

INSTITUT FRANCAIS DE RECHERCHE SCIENTIFIQUE
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MISSION ORSTOM DE PORT-VILA

RESEARCH PROSPECTS IN 1989
FOR THE RESEARCH TEAM
ORSTOM-FISHERIES DEPARTMENT

DAVID, G.
CILLAUREN, E.
GUERIN, J.M.

MISSION ORSTOM
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INTRODUCTION

As at January 1st, 1989, the research team consists of :

- an ORSTOM cell including a biochemist, a socio-economic geographer, a fisheries technician and a fishing engineer funded by the French Embassy;
- a computer expert and a fisherman, being the Department of Fisheries contribution to the research programmes.

Three lines of work have been projected for 1989 :

- analysis of the data collected in previous years
- setting up further data collection on operations involved in marketing of produce
- instituting new long-term research projects.

In addition to publishing the findings in the usual manner under "Notes and Documents on Oceanography" through the ORSTOM office in Port Vila, particular attention will be paid to extension services and disseminating the information to the fishermen.

1. ANALYSIS OF THE DATA COLLECTED

1.1 Fishing for deep-sea bottom-dwelling species

ORSTOM has been collecting statistics on a regular basis since 1982 from the village fishing associations set up under the Village Fisheries Development Programme (V.F.D.P.). As a result of the analysis of such data, it will be possible to :

- examine the spatial distribution and developments in time of the fishing effort;
- assess production yields according to fishing zones;
- examine the annual and seasonal variations of production;
- follow up the size of operations;
- follow up the operational costs.

The purpose of such research is to ensure appropriate fishing management, to preserve resources wherever over-fishing occurs, and to develop fishing activities wherever the environment's potential allows.

1.2 Small-scale village fishing

A study was started in 1984 in respect of fishing activities and yield per fishing gear and is now nearing completion. The findings are expected to be published towards the end of 1989. Following analysis of the data, it will be possible to :

- ascertain the particular content of catches;
- compare the performance of fishing gear;
- distinguish the various fishing strategies;
- assess fishing activities;
- outline a standard fishing effort.

The ultimate object is to determine the impact of small-scale village fishing on reef populations. The results will be illustrated by means of a topical chart or mapping of the fishing grounds according to level of exploitation, thereby bringing to light any under-exploited zones where fishing could be further developed in the future.

1.3 The fisheries system

It is vital that an overall study of the existing fisheries situation in Vanuatu and development prospects be carried out, given the numerous and varied inter-relationships between the marine environment, the fishing resources, the fishermen, the market for fishing produce, the consumers and the public authorities. Three subsidiary lines of approach will be taken in addition to the systemic analysis, namely, study of the ingress to and exit from the boundaries of the system, functional analysis and study of networks. This will highlight the various components of the fisheries system and their inter-relationships and specify the system's malfunctions, especially with regard to fisheries development. The procedures involved are fairly complex, therefore this research work, started in 1988, shall continue for several years. A first stage, considering the relationships between fisheries systems and nutrition, will be contained in a thesis.

1.4 Biology of the Thunidae

Following on from the study of the concentration of shoals of deep-sea fish around fish aggregating devices (CILLAUREN, 1988), an analysis of growth parameters by means of otolith measurement is now being carried out on the yellow tuna and bonito which will be included in a document due to be written in 1989. The findings will be compared with the results obtained with other populations of Thunidae in the Pacific region. This research work is part of the regional research into the dynamics of deep-sea species exploited by large-scale and small-scale tuna fishing operations.

2. NEW SYSTEMS OF DATA COLLECTION

2.1 Mother-of-pearl shells

There are two kinds of mother-of-pearl shells currently being used for industrial purposes : the trocas (*Trochus niloticus*) and the green snail (*Turbo marmoratus*). For the most part oriented towards export this industry represents a substantial source of foreign currency earnings for Vanuatu. The mother-of-pearl is processed by Melanesian Shell Products (M.S.P.) which holds the monopoly over exports.

2.1.1 THE TROCAS

By systematically going through the logs of the coastal traders carrying the trocas to Port Vila, an estimate of the production could be assessed from island to island between 1976 and 1981. With a view to updating the information, a similar process is to be undertaken in 1989 through M.S.P. and by early 1990 it should be possible to publish a document reviewing the production trends and tendencies over a period of some ten years. Parallel to this a mapping of the trocas habitats will be undertaken by means of the Spot satellite pictures in order to assess population densities. In due course, the combination of these two lines of research will enable to assess, from one island to another, the rate of exploitation of the resources, with the ultimate view of determining the potential usefulness of trocas farming (aquaculture) so as to restock the reefs.

