

INDONESIA

TRAINING CENTRE ON IMPROVED FISHING

LAMALERA

1973-75 - Phase I

LARANTUKA

1976-78 - Phase II

A report prepared for the  
Training Centre on Improved Fishing Project

by

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## 1. INTRODUCTION

### 1.1 TERMS OF REFERENCE

The Government of Indonesia, assisted by the Food and Agriculture Organization of the United Nations under its freedom from Hunger Campaign/Action for Development, have been engaged in a project whose main purpose has been to train local fishermen in improved methods of fishing extension work, utilization of fish products; to assist in establishing a Training Centre, developing facilities for repairs and maintenance of fishing boats, and establishment and operation of fishermen's cooperatives.

As part of the project operation, FAO assigned Mr. Paul Fjeldstad, Masterfisherman, from 15 February 1973 to 19 February 1979 with the following terms of reference:

- "1. To expand the training and development activities of the project to other villages on the islands. Trainees from other nearby islands will be accepted as far as possible. In order to supplement food for local population, whaling will be continued from Lamalera on a moderate scale but the main emphasis will be on the development of small-scale fishing and related training in courses as well as by promoting and supervising the extension type activities of trainees in subsequent commercial operation.
2. To assist in developing facilities for repairs and maintenance of fishing boats and motors and to train local fishermen in this field.
3. To assist in the establishment of small-scale boat building facilities to improve local craft and local skills by providing relevant training.
4. To improve handling and processing of fish and whale meat, and to provide relevant training.
5. To assist in the establishment and operation of Fishermen's Cooperatives and to provide relevant training."

### 1.2 BACKGROUND INFORMATION

The first phase of the project was a request from the Catholic Mission in Larantuka to FAO/FFH/AD to help the people on the island of Lomblen, in the

east part of Flores, a part of the province Nussa Tenggara Timor. The donor for this project was MISEREOR (Aktion gegen Hunger und Krankheit in der Welt, Bischöfliches Hilfswerk E.V.) of the Federal Republic of Germany.

For a long time, Lomblen Island was neglected because of retarded economic development. The people on this island are in general small farmers and fishermen and they work with very primitive methods. The main problem for the farmers is getting water during the harvesting season and for the fishermen lack of the equipment they need and lack of knowledge in using modern fishing gear.

The main fishing village on the island of Lomblen is Lamalera, and the first phase of the project was therefore concentrated on this village.

The population on the island of Lomblen is 75 000 and in the village of Lamalera there are 2 000 people. The main income in Lamalera is derived from whaling, which is a traditional occupation that goes back for generations. The main catch is sperm whale (Physeter catodon). The whale hunting is still executed in "Moby Dick" style, with home-made equipment. The equipment the fishermen use is not good enough for good results and the methods are difficult and dangerous.

It is not yet known when the people of Lamalera started whale hunting, but it is said that a whale brought the first man to Lamalera. Lamalera has a good view of the sea, and when whales pass by, it is easy for the people ashore to recognize them and all the fishermen go out hunting.

The main whaling season lasts from May to the end of September, but in other months of the year some whales are caught, and very often they catch other kinds of fish with the same equipment in the same season.

The boats, named "pledang" are only used for hunting. These boats are about 5-7 metre long and home-made.

The whale hunting is an old tradition and the fishermen do not want to give it up, in spite of the fact that they could have a much better income, when doing other kinds of fishing.

Meat from the sperm whale is not the best food for human consumption, so other kinds of fish would give the people of Lamalera a better and more healthy life.

LAMALERA (1973-75 - PHASE I

## 2. PURPOSE OF THE PROJECT

This project was a pilot project. After a short period it was clear that the development of whaling in a modern way, could not continue. Therefore, it was decided to concentrate more on the small-scale inshore fishing. An idea was brought forward - to build a training centre for fishermen in Lamalera. But to build the training centre for fishermen on this island, which is very isolated, with no harbour and difficulties of communication, would not be suitable for the province as a whole.

PHASE IPurpose:

1. To organize, on a pilot basis, a training centre for instructing the fishermen on improved fishing.
2. To increase production so as to alleviate protein deficiency in the villages around the centre.
3. To carry out extension work on improved fishing methods in both Lamalera and neighbouring villages and, at an appropriate stage, provide guidance on marketing and utilization of fish products.
4. To provide advice in boatbuilding and mechanization.

