

PN-ABT-715
vol 1 page 1

**P-151
94-09**

**IMPROVING COMMERCIAL
FEASIBILITY OF
TUVALU BOTTOMFISHING**

**Pacific Islands Marine Resource Project
Tuvalu Component
Project No. 879-0020**

**Prepared by RDA International, Inc.
under Contract No. 879-0020-C-00-1231-00
with USAID/RDO/South Pacific**

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December 1994

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This report was made possible through support provided by USAID under terms of Contract No. AID-0020-C-00-1231-00. The opinions expressed and conclusions reached here are those of the author and do not necessarily reflect the views of USAID.

TABLE OF CONTENTS

| | |
|--|-----|
| 1.0 EXECUTIVE SUMMARY | 1-1 |
| 2.0 INTRODUCTION | 2-1 |
| 3.0 COMMERCIAL POTENTIAL OF DEEP-SLOPE BOTTOMFISH | 3-1 |
| 4.0 TRAINING | 4-1 |
| 4.1 Targeting <i>onaga</i> and redfin <i>opakapaka</i> | 4-1 |
| 4.2 Anchoring | 4-1 |
| 4.3 Fishing effectiveness | 4-2 |
| 5.0 RECOMMENDATIONS FOR PROPER EQUIPMENT | 5-1 |

IMPROVING COMMERCIAL FEASIBILITY OF TUVALU BOTTOMFISHING

1.0 EXECUTIVE SUMMARY

This report summarized the observations by and recommendations of the RDA Marketing Advisor and the RDA Master Fisherman on how to improve the commercial feasibility of bottomfishing on Tuvalu's distant seamounts by improved targeting of high-valued export species and increasing fishing efficiency (i.e., catch rates) when the target species are located. This report has been prepared by RDA International, Inc. (RDA), as part of the Tuvalu Component of the Pacific Islands Marine Resource (PIMAR) Project, Project No. AID 879-0020-C-00-1231-00, funded by the United States Agency for International Development (USAID/RDO/South Pacific).

It is clear that the 2 most highly valued species, *onaga* (*Etelis coruscans* or long-tailed red snapper) and redfin *opakapaka* (*Pristipomoides filamentosus* or ruby jobfish), are found at depths of greater than 250-300 m. Since most of the test fishing was conducted as part of the hydrographic testing to determine the 200 m isobaths of the seamounts, the resource assessment data does not adequately characterize the abundance of these most highly valued species. Furthermore, several of the key equipments required for targeting the higher valued species were not functioning during most of the commercial fishing trials, so knowledge of the abundance of these species is still inadequate. Commercial operators will need to search at the proper depths for the bottom features and fish images which suggest abundance of the targeted species. Improving targeting and fishing efficiency of these species requires appropriate use of a video sounder for locating the fish, a heavy-duty anchor for maintaining vessel position, and hydraulic reels to enable fishermen to work the long hours required.

2.0 INTRODUCTION

In the RDA Tuvalu Bottomfish Project the commercial potential has not received as much attention as that given to resource assessment, hydrographic mapping of seamounts, and other project objectives. Commercial fishing operations in Tuvalu will face relatively high operating costs because of the travel time to more distant fishing grounds, the cost of electrical power for ice-making and refrigeration, the cost of imported fishing supplies, and other factors. The commercial feasibility of bottomfishing could be improved by targeting species with the highest export value and increasing fishing efficiency (i.e., catch rates) when target species are located.

The authors of this report visited Tuvalu during August 20-31, 1994, to conduct training on improving targeting of high-valued export species and increasing fishing efficiency. This report summarizes the observations of the authors on the commercial bottomfishing potential of Tuvalu, describes the training exercises and their apparent effectiveness, and makes recommendations to correct inadequacies in basic equipment.

3.0 COMMERCIAL POTENTIAL OF DEEP-SLOPE BOTTOMFISH

The commercial potential of bottomfishing in Tuvalu depends principally on how successfully fishermen can target *onaga* (*Etelis coruscans*, or long-tailed red snapper) and redfin *opakapaka* (*Pristipomoides filamentosus* or ruby jobfish). The importance of these species was evident from the Preliminary Economic Evaluation prepared by P.W. Philipson in 1992 and has been confirmed in an early draft of The Commercial Feasibility of Bottomfishing in Tuvalu: Final Economic Evaluation prepared by J. Rowntree in 1994 for the RDA Tuvalu Bottomfish Project. They receive substantial price premiums in the Hawaii market compared to other bottomfish species, and fishing revenues can be greatly enhanced by exporting these species exclusively.