2.1.2 GREEN SNAIL

So far, no biological nor ecological research has been undertaken or carried out in respect of this particular species. A similar study to the one on the trocas will be undertaken with an analysis of the accounting records at M.S.P.

2.2 Crustaceans

Two kinds of crustacean are the focus of intense commercial activity in Vanuatu at present : lobster and coconut crab. As yet, only the minimum sizes being marketed is subject to control. In a number of islands, their exploitation constitutes a major source of revenue.

2.2.1 LOBSTER

Port Vila and Luganville are the main commercial outlets. As the crustaceans are mostly air-freighted, setting up a survey system at the airports will enable to assess the landed volumes and obtain some biological data, such species and sex, and sizes. It would then be possible to follow up exploitation by island and assess the economic impact of this industry at the village level.

2.2.2 COCONUT CRAB

Three years ago, the A.C.I.A.R. (Australian Centre for International Agriculture Research) launched a large-scale study of the biology and ecology of the coconut crab. In addition to this work, the landed produce is being monitored at airports. This will lead to an assessment

of the quantities sold from each island and the levels of exploitation of the resource.

2.3 Fishing of aggregated pelagic species

For the time being, the exploitation of deep-sea species which congregate around the fish aggregating devices (FAD's) set up in Vanuatu's territorial waters is mainly for sport and leisure and is marketed outside the official channels. The introduction of new legislation on the sale of fish should enable a network for the collection of data from these fishermen to be organised with a view to comparing the present situation to what it was in 1984 and 1985 (CILLAUREN, 1988) and to understanding more clearly the dynamics of aggregation. An economic assessment of the usefulness of setting up FAD's for sporting purposes (game fishing) will also be undertaken as this kind of leisure fishing or sport could develop into a potential tourist attraction in Vanuatu.

3. FUTURE PROJECTS

3.1 Assessment of the physical and chemical characteristics of the environment

Since the coastal station installed at Manuro Point ceased operation in 1982, no further data about the coastal hydroclimate has been collected. This is particularly unfortunate when prospects for aquaculture in free-flowing water are looking up. If these do indeed take shape, the temperature and salinity could be recorded, the pH levels measured, and the oxygen, nitrite and nitrate contents assessed in order to monitor the chemio-physical environment of aquacultural farms and follow up the disruptions such farms may cause to the aquatic environment.

3.2 Sea-mounts campaigns

A proposal has recently been submitted to the European Communities Commission for funding of a research programme over four years to study the sea-mounts in the region. Exploration campaigns would be organised from the ORSTOM Centre in Noumea. This work would involve specific sea-bed mapping, taking stock of the resources and undertaking experimental fishing and in due course provide information as to the fishing potential of these deep-lying habitats which are already being successfully exploited in other Pacific countries.

Parallel to this heavy programme, other smaller campaigns (of one week periods) could be organised to explore seamounts situated to the south of Port Vila with the help of the Fisheries Department, using their sea-going facilities.

3.3 Analysis of the environment through SPOT satellite pictures

With the acquisition in 1987 of a SPOT stage for the northern part of Malakula Island, it was possible to draw up a thematic mapping of the coastline, with the close co-operation of the teledetection unit of the

IFREMER Centre in Brest (DAVID *et al*). The whole of the group islands will now be covered thanks to the 1989 budgetary allocation of 380 KF from the French Ministry of Foreign Affairs. The data processing will be carried out at LATICAL in Noumea. The research will focus mainly on an inventory of mangroves and reef formations. Work on the latter topic is planned to be carried out with the assistance of the Australian Institute of Marine Science and the J. COOK University in Townsville (Australia). This work is likely to extend over several years due to the delay in obtaining the SPOT scenes, the comprehensive information they will provide and the extensive area to be covered.

3.4 Study of the biology of trocas and green snail

Similarly to the trocas, marking of the green snail to study their growth patterns will start in 1989 and continue in 1990.

Work will also be carried out in aquariums to examine the effects of the environment's physical factors, i.e. temperature, salinity, luminosity, etc., on trocas egg-laying. This research, undertaken in an environment where all the factors are closely monitored and controlled, is an essential preliminary to any trocas farming enterprise.

4. INFORMATION DISSEMINATION, RESEARCH VALUATION AND TRAINING

Any co-operative fisheries research must include a deliberate effort to disseminate the information and enhance the importance of the research work at all levels of government and local communities involved in fisheries development, including fishermen and any other user of marine environment.