## 3. IMPLEMENTATION

- I. To start building a structure for training in Lamalera was impossible. There was no material available at that time. A house near the beach, which belongs to the fishermen group, was found suitable for the training centre and after negotiations with this group, the house was given to the project for the project period. The house was not in a good condition and it had to be rebuilt before being placed into use as training centre.

In the project 28 students were trained and some of them worked with the project as crew on the vessel FAO 82 for the whole period. Two young men from Lamalera were sent to SUMP Tegal for further schooling for a three year period, and two were sent to a training centre in Singaradja, Bali, for further training. All of them came back to Lamalera after finishing the school.

The practical training at sea was in whaling, gillnetting and longlining. The theoretical activity in the training centre is mentioned in the schoolplan.

#### 4. WHALING

In Lamalera 18 boats went whaling during the whale season. Each boat had 14 crew members. The boats were built in Lamalera with the same methods as those of a hundred years ago, and of course not good enough for whaling. Better boats could have been built with more outside assistance.

The amount of the whale catch changes from year to year, from 5 to 56 each year. The reasons are many, but obviously the main reason is due to change in the temperatures and feeding from year to year. The amount of whales caught differed for each boat. In some seasons some of them do not catch any whales at all. Maximum catch each season is three whales by each boat.

In the project a modern way of whaling was to be taught with a boat 12 m long and a 68 HP Yanmar motor. For shooting the whale a 50 mm harpoon gun was fitted onto the boat and the boat had a crew of six.

During 1974 the first season of modern whaling, 11 whales were caught with the FAO 82. At the same time the 18 whalers from Lamalera had 23 whales altogether, with help from FAO 82. The next season, 1975, the FAO 82 caught 20 whales and the 18 local whalers got 21 whales. With a little more training it should be possible to catch more whales with the modern whaler.

In these two seasons when whaling was done, a tremendous amount of protein-rich whale meat was provided to the people of Lamalera and to the people of the island of Lomblen. Also a large amount of whale oil was provided for lamps.

During these two seasons the crew and a gunner were trained and during the last season the gunner himself shot 16 whales.

Before and after the whale season other methods of fishing were used, such as drifting with gillnets, beach netting, longlining for tuna and shark, trolling after tuna and other kinds of fish. The above-mentioned methods of fishing all gave good results.

## 5. IMPROVED FISHING METHODS

During the project period in Lamalera, students from neighbouring villages were also trained at the training centre on improved fishing methods.

Courses in fish handling and marketing were given on a small-scale and improved. The inland farmers, who were the main buyers of the fish, very soon became aware of the better quality of the fish. The handling of the fish was improved and the fish was now gutted and salted at once after catching and then dried.

## 6. BOATBUILDING

All the boats on Lomblen Island and also in the neighbouring villages were locally built. Wood was taken from the forest a long time before they started to build a boat, to allow for drying. The ribs were branches from the trees, but the planking was shaped by cutting a part of the wood. This method damaged large areas of the forest.

To show the people that other ways of building a boat could be both better and more economical, a small boat suitable for Lamalera fishermen was built. The boat was 4.25 m long.

Material for the boat was planks of 8 cm wide and 2 cm thick and a length of 2.5 m. To get the right shape, the plank was heated with hot water and became more flexible.

## 7. PROJECT EXTENSION

At the end of the project period (phase I) a suggestion was made by the expert to the Governor of the province, the Provincial Fisheries Service in Kupang and to the local fisheries service in Larantuka and the Direktorat Jenderal Perikanan in Djakarta to move the project Training Centre on Improved Fishing to another more central and suitable place - Larantuka. They agreed to this but funds for a period of three years more were needed urgently.

A new request with an estimate of cost for a period of three more years 1976-78, was sent to MISEREOR. The FAO expert himself went to MISEREOR in Germany during his home leave to discuss the final plan of operation.

The request was accepted by MISEREOR, which agreed to fund the project for a period of three more years.

## LARANTUKA (1976-78 - PHASE II)

## 1. INTRODUCTION

After spending two of the three year period of the project in Lamalera, it was clear that the fishermen in this part of Flores needed help to obtain better knowledge of a more modern way of fishing.

