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PROSPECTS AS TO THE ROLE OF WOMEN
IN THE VALORISATION OF
VILLAGE FISHERIES PRODUCTS
IN VANUATU

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PROSPECTS AS TO THE ROLE OF WOMEN IN THE VALORISATION OF VILLAGE FISHERIES PRODUCTS IN VANUATU

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I. GENERAL INTRODUCTION OF THE ISSUE

The valorisation of fisheries products, especially their preservation over several days, is an essential component of fisheries development in small Pacific nations. Indeed, what is the point of catching fish if it becomes unfit for human consumption because of the lack of appropriate means of conservation, and consumers refuse to buy the fish.

Up until now, in most of the small-scale fisheries development plans prepared in recent years for the South Pacific, the emphasis has always been on cold conservation of produce. This technique is quite satisfactory, as long as the fishermen are able to obtain the necessary fuel to operate the refrigeration units, the spare parts and are competent enough to maintain the equipment and solve any breakdown problems. These conditions are not always readily met, as was noted by the consultants from the South Pacific Commission in the course of a survey carried out on small island nations as a whole in 1984 (PRESTON & VINCENT, 1986). Moreover, cold conservation is expensive, not only to purchase the equipment, but also to operate it. Therefore, it is hardly surprising that this method of conservation is not commonly used in fishing villages in the South Pacific.

Where cold conservation would appear impracticable, it would be useful to encourage other methods of conservation which are not as involved or as expensive. Taking for example African countries, it is clear that smoking and combining salting and drying techniques are perfectly appropriate for implementation at village level in inter-tropical countries.

As a rule, these methods are seldom applied in the Pacific. Smoking fish was common practice in Vanuatu up until the beginning of this century, particularly in Malakula where a naval doctor observed in 1911 that "fish is eaten mostly in its raw form or smoked ...",

smoked fish and baked yam being used as food reserves on journeys" (OLIVEAU, 1911). In the space of fifty years, the method of smoking fish has completely died out. Would it be possible to re-introduce this technique in Vanuatu and add fish salting and drying ? How could the fishermen benefit from these methods ? This question will be raised once the main techniques likely to be introduced or re-introduced in Vanuatu have been briefly outlined. After which another question will be considered, that of the role of women. In most of the countries where small-scale smoking of fish is commonly used, the women are responsible for such tasks. In African countries, fishermen often sell their catch upon landing to their wives who then smoke the fish and re-sell it for their own benefit. This system of processing and marketing fishing produce is often more lucrative than the actual fishing activity and has enabled many fishermen's wives to become real businesswomen who now only drive around in Mercedes Benz, hence their nickname "Benz-Mamas".

Can this African example be reproduced in the South Pacific, particularly in Vanuatu ? How can the ni-Vanuatu women become involved in the valorisation and marketing of products from village fisheries ?

Such is the question to which we shall endeavour to provide some possible reply.

II. OUTLINE OF SMOKING, SALTING AND DRYING TECHNIQUES FOR FISH

1) SMOKING

Smoking procedures vary depending on the size of the fish. The simplest method is used for small pelagic or reef fish.

Once they have been washed, the fish is laid, whole, on screens usually made of metal wire, over the fire. LAURE (1974) noticed that along the Cameroon coast, small pelagic fish are "placed vertically, head down, in rows divided by sticks of raffia". Firstly, they are subjected to an intense wood fire which, because of the high temperature (150°-180°), causes the flesh to dry out very quickly and the fats in the surface tissue to melt away (BESANÇON, 1965). In this processing the fish soon lose up to one third of their weight (LAURE, 1974). Then follows a second stage, lasting between one and three days, in which the fish is subjected to the effects of dense smoke originating from the slow burning of green dampened wood. "After a day, the fish are turned over, then scattered, laying flat ... From time to time, the top fish are moved underneath and vice-versa." (LAURE, *op. cit.*).

Average-sized fish have to be first disembowelled, their scales removed, and if possible, beheaded, in order to prevent any risk of bacterial and enzyme contamination. They are then cut up, in slices, in filets or in large pieces before being placed over the fire. Because the product is thicker, smoking takes longer; but then afterwards, they keep better.

The main effect of the smoke on the fish stems from the increased temperature from the burning wood. It is the temperature which causes a substantial drop in the water contained in the tissue, which from an initial 60% to 70% of the live-weight (JARDIN & CROS-

NIER, 1975) falls to 30% to 40% in the case of average-sized fish, and to 10% to 20% in the small pelagic fish and other small-sized fish (LAURE, 1974). Overall, smoking the fish causes a weight loss of some 60% to 70%. The actual smoke has little impact since it only affects the surface of the flesh. It has some anti-oxidation and sterilisation effects, caused by the volatile phenols and the formaldehyde which it contains (BESANÇON, 1965). Its main attraction is from the consumer's point of view. The smoke covers the fish with a pleasantly tasting brownish film.

