Short Communication

Traditional reef fish farming method in Panamecho village of New Ireland, Papua New Guinea: A sustainable and environmentally friendly fish farming method for food security

William Nano[1] & Takfulu Emos Nano[2]

ABSTRACT

Food security and sustainable and environmentally friendly farming are traditional concepts which have been carried out from generation to generation in most villages in Papua New Guinea. One of these concepts is the traditional reef fish farming practice to sustain food security in Panamecho village of New Ireland Province. A total of 30 reef gardens were constructed from coral stones. These farms were designed to provide daily fish supply for a month. Harvesting was conducted so that when the thirtieth garden was harvested the first garden was ready for harvesting at the beginning of the next month. Three of the 30 gardens were harvested to study the kinds of fishes harvested and the total kilograms of fresh fishes that were produced. The results of the study showed that out of the three harvests, a total of 12 different kinds of fishes was harvested and a total of 27.9 kilograms of fresh fish weight with an average of 9.3 kilograms per day. This is enough fresh fish daily for a household. 12 different types of fish were identified.

Key words: Traditional reef fish farming, Papua New Guinea, food security, sustainable methods.

INTRODUCTION

Fish has been one of the main sources of protein food along coastal areas of Papua New Guinea (PNG). Farming reef fish was a common cultural practice in many coastal villages of PNG in the past. Today, the art of reef sea farming has been largely forgotten in many of these villages and is no longer being practiced. As populations in the villages increase the demand on fish protein also increases and frequent fishing trips exhaust and deplete the fishing grounds; as consequence, food insecurity (protein) is created which in many cases has manifested in problems like malnutrition in many rural coastal villages.

However, there are some coastal areas that still practice reef sea fish farming, and one such area is where this study is undertaken, namely; Panamecho village, West Coast Kara-Nalik of Kavieng in the New Ireland Province, PNG. This study is done in line with the national government's food security programme for villages in PNG.

This study was carried out to see whether the traditional farming practices can sufficiently and reliably supply families with protein needs all year round.

MATERIALS AND METHODS

The study was conducted in Panamecho village, West-Coast, Kara-Nalik of Kavieng New Ireland Province. Thirty reef fish gardens were constructed, triangular in shape (7 m x 3 m x 0.3 m). The gardens were constructed following the current and known fish movements in the lagoon. The gardens were constructed in groups of 5-7 in the deeper parts of the lagoon and scattered along the pathway about 10-20 m apart. After the construction of the gardens, they were left alone for 3-4 months so that the fishes could take ownership and residence in the gardens. Everything else was left to take their natural course, so there was no supply of fingerlings and food and other needs. After 3-4 months, harvesting of the gardens began. The harvests were normally conducted on a daily basis so as to supply protein food need in a family. Since there were 30 of them, harvesting rounds were monthly and as soon as the 30th garden was harvested, garden #1 was ready to start the

[1]University of Technology, Department of Agriculture, PMB, Lae, Papua New Guinea.
[2]House Manager and Financial Controller, P.O. Box 7, Unitech, Lae, Papua New Guinea.
Corresponding author e-mail: wnano@ag.unitech.ac.pg

following month. Harvesting normally began from one end of the lagoon and ended on the other. This allowed the fishes to again take ownership and residence in the first harvested gardens.

Steps in harvesting

Step 1. The surrounding of the garden was vigorously disturbed, by hitting the top of the water around and close to the garden or by hitting the bottom of the surroundings.

Step 2. A small fishing net was pulled around the garden (a special one was normally made for this purpose). If no net was allocated someone disturbed the garden surrounding while removing the coral stone in the garden.

Step 3. A woven coconut basket (40 cm x 30 cm x 30 cm) was placed in the front point of the triangle of the garden. The basket's mouth was open and one of the coral stones was put in it.