The public authorities and overseas research organisations are kept informed on a regular basis through the "Notes and Documents on Oceanography" published by the ORSTOM office in Port Vila. The fishermen receive the information through visits from the research team to the islands and attendance of V.F.D.P. workshops by representatives of fishermen from all over the country (CILLAUREN & DAVID, 1985). A major effort will be made in 1989 to extend the scope of this operation. A newsletter on fisheries, containing a presentation in Bislama, in a simplified form, of the biology, the ecology and the management of stocks of the main species exploited will be circulated every three months to the village fisheries, as these are the first link in the chain of data collection. It is therefore important that they should feel involved in the research work carried out by the team.

The general public will also be kept informed through :

- a dynamic contribution on the part of ORSTOM to the activities of the Vanuatu Natural Science Society, especially through articles written for the newsletter known as "Naika";
- conferences held for the general public;
- a special section to be included in the Vanuatu Weekly on marine environment and fisheries;
- radio programmes devoted to these topics.

This information and enhancement effort with regard to this field of research will coincide, at an international level, with participation in scientific workshops and seminars such as those organised by the Pacific Science Association and the South Pacific Commission.

Another major concern of ORSTOM is to train ni-Vanuatu research workers and fisheries technicians. In 1989, the training scheme will include :

- setting up ongoing training courses at the ORSTOM Centre in Noumea which will be attended by F. N'GUYEN, the team's technician;
- introducing lectures on biology, geography and seminars on economy at the USP Centre in Port Vila in order to provide students with the necessary basics to enable them to take part in generalized training courses on fisheries.

CONCLUSION

1989 represents a turning point in fisheries research in Vanuatu. The activities over the last ten years, most of which were undertaken by ORSTOM, have contributed substantially to the development of fisheries and provided Vanuatu with a wealth of knowledge about the marine environment, to which many other Pacific countries aspire. A number of major programmes having been completed (Inventory of the deep-sea reef resources, Fish aggregating devices) and staffing levels having dropped at ORSTOM in 1987, a latency period evolved during which the main activity consisted in collecting the V.F.D.P. fishing statistics. With the arrival at the end of 1988 of two expert research workers, the research operations can be initiated again. The bulk of the work will be aimed at processing previously collected data, particularly the information on the village fisheries set up under the V.F.D.P.; then at monitoring the exploitation of stocks of mother-of-pearl shells and crustaceans which have not been studied so far; and at initiating two vast programmes, i.e. studying seamounts and satellite teledetection of the coastlines, which should keep everybody busy for several years to come.

Overall, this research enables to combine two prerequisites of any co-operative effort in developing countries, namely :

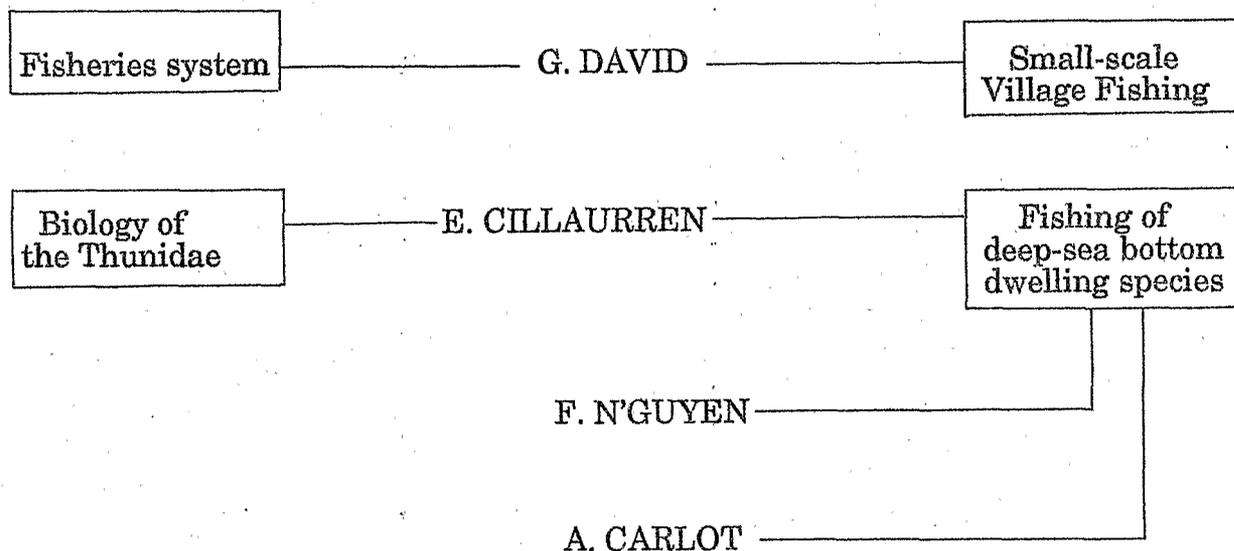
- meet the requests of the Vanuatu Government with regard to stock or resource management and fisheries development planning;
- continue high quality research which is part and parcel of the current major concerns within the international scientific community.