Therefore, an extension of the project for a period of three years more was suggested. If an extension was possible, the project then should be transferred to another more central place in the same area.

In order to be more effective in this area and to give full support to the development of fisheries in this part of the province Nusa Tenggara Timor, it was proposed by the expert to move the project (phase II) from Lamalera to Larantuka. This proposal was discussed and accepted by the donor MISEREOR of the Federal Republic of Germany, Direktorat Jenderal of Fisheries of Indonesia, Governor of Nusa Tenggara Timor and Fisheries Service, Timor.

The new plan fitted very well into the already existing fishery project run by the Catholic Mission in Larantuka.

The new plan could also be a benefit for the fishermen in the whole province. This would be the first training centre for fishermen in this area where thousands of fishermen really need help.

## 2. PURPOSE OF THE PROJECT

1. The project will be moved to Larantuka, where there is a more suitable location for a training centre. The vessel FAO 82 provided by the donor MISEREOR, and two fibreglass boats with auxiliary outboard engines for training purposes and for experimental/demonstration fishing, which are provided by the Government, will also be moved to Larantuka. Practical training in simple boatbuilding in addition to the courses in artisanal fishing techniques will continue. Courses will last from four to six months, depending on the candidate's background.
2. The project will in the future put more emphasis on training fishermen from other villages from nearby islands. The training centre in Larantuka will be the only one in Nusa Tenggara east of Bali.
3. The project will assist in setting up facilities for repairs and maintenance of fishing boats and motors in close cooperation with



the existing Catholic Mission's Workshop in Larantuka. This will include the provision of tools and material. Training will be predominantly practical and on the job.

4. The project will provide consultants to improve handling and processing of the fish and whale meat. On-the-job training may be complemented by short courses, linked with the already existing Catholic Mission project.
5. There is continued need for assistance in organizing and running the existing Fishermen's Cooperative in Lamalera and for setting up new cooperatives in other villages. This will be provided by the master-fisherman and consultancies. Training will be mainly on the job and concentrated on management and administration. This will be done in collaboration with the already existing Diocesan project.
6. Modern whaling by harpoon gun with FAO 82 will be restricted to satisfying actual needs for additional food as and when this arises. Counterparts will continue to be trained so that this activity can be continued after the termination of the project if required.
7. The project will strive towards creating sufficient saleable products to ensure the continuation of mechanized fishing after the termination of the project.

### 3. GOVERNMENT CONTRIBUTION

The Government will continue to make available the facilities and equipment already provided to the project during Phase I.

The Government will provide a counterpart masterfisherman and an engineer for the vessel FAO 82.

The Government will provide the area and housing for the new training centre at Larantuka, approximately 6 000 m<sup>2</sup> of land.

At the time the Training Centre on Improved Fishing, Phase I, was terminated, most of the fishing gear, two fibreglass boats, each 4.25 m, each with an outboard engine, were handed over to the Fishing Cooperative in Lamalera. The fishing boat FAO 82 and the small wooden boat which was built in Lamalera were transferred to the new project, but only for the project period. When the project's Phase II was terminated a decision was to be taken as to whom the FAO 82 should belong to, Project Phase I or Project Phase II.

## 4. TRAINING CENTRE

## 4.1 CONSTRUCTION

When the FAO expert arrived in Larantuka in March 1976, no building was available to start a training centre for fishermen. Therefore, it was the wish of the authorities in the province and also necessary to construct a building. This responsibility was given to the FAO expert.

Together with the staff from the Fisheries Service and the administrator of the Kabupaten (region) a suitable place was found 9 km from the centre of Larantuka close to the beach.

The expert was then requested to make a plan and an estimate of cost for a training centre. By careful management of existing funds and good planning for the construction, it was possible to build the training centre adequate for the future, and which still has room for later expansion.

The cost estimate to build a training centre was worked out by the expert in March 1977 at an amount of Rp. 12 750 000.

A drawing of the training centre was sent to two private companies, which had built some houses in Larantuka, with a request of cost. Their estimate of cost was three times more than the estimated amount worked out by the expert and could not be accepted. Because of the financial situation for building the training centre, the expert had to look into the whole matter himself.

