk. Improvement of processing, if commercially viable, would certainly be the simplest technical solution to their marketing problems.

The capacity to carry ice is an important feature of the new outrigger canoes being demonstrated on the island. It has apparently, contributed considerably to the commercial success of the craft's operations up to date. But ice is now commercially available only in the Gunung Sitoli area. Its production here is probably made viable by the domestic demand for ice around Gunung Sitoli and the use of ice for exporting fish from Nias to Sibolga. This demand will probably increase with the commencement of the new ferry service from the island. It is noteworthy that none of the craft based in Nias carry ice for their operations.

Conditions which seem to have led to the viability of ice production in Gunung Sitoli do not yet exist in the southern and western parts of the island. Fresh fish is not exported from Teluk Dalam to the mainland and domestic demand is apparently satisfied by home freezers. One local businessman had attempted in the past to set up a storage for ice brought from the mainland, but it did not prove viable. In the short term, this situation is unlikely to change and, for the purposes of the canoe demonstrations alternative arrangements should be explored.

One possible option would be for the project, or a private individual with project support, to take up the transport of ice and collection and transport of fish directly between the villages and Sibolga. Some of the large fishing companies operating out of Sibolga might be interested in this option, as they already have craft fishing in the Nias area. The volume of fish generated, and, therefore,

the number of craft involved, would have to be sufficiently large to justify such operations. Alternatively, fish could be sold directly to ice-carrying fishing craft from the mainland, although the prices obtained would probably be low. Such direct export of catches would also avoid a negative effect on the local market for other fisherfolk.

To summarize, it is clear that the situation on the southern and western coasts of Nias is very different from that in the Gunung Sitoli area. While there is no reason to think that the technical viability of improved outrigger canoes would be affected by moving to these new areas, the marketing problems there might affect the economic feasibility of the craft. The impact of these problems needs to be carefully assessed before undertaking any extensive introduction of craft in Teluk Dalam or Sirombu subdistricts.

4.7.5 FISHERIES MANAGEMENT

The remote location of Nias island does not protect its small-scale fisherfolk from extensive interaction with larger-scale fisheries based elsewhere. Also, because of its remote location and the extensive sea area surrounding the island, effective enforcement of fisheries regulations is extremely difficult.

However, considering the concern expressed by fisherfolk over interaction with outside fishing craft, some effort should be made to assess the extent of the problem. The fisheries which are reported as interacting with the current operations of the traditional fisherfolk are predominantly medium-scale purse-seining, trolling and trawling and small-scale longlining and handlining.

The following are pre-requisites for planning the scale of any future introduction of new motorized outrigger canoes

- a more detailed picture of the fishing grounds being exploited by different categories of fishing craft from outside Nias;
- an assessment of the impact of these fisheries on local resources in general and the catches of small-scale fisherfolk in particular;
- an assessment of the potential increase or decrease of interactions with Nias fisherfolk in the event of introduction of motorized canoes; and,
- identification of resources and fishing grounds not currently exploited by outside fishing operations and which could be utilized by local fisherfolk using motorized craft.