In respect of the Cameroon coast, LAURE (*op. cit.*) noted that if properly smoked, the fish could keep for several weeks. This leads us to believe that it could be feasible in Vanuatu where the climate is not as humid¹. Under ideal conservation conditions, the fish is carefully stored in baskets under cover from the weather in a dry and airy place. Another way is to store it on a tray over the kitchen stove/fire. After a few weeks, when the fish starts to get covered by fish-eating insects, it simply has to be smoked again to extend the time of preservation. The water content in the fish drops yet again.

In French Polynesia, the E.V.A.A.M. (Etablissement pour la Valorisation des Activités Aquacoles et Maritimes) (Establishment for the Valorisation of aquacultural and maritime activities) identified a technique of combined salting and smoking for average-sized fish cut up in filets (YEN & NEAGLE, 1985). The advantage of this system is that it substantially reduces smoking time to a few hours only. However, it requires large amounts of salt, which leads to fairly onerous manufacturing costs, especially where salt can only be bought at high retail prices.

When VAN PEL (1956) came to Vanuatu, he tried out an equally interesting formula, which had the additional advantage of costing nothing. Firstly the fish has to be cleaned, disembowelled and its scales removed, and then cut into pieces, as the case requires. It is then put into a cooking pot to cook for half an hour in a mixture of sea water and coconut water, with proportions varying between three-quarters for one quarter to half sea water, half coconut water. Thus cooked, the bones are removed from the fish, then reduced to tiny morsels which are spread over a metal plate to be smoked. Low temperature is used for smoking, approximately 40°, which lasts for 24 hours. Coconut husks are used as fuel, placed at 80 to 90 cm away from the plate. The resulting smoked product is stored in a sealed container, such as a bottle or a tin of hard-tack where it will keep for over six months without any significant deterioration to the bacteriological quality of the flesh, despite frequent, although brief, exposure to the atmosphere. The bits of smoked fish are ideal for use in soup or laplap, which is then impregnated with their typical flavour.

2) DRYING AND SALTING

As sole means of preserving fish, drying fish out in the air produces only indifferent results in humid tropical or equatorial countries where the relative humidity factor is too close to saturation point. The only favourable time for drying is the winter season when

1 Average annual rainfall is 4150 mm in Douala, on the Cameroon coast, where for 234 days in the year, the rainfall exceeds 0.1 mm. In Luganville, the annual rainfall is 2923 mm, with rainfall in excess of 0.1 mm for 194 days in the year. Port Vila is not as humid, with only 167 days of rain and an average rainfall of 2160 mm per year.

the tradewinds blow; but, in that case, the sun presents a problem, because "by drying out the surface layers of muscle very quickly, it prevents the water held inside from evaporating" (BESANÇON, 1965). To produce the desired results, drying has to occur in the shade, in a clean and well aired area, away from domestic animals such as herds of cattle, as these attract insects. The quality of the fish being dried deteriorates rapidly with the effect of insects. Given its structural simplicity, its low cost and attendant benefits, especially with regard to hygiene, the solar dryer represents a considerable step forward by comparison with traditional air drying (CAMU *et al*, 1983), (CURRAN & TRIM, 1983), (SALLEH ISMAIL, 1983).

These techniques of salting combined with drying to preserve fish (GLUCKSMAN, 1978), (DAGBJARTSSON, 1983), (SUMMARDI *et al*, 1983), which originated in South-East Asia, have caught the interest of a number of Oceanic countries, such as Fiji, Papua New Guinea (BOLLARD, 1979) and French Polynesia, where they have been put to use for several years now (YEN & NEAGLE, 1985). As salting accelerates the dehydration process in the tissues, it always occurs first, before drying. The tissue dehydration occurs through osmosis under low oxygen conditions, which has the advantage of impeding the action of the bacteria and enzymes found in the flesh of the fish. The most common salting process consists in alternating layers of salt and fish tightly packed in a large container, such as a wooden barrel or a concrete vat. It is followed by drying, either in the fresh air or in a solar dryer.

As a rule, combining the salting and drying processes enables the fish to be kept longer than when smoked, i.e. for several months, provided the contents are shielded from the humidity. Given a relatively reasonable cost of production, involving mainly the purchase of salt, the salted and dried fish is very competitive price-wise on the local markets. For instance, BOLLARD (1979) observed that in Papua New Guinea, a fillet of tilapia, salted and dried in the villages along the Sepik river, was being sold at half the price of tinned mackerel imported from Japan.

III. FEASIBILITY OF INTRODUCING FISH SMOKING, SALTING AND DRYING METHODS IN VANUATU

So far in Vanuatu, there has been no large scale experimenting with drying, salting and smoking local fish for sale in the rural villages, although CARLETON (1982) recommended in his consultancy report that these techniques be developed for processing surplus of production.