It took more time than expected to get everything going, so the "corner stone" for the training centre was laid down on 17 May 1976, marked with a ceremony given by the local Fisheries Service in Larantuka. The housing at the centre had to be built step by step because of the financial situation, which was a constant problem. Before the termination of the project the training centre was completed and the local authorities found it excellent.

A.	Estimated cost to build a training centre on March 1976.	Rp. 12 750 000
B.	Total cost to build a training centre from 17 May 1976 to 30 September 1978	
	(1) Cost of land	Rp. 450 000
	(2) Foundation - cements - stones labour costs	Rp. 2 590 933

(3) Building materials: materials, waterpipe electric installations, WC and septic tank	Rp. 11 000 000
(4) Generator set: 5 KW YANMAR (1) - 3 KW Yanmar (1)	Rp. 590 000
Total	<u>Rp. 14 630 933</u>

C. Funds available:

(1) From the 1st phase of the project	Rp. 1 800 000
(2) Additional funds from Norway, October 1976	Rp. 6 225 000
(3) Counterpart Contract 77-78 March 1978	<u>Rp. 5 000 000</u>
Total	<u>Rp. 13 025 000</u>

The training centre covers an area of 700 m<sup>2</sup> and includes:

Three class-rooms  
Kitchen and Dining-room  
Dormitories for 40 young men and four teachers  
Six bath-rooms  
Six toilet-rooms  
A small office

Electricity for all the buildings with 5 Kw + 3 Kw generators.

Watertank of 11 m<sup>3</sup>.

A drawing of the training centre facilities is attached to this report.

The whole training centre was painted outside and inside and was in an excellent condition when it was handed over to the Provincial Fisheries Service in Nusa Tenggara Timor 30 September 1978.

The total cost of building the Training Centre was Rp. 14 630 993.

#### 4.2 SCHOOLING AT THE CENTRE

As soon as the first building was finished (the netloft) the first week of October 1976, arrangements were made to enter boys (fishermen) in the school.

Fourteen boys attended the school on 15 October and finished the course at the end of January. Several more wanted to attend but there was not space enough at that time for more pupils. When they entered the school they had to go through a medical check paid for by the project.

Most of the young men who joined the course at the training centre came from fishing villages and from fishermen's family in the area of Lamalera and Larantuka. A few came from the Fisheries Service Office to get more theoretical and practical experience.

Those who entered the Training Centre had different backgrounds/education, varying from three to seven years in school. Therefore in theoretical lessons the staff had to find out how far it could go to educate all the boys without making it too difficult, and sometimes had to divide the group into smaller parts.

Some of the students were sent to the training centre by the missionaries of the Catholic Mission who worked in the field, some came from the local Fisheries Service.

The teachers at the first course were the FAO expert and the counterpart Mr. Mans Bataone. The head of the Fisheries Service in Larantuka, Mr. Jantje Sacaria, spent also a few hours per week as a part-time teacher.

Mr. Bataone had been educated at the SUMP, Tegal, for a period of three years and received the masterfisherman diploma from the school. He has also taken several courses in development and social work given by the mission. After trying several persons as the expert's counterpart, Mr. Bataone was chosen as the best one and he worked together with the expert for the whole six year period. During this period he received a lot of practical and theoretical experience. His personality was also excellent. Therefore, the expert recommends using him as the head of the training centre until a better qualified man may step in.

After having gone through the training centre course for a period of two months ashore, the boys had to do practical training at sea, in the beginning, together with the FAO expert and the teacher of the training centre. Later they went by themselves but were still controlled by the project staff.

While in the training centre the students had to take care of themselves, i.e. make their own food, clean the houses and see that everything was in good order.

After four months the training course was finished and the young men went through an examination. For completing this period at the training centre they were presented with a certificate with photo.

The results of the courses at the training centre were very good.

A time syllabus of the training course is given in detail in Appendix 1. Boatbuilding, gear and instruction is detailed in Appendix 2. A budget for a four month course in the training centre is given in Appendix 3.

The second course started on 12 April 1977 and finished at the end of July. Fifteen young men, with the same teachers, joined the course. A request was sent to the provincial Fisheries Service to get further help. Two months after the second course was started, three teachers came from Kupang as part time teachers:

Gear instructor	Mr. Nicodemus Leka
Engineer instructor	Mr. Jacob Landoe
Electrical instructor	Mr. Chris O. Uberra

A new course should have been started in November 1977 by the provincial and local Fisheries Service but some problems arose when the expert went for his home leave and he had to arrange for a new course when he returned to Larantuka. The third course could not start before the first week of March 1978, but when it was started 20 young men attended the course.