The seamounts in the Tuvalu exclusive economic zone have surfaces which rise from depths of about 200 m to near the ocean surface. This depth range is too shallow to provide prime habitat for either *onaga* or redfin *opakapaka*. These species are caught by fishing along the slopes of seamounts or atolls in the depth range of 250+ m (for *opakapaka*) to 300+ m (for *onaga*). Hydrographic mapping, resource assessment, and test fishing during the RDA Tuvalu Bottomfish Project focused primarily on seamount surfaces above 200 m. *Onaga* and redfin *opakapaka* were harvested infrequently during previous fishing trials because their deeper habitat was not targeted. Deeper water fishing was generally limited to the commercial fishing trials. The abundance of these more valuable, deeper-water snappers remains unknown. The first impression of the authors is that the latter resource is limited and that fleet development for the purpose of exporting *onaga* and redfin *opakapaka* should proceed cautiously. The deep submarine slopes off of the atolls seem more productive than the seamount slopes.

4.0 TRAINING

4.1 Targeting *onaga* and redfin *opakapaka*

The most valuable bottomfish for export, *onaga* and redfin *opakapaka*, are not evenly distributed over submarine slopes. They are concentrated within a preferred depth range (250+ m for *opakapaka*; 300+ m for *onaga*) and around small-scale bottom features, such as pinnacles and canyons. The first step in targeting of the desired species is to search the bottom, using a color video sounder (or paper recorder) to detect bottom features and fish images (in the appropriate depth range) which offer the promise of good catch rates.

The authors were greatly handicapped in this element of training because of equipment problems on the *Manui*. The regular transducer was damaged when the vessel grounded late in April 1994. A "small-boat" transducer was installed as a temporary measure until the regular transducer could be replaced. The temporary transducer was unable to transmit images of the bottom below 150 m, so that the sounder was "blind" in the depth range of *opakapaka* and *onaga* (below 250-300 m). In addition to the inadequate transducer, the color video sounder (Furuno FCV-261) itself malfunctioned so that the bottom depth was not known accurately for much of the time. The Tuvalu Fisheries Department has reportedly ordered a replacement unit of the same model. A paper recorder which once served as a backup unit was removed from *Manui* for repair in 1993 and was unavailable during the training cruise.

Bottom searching exercises could not be conducted efficiently because of the equipment problems. High-relief bottom features were found by extrapolating shallow-water "returns" from the video sounder. Training then focused on presenting baited hooks and chum at the preferred swimming depths of the target species. Good catches were made at water depths below 250-300 m.

4.2 Anchoring

When suitable bottom features and fish images are detected on the color video sounder, the vessel should be anchored so that it will drift slowly over the target area, maximizing the time that fishing gear is presented to fish concentrations at their swimming depth. A heavy pronged anchor which can claw into the bottom is best suited for this purpose. A long length of anchor chain is also desirable so that the anchor can grip the bottom as it is dragged. Based on limited "return" from the video sounder, the authors believe that a large proportion of the seamount surfaces are comprised of semi-consolidated calcareous material that poses difficulties for anchoring.

The *Manui* is not equipped with a suitable anchor or a sufficient length of anchor chain. One of the authors designed an anchor that could be constructed from locally

available material (3/4-inch rebar) but the new anchor was not completed before fishing exercises began. Due to these constraints, emphasis was shifted to the proper use of a sea anchor. A sea anchor is simply a large parachute drifted from the fishing vessel in the opposite direction from the prevailing wind so that sub-surface currents push against the chute and slow the wind drift of the boat. The *Manauí* crew found the sea anchor to be quite effective in maintaining vessel position over productive bottomfishing sites.

4.3 Fishing effectiveness

Training emphasized the limited period of time that the fishing vessel and gear are properly positioned over small bottom features where fish are concentrated. To make best use of this time, fishermen were encouraged to use droplines with 6-10 baited hooks and rigged with chum bags. When the *Manauí* crew discovered that three or four exportable fish could be caught on a single line drop, they were quick to adopt the methods taught by the authors.

5.0 RECOMMENDATIONS FOR PROPER EQUIPMENT

Based on the experiences of the authors during their training visit to Tuvalu, the following recommendations on proper equipment are presented here:

First, locating small bottom features where bottomfish are concentrated requires a properly-functioning video sounder, both on the *Manau* and on commercial vessels that may enter the Tuvalu fishery.

Holding vessel position over concentrations of bottomfish requires a suitable and heavy-duty anchor and a sufficient length of anchor chain. This requirement pertains to the *Manau* as well as to new commercial vessels entering the Tuvalu fishery. A sea anchor, by itself, will not suffice in every situation.

The *Manau* is equipped with two hydraulic reels but the crew prefers using handreels for several reasons. If a commercial bottomfishing operation develops in Tuvalu, however, the vessels will be smaller and will carry fewer fishermen than the *Manau*. Hydraulic reels will have to be used in such operations to prevent crew "burnout."