Among the three processes outlined above, smoking would appear to be the simplest method to implement. Given the abundance of fuelwood and the ni-Vanuatu's expertise of copra smoking, re-introducing the smoking method would not appear to present any problems in Vanuatu, provided it is supported by a dynamic campaign of information and the technical advice of agricultural field officers operating in each region. With regard to difficulties with introducing a new product into their dietary habits, there seems to be no reason, as P. SCHOEFFEL (1984) quite rightly puts it, to believe that, with the appropriate information, the villagers would "disdain" smoked fish, which is no more exotic or foreign than "tin fis" and moreover, holds all its advantages, namely :

- low pricing; thanks to the abundance of fuel wood, the cost of smoking should be minor compared to the cost of fishing;
- large-scale distribution; smoked fish could be sold like "tin fis" in all village stores;
- easy and quick to prepare; just like "tin fis", smoked fish can be eaten cold or re-heated;
- marked flavour; thus smoked fish could be used as seasoning with root vegetables, rice, vegetables or be added to soup or to laplap.

The same comments with regard to nutritional novelty apply to dried fish, or salted and dried fish. However, introducing drying and salting methods would appear more difficult to implement from a technical point of view than would smoking, to which the villagers are already accustomed. Therefore, it would be useful if an extension programme about such techniques could be included in the Fisheries Development Programme and aid funds made available for solar dryers and salting units in the same way as for refrigeration units. Distribution of coarse sea salt at tax-exemption rates would also be an important consideration in order to minimise production costs on salted fish.

IV. BENEFITS TO BE DERIVED FROM THE GENERAL IMPLEMENTATION OF SMOKING, SALTING AND DRYING TECHNIQUES FOR FISH IN VANUATU

To encourage the general use of smoking, salting and drying methods is of dual importance, both economically and nutritionally.

1. NUTRITIONAL BENEFIT

From a nutritional point of view, smoked fish, salted fish or dried fish has, weights being equal, a higher content of protein, mineral salts and vitamins than fresh fish (JARDIN & CROSNIER, 1975). When added in small quantities to the starchy foods such as tubers, bananas or breadfruit, the traditional staple diet of Oceanic people, they facilitate the assimilation of plant protein through the sulphur amino-acids they contain and their rich lysin content. Most plants do contain protein, but as they lack specific amino-acids, they cannot be fully assimilated by the organism. So only 35% to 45% of the protide mass of leguminous seeds are used. Adding a few grams of smoked or salted or dried fish to a plate of these seeds is sufficient to substantially increase the quantity of proteins assimilated, thereby achieving what nutritionists call the protein-added supply (KAYSER, 1970).

If generalising the use of smoking, salting and drying fish in the South Pacific is of nutritional benefit, it is also an economic advantage and this concerns all the fishermen and women living in coastal villages.

2. ECONOMIC BENEFIT

- a) In the case of professional fishermen who send their catch to the market regularly and have no cold storage facilities available to them, these techni-

ques would not only enhance the value of the fish marketed as fresh fish and remains unsold, but also substantially extend the distribution networks which are at present limited to the vicinity of the landing stages and the villages close to the access roads, in the case of fishermen having a vehicle and selling their produce along the way.

- b) Fishermen who use refrigeration facilities will find that smoking and drying techniques are fast and flexible to implement, thus enabling them to by-pass any breakdowns in their equipment and obtain added-value for their unsold goods.
- c) Where the fishermen fish to satisfy their own needs only, smoking, drying and salting would enable them to make the most of the occasional abundance of small pelagic fish, which they cannot do at present due the lack of means of preserving their catch. They could then build up a surplus and, if they so wish, become interested in marketing.

On the whole, the smoking, drying and salting techniques would appear to be well suited to enhance the production from outrigger fishing and fishing on foot, especially cast-net fishing. They represent simple and relatively cheap means of processing fish, in keeping with such low-cost fishing techniques. They provide a large number of fishermen who do not have the financial means with an opportunity to market their produce and as such, they are a key tool in the development of fisheries and marketing networks inland into the higher regions, where roads are far and few between, if any.

3. BENEFIT TO THE WOMEN

As mentioned earlier on, in most tropical countries where smoking, drying and salting of fish is carried out on a small scale, the women are responsible for the processing and marketing of the produce. In the interest of economic efficiency, the Vanuatu public authorities would be well advised to adopt this system. They could benefit from the fact that in rural areas, women, confined to household or custom tasks, have no means of earning an income of their own and therefore wish to achieve a certain financial independence which has been denied them so far, as the men keep the income-generating activities to themselves, especially cash crops (copra, coffee, cocoa, etc.).

If they were to produce commercial quantities of smoked, salted or dried fish, the women could, up to a point, break free from their financial dependence on their husbands and assume a new and important role in the household economics. Since such activities can be run within the context of their homes, they could be carried out in addition to the usual household chores. They would probably encourage many women who occasionally go fishing for self-consumption purposes to increase their efforts and direct them to a commercial end.

There are, therefore, many arguments in favour of women taking on new processing and marketing duties in fishing. In this respect, the numerous women's groups which are active in the islands, could play an important part in spreading the novelty and help organise the smoking, salting and drying by groups of women who will undoubtedly find it difficult to impose their new status as businesswomen on the men, particularly their husbands.

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