At that time little help was given by the local Fisheries Service. And the teachers from Kupang did not arrive. The main reason for this was the financial situation for the local Fisheries Service.

To solve the teacher problems, Mr. Daton Kedang from Lamalera, was employed as a teacher for the course period for four months, paid by the project.

Mr. Kedang was sent from Lamalera for three years (1974-77) to the SUPM, Tegal, by the project. He came back to Lamalera in January 1978 and he was a very good teacher for the training centre both in theoretical and practical lessons.

## 5. GENERAL OBSERVATIONS

### 5.1 RESOURCES

The resources of fish in this area are unknown. Statistics are not available from any marine biology institution, only from the local Fisheries Service, therefore it is very difficult to give clear information considering the stocks of fish.

Most of the fish caught is caught inshore, none of the fishermen do fishing in the open sea. Therefore, the main type of fish caught is as follows: tuna, bonito, anchovy, herring, sardines and mackerels, also many different kinds of rockfish.

At the time the FAO expert was in Larantuka the ocean in this part of Nusa Tenggara Timor was rich in fish. One of the reasons for this is probably that they do not have the right fishing equipment and therefore they do not utilize their resources.

## 5.2 OFFSHORE FISHING

Offshore fishing in this area is very difficult due to the very deep water, the fishermen only have small boats and, as said earlier, are not equipped for deep water fishing.

Suggested fishing gear is that such as longlines and drifnets for shark and tuna. Bottom trawling in this area is a problem because the bottom slopes very quickly from the shore down to deep water and the bottom is rocky and full of coral.

## 5.3 FISHING COOPERATIVE - LAMALERA

During the project period in Lamalera a Fishing Cooperative for the fishermen was established with a membership of 187 fishermen.

In the beginning it was not easy to convince the fishermen that to "work together" is very important. In the end of the project period such cooperation was accepted and the result was very good.

When the project Phase I was terminated in Lamalera, an amount of Rp. 650 000, which was profit from the sale of fish in the project period, was handed over to the Fishing Cooperative as starting capital.

During the project period Phase I the Fishing Cooperative in Lamalera was given the practical and theoretical assistance it needed.

When the project Phase II was terminated, the capital of the Fishing Cooperative in Lamalera had increased to Rp. 1.5 million.

## 5.4 CATHOLIC MISSION CONTRIBUTION

During the entire project period from 1973 to 1978, the Catholic Mission in the Larantuka area has given a very great amount of assistance to get the FAO project going well in order to give help to the people.

The Mission is believed to be still in favour of giving help to the development in this area in cooperation with the local Fisheries Service in the province.

Gratitude is due to the Catholic Mission in Larantuka for the assistance given to the implementation of the project.

## 6. CONCLUSIONS AND RECOMMENDATIONS

- (1) The project documents and Plan of Operation were signed by the UNDP staff and the Secretary General, Department of Agriculture, Indonesia. Before and after that time the communication between the Direktorat Jenderal Perikanan and the provincial and local Fisheries Service in NTT were very poor.

The FAO expert had to travel many times from Larantuka to Kupang (provincial Fisheries Service) and to Djakarta for discussion with the responsible government staff about the progress of the project, and the future planning.

The Fisheries Service staff in NTT and DGF themselves should have been in more contact with each other. This is necessary in the future for the Training Centre in Larantuka and for the development of the fisheries in this area.

- (2) The training centre built in Larantuka is very valuable for the whole NTT province. Not only for NTT, but this training centre has also been valuable for the other two provinces NTB and TT if cooperation could have been established between the three provinces. If this could be done, it would be relatively inexpensive to keep the training centre operating.
- (3) From the beginning of Phase II of the project, the FAO expert advised the Fisheries Service in NTT to arrange permission to start a course at the training centre where the fishermen could be graduated to receive an M.P.L. diploma.

These requests were not answered when the project was terminated. At this time fishermen wishing to have an M.P.L. diploma have to go to Tegal, which is the nearest place but it is very difficult for the young men to get enough money.