Step 4. The coral stones were turned and removed and in the process another triangular garden was constructed. This process was progressive toward the triangle tip and the basket. As the removal of the stone moved slowly forwards the fishes also moved forward following the unturned stones. When the last stone was moved, the one in the mouth of the basket, all the fishes swam into the basket immediately.

Step 5. The basket mouth was then closed and the basket was lifted up above the water. Under normal traditional practice, selection or sorting of the big and small fishes would then take place. The big ones are taken home for the meal while the small ones are returned to the water. In this observation study, however, all fishes that were caught were taken to the house so the weights and types could be recorded; in other word, no sorting of the big and small fishes was done.

RESULTS AND DISCUSSION

Table 1 shows that a total of 27.2 kg of fresh fish and average of 9.12 kg of fresh fish per day was harvested. Twelve different types or kinds of reef fish were noted for the 3 days of observation.

The harvests per day can easily provide an average of 9.12 kg of fresh fish daily. Based on the recommendation in Table 2 (Edwards & Allan, 2004), 400 g of fresh fish is enough for a daily meal for an average household. In PNG, about 54 % of the population lives in the lowlands and coastal region. About half of this population lives near the sea. This kind of sustainable reef fish farming, if adopted, could easily cater for the 25 % of the population in their daily protein food requirement.

The results of the three days harvests have clearly shown that a sustainable food security programme can be achieved with the

Table 1. Daily harvests of reef fish fresh weight (kg) and type of locally known fishes.

Types	Day 1	Day 2	Day 3	Total	mean
Balang (eels)	1.6	1	0.4	3.0	1.0
Yagwung(crabs)	2.0	3	0.4	5.4	1.8
Ura (octopus)	0.3	1.0	0.6	2.6	0.87
M axira (black)	1.5	2.0	0.3	3.8	1.3
Cowboy	1.0	1.5	0.2	2.7	0.9
Ulavi	1.5	1.0	0.2	2.7	0.9
Ki (big eye red)	1.0	0.5	0.5	2.0	0.7
Ragugut	0.6	0.5	0.1	1.2	0.4
Bilas	1.5	1.0	0.1	2.6	0.9
Dudus	0.1	0.4	0.1	0.6	0.2
Kiaf	0.2	0.4	0.1	0.7	0.23
Unknown	0.2	0.3	0.5	1.0	0.33
Total	11.5	12.2	3.5	27.2	-
Mean	3.83	4.1	1.2	9.12	-

Table 2. Average protein requirement of 10 people in a typical home in Papua New Guinea.

Infant	5month-1year	14grams
Children	1-3years	16grams
	4-6years	24grams
	7-10years	28grams
Males	15-18years	59grams
	25+years	63grams
Females	11-14years	46grams
	19-24years	46grams
Pregnant		60grams
Lactating	Second 6 months	50grams
Total		406grams

Average fresh fish protein = 17%CP and 70% moisture.*Daily average caught = 9.12 kg x 70/100 x 17/100 = 474g, so there is sufficient daily protein provided in the traditional fish farming method.

present traditional farming methods especially in the coastal areas. The farming system is environmentally sound because it does not disturb the reef environment.

A total of 12 types of fishes was identified locally (Table 1) in the harvests. In the traditional practices only the big fishes are normally taken out for the meal and the small fishes are thrown back into the sea and gardens.

While doing this sort of farming in our area, it was clear that a lot of the children and young people did not know this type of sustainable farming. Like elsewhere in PNG, this cultural practice dying away.

This study was very short and it would be better to do a year cycle in order to properly study the true outcome of this farming system.

Acknowledgements

The authors are sincerely in debt and are very thankful to the people of Panamecho village, Kara-Nalik, Kavieng, New Ireland Province for sharing their traditional knowledge. We would like, also, to sincerely thank Associate Professor Dr.Gariba Danbaro for his valuable advice in writing up the paper.

Reference

EDWARDS, P. & ALLAN, G. L. 2004. Your personal protein requirement. (Unpublished report.)