BIBLIOGRAPHY

- CILLAUREN, E. - 1988 - La pêche à la traîne autour des dispositifs de concentration de poissons mouillés à Vanuatu : un exemple dans le Pacifique Sud-Ouest. Mission ORSTOM, Port Vila. Notes & Documents on Oceanography, No. 17, 201 p.
- CILLAUREN, E. and DAVID, G. - 1985 - Contribution to the Third Workshop on Village Fisheries Development in Vanuatu. Mission ORSTOM, 31 p.
- DAVID, G., CAILLAUD, L. and CILLAUREN, E. - 1988 - Poster de présentation "Carte thématique des mangroves de la côte centre orientale de Mallicolo (Sud-Ouest Pacifique)". Third International Conference of Wet Zones, Rennes, 19-23 September 1988.

APPENDIX IPersonnel involved in the research programmes in 1989**COMPOSITION OF THE RESEARCH TEAM**

A. CARLOT :	Computer expert (Fisheries Department)
E. CILLAURREN :	Bio-chemist (ORSTOM)
G. DAVID :	Socio-economic geographer (French Embassy - ORSTOM)
A. FIRYAM :	Fisherman (Fisheries Department)
J.M. GUERIN :	Fisheries engineer (French Embassy - Fisheries Dept.)
F. N'GUYEN :	Fisheries technician (ORSTOM)

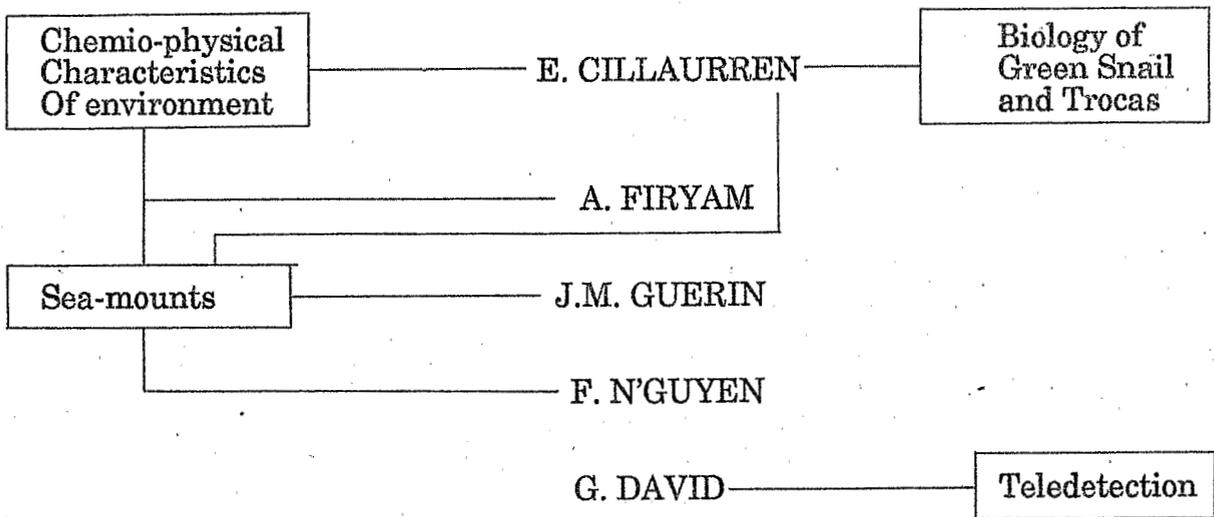
ALLOCATION OF DUTIES**ANALYSIS OF DATA COLLECTED**

APPENDIX (ctd)

Personnel involved in research programmes in 1989

ALLOCATION OF DUTIES
(cont'd)

PROJECTS TO BE UNDERTAKEN



DISSEMINATION OF INFORMATION, EMPHASIS OF RESEARCH VALUE AND TRAINING