- (4) Fishermen who have gone through the training course at the training centre should have available some help from the Government (Fisheries Service) to start with fishing.
- (5) The Government of Indonesia and UNDP are planning a Second Country Programme for 1979-83. It is recommended that the training centre on Improved Fishing, Larantuka, could be integrated with the extension service project.

Appendix 1

## TIME SYLLABUS

1. GROUP I (Fisheries Group)1. Fishing Gear (hour/week)

All kinds of material and their characteristics  
Twine measurement and their numbering systems  
Methods of preservation/colouring  
Gear care  
Floats and sinkers

2. Fishing Gear Construction (6 hour/week)

Gillnet  
Lampara  
Purse seine  
Pole and line  
Longline

3. Fishing Techniques (6 hour/week)

Gillnet  
Lampara  
Purse seine  
Pole and line  
Longline

4. Fish Biology (3 hour/week)

Status of fish in the world of animals  
Their reproduction and life cycles  
Habitat, distribution, migration  
Their sizes and movement  
Various fish tails  
Their fins and functions

5. Preservation and Processing (3 hour/week)

Handling of fresh fish  
Salting  
Icing  
Care of processed fish  
Fermented fish, fish crackers, crushed fish meal, etc.



6. Cutting/Mending/Repairing/Joinings (5 hour/week)

Introduction of MESH - BAR - POINT  
 Net repairing  
 Mending  
 Net construction and cutting methods  
 Joining and lacing methods

2. GROUP II (Navigation Group)1. Navigation (3 hour/week)

Direction and courses  
 Cross bearing; crossing and courses/paths  
 Special 4 bearings  
 Use of sea charts

2. Knowledge of Deck Work (2 hours/week)

Berthing equipment  
 Ship's equipment  
 Manoeuvring

3. Regulation on Prevention of Collision at Sea (3 hour/week)

General - 31 rules  
 Specific: - lights and objects  
           - obligations to be met by fishing vessels  
           - exclusions  
           - distress signals

4. Maritime Law (2 hour/week)

Rights and obligations of captain  
 Personnel relations  
 Sea employment

5. Splicing (2 hour/week)

Rope splicing  
 Wire splicing

3. GROUP III (Engine Group)1. Engine knowledge (3 hour/week)

Principles of 2 and 4 stroke engines  
 Operation of gasoline and diesel engines  
 Systems of fuel, lubrication and cooling  
 Trouble shooting and solutions

2. Electricity (4 hour/week)

Measurements  
Electricity knowledge  
Installation work

3. Workshop (2 hour/week)4. GROUP IV (Supplementary Group)

1. Extension/Organization (1 hour/week)
2. Fisheries management (2 hour/week)
3. Marketing (2 hour/week)
4. Cooperative (1 hour/week)

Appendix 2

## BOATBUILDING, GEAR AND INSTRUCTION

Most of the material which was used at the training centre to train the candidates during the training course, such as: rope, twine, netting, floats, etc., was available and bought in Indonesia.

If the training centre could get authorization to enable fishermen to graduate with a diploma M.P.L. then the school would need more technical equipment, but as long as the course is only to train young fishermen to handle fishing gear and to fish in a better and easier way, a good deal of modern equipment is not necessary.

The following main instruction was given:

Nets	Netmaking, mending, hanging, cutting, rigging of nets, gillnets, ringnets, purse seine, lampara nets.
Ropes and Lines	Knots and splicing, rope and wire, longline assembly
Seamanship	Nautical charts, navigation, magnetic compasses, winds and currents, depth and sea conditions, lights and signals for vessels.
Engineering	Basic use of tools, operation and maintenance of small engines, special outboard engines.
Boats	Simple modern construction of boat building, handling and maintenance of wood and fibreglass boats.
Fish handling	Basic hygiene and cleanliness, gutting and splitting of fish, salting and drying.
Safety and first aid	Health and cleanliness
Sea training	Use of the most suitable fishing method in tropical waters, such as: gillnet, anchored on the beach and as driftnets, lampara net with light attraction small purse seine and beach seine trolling longline

### Boatbuilding Instruction

When the expert arrived at the duty station, Lamalera, he soon became aware that the fishermen need help to modify their boatbuilding methods. At that time none of the boatbuilders used drawings of how to build a boat. What they did was to learn from another boatbuilder in the same area. Therefore, they build the boats today as they did a generation ago.

To convince the old boatbuilders to change their methods of building was not easy. Therefore, in the training course for the young fishermen at the training centre lessons were given for more modern boatbuilding in both a theoretical and practical way. A small boat was built, 4.25 m long, 1.60 m beam, 0.80 m deep. The same model is given in FAO Fisheries Technical Paper No. 134.

When the boat was finished it was well accepted by the local fishermen and found more suitable for small-scale inshore fishing than the boat they now have.

When the project was terminated the boat was given to the Fishing Cooperative in Lamalera as an example for future boatbuilding.

During the project period a small fibreglass boat was provided to the project. These boats also need repairs sometimes. Therefore, lessons on how to repair fibreglass boats were given, including how to mix together resin with hardener and how to use it together with the fibreglass matt on the damaged part of the boat.

During the project period, a professional boatbuilder was not available, therefore, the expert (masterfisherman) did the job himself according to his knowledge.

Appendix 3

## BUDGET FOR A FOUR MONTH COURSE IN THE TRAINING CENTRE

It was found possible, by careful planning and management, to organize a course at the training centre quite economically.

When the participants fished from the centre, which was their main reason for attending, they caught a good deal of fish, some of which was for their own consumption. They fished three days, three hours a day, and the FAO expert carried out a trial operation. After consuming part of the fish the remainder was sold at Rp. 53 000.

Part of the fishing gear made at the training centre by the students could be used successfully during the next course.

1. Food (for 15 Trainees)

Rice one person/day = 3/4 kg x Rp. 140	= Rp.	105
Sugar one person/day	= Rp.	5
Tea + coffee	= Rp.	10
Vegetables	= Rp.	16
Coconut oil	= Rp.	12
All sorts of side dishes	= Rp.	120
	Total/person/day	= Rp. 268
One course: 120 days x 15 persons x Rp. 268	= Rp.	482 400
		=====

II. Fishing Gear (for 15 Trainees)A. Gillnet

Net 5 pcs x Rp. 18 500	= Rp.	92 500
Float (Y8) 300 x Rp. 65	= Rp.	19 500
Rope, 3 coil = 7.2 kg x Rp. 2 250	= Rp.	16 200
Twine 1 package	= Rp.	2 750

B. Lampara

Net 1/2 in and 3/4 in	= Rp.	101 000
Net 1 in	= Rp.	80 000
Net 3 in 5 pcs x Rp. 18 500	= Rp.	92 500
Float (Y30) 274 x Rp. 200	= Rp.	54 800
Rope 5 coil x 2.4 kg x Rp. 2 250	= Rp.	27 000
Warp 1 coil = 14.4 kg x Rp. 1 200	= Rp.	17 280
Sinkers 80 x Rp. 100	= Rp.	8 000
Twine 3 packages x Rp. 2 750	= Rp.	8 250
	Total	= Rp. 519 780
		=====

III. Fuel

H.S.D.	: For FAO 82, 1 020 litre x Rp. 45	= Rp.	45 900
	For electricity, 360 x Rp. 45	= Rp.	16 200
Petrol	: For sloop, 542 litre x Rp. 100	= Rp.	54 200
Lubricant: FAO 82,	30 litre x Rp. 350	= Rp.	10 500
	Sloop, 25 litre x Rp. 350	= Rp.	8 750
	Electricity, 12 litre x Rp. 350	= Rp.	4 200
	Total	= Rp.	139 750
			=====

IV. Treatment

Rp. 15 000,-/month x 4 months = Rp. 60 000

V. Transportation

Rp. 300,-day x 120 days = Rp. 36 000

VI. Unexpected expenses

= Rp. 12 000

RECAPITULATION

I.	Food	= Rp.	482 400
II.	Fishing Gear	= Rp.	519 780
III.	Fuel	= Rp.	139 750
IV.	Treatment	= Rp.	60 000
V.	Transportation	= Rp.	36 000
VI	Unexpected expenses	= Rp.	12 000
	Total	= Rp.	1 249 930
			=====

The above mentioned amount is total cost for the students for a period of four months. With more students attending the courses, the average cost will decrease.

Jalan Maumere - Larantuka

AIR PANAS - LARANTUKA  
→ 9 km

