

DEVELOPMENT OF FISHING AND
FISHERIES

IN
DJIBOUTI

Mid-Project Report
On
Resources Development Associates
Technical Assistance Contract

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Paul A. DeRito, Project Manager, contributed the majority of the information related to progress of the project to date, with special emphasis on cooperative development, surveys of marketing, production and harvesting, wholesale and retail distribution, fish handling and storage, and relationship to other donor activities. Mr. Dee W. McFadden prepared sections on fishing techniques, training, and boat building. Mr. Keith W. Cox developed the oyster culture program, and Mr. Robert W. Campbell provided background information, scheduling, and editing.

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ACRONYMS

The following acronyms and abbreviations are in common use throughout this report:

ACPM	-	Association Cooperative de Peche Maritime
CRS	-	Catholic Relief Services
FAC	-	Francais Assistance Cooperation
FIDA	-	Fonds International Pour le Development de L'Agriculture
GROD	-	Government of the Republic of Djibouti
IFAD	-	International Funds for Agricultural Development
ONARS	-	Organizational National Pour L'Aide de Refugée et Sinistre
RDA	-	Resources Development Associates
SEP	-	Service Elevage et de la Peche
SIDA/LWF	-	Swedish International Development Agency/Lutheran World Federation
UNDP	-	United Nations Development Programme
UNICEF	-	United Nations International Children's Emergency Fund
USAID	-	United States Agency for International Development

1.0 EXECUTIVE SUMMARY

Recognizing the needs of and potential for fisheries development in Djibouti, USAID initiated efforts in 1979 to provide meaningful assistance to compliment the efforts of the other donors. The Fisheries Development Project was approved and authorized for two years in January 1979 for total funding of \$498,000.

The purpose of the project is to assist the MOA in its efforts to create a viable system for the improved harvesting, handling/storage and marketing of fish. At the same time, the project is providing assistance toward strengthening the institutional capacity of the Fisheries Division, Ministry of Agriculture, to support or augment private sector initiatives in the fishing industry. The successful completion of the project will result in an improved nutritional status for the majority of Djiboutians, as well as increased income for nearly 300 fishermen, merchants, and other artisans in the fishing industry.

In support of this project, a two-year contract for technical assistance was awarded to Resources Development Associates of Diamond Springs, California, in March 1980 for a total of \$299,000. Under this original contract, a Project Advisor is providing long-term advisory services to the Director of the Fisheries Division and supervising the implementation of the AID project. He is providing appropriate on-the-job training to artisinal fishermen, managing the fish demonstration program, supervising a revolving credit fund with Fisheries Division staff for purchases of fishing gear, organizing a transport system for movement of fish, developing contacts with potential consumer groups, and undertaking simple marketing innovations.

In addition, RDA is providing short-term assistance consisting of advisors in marketing, fishing technology, cooperative development and data completion. RDA, in addition to providing the above technical services, is responsible for

conducting a series of demonstration and educational activities and procurement of fishing gear and fish storage equipment for the revolving credit fund administered by the project manager and the Fisheries Division.

Overall progress achieved in the first year of the technical assistance contract was exceptionally encouraging. Two-year goals for some activities were met in less than one year. The project became a centerpiece of GROD's attention. These factors convinced USAID that an extension and expansion to the project was desirable.

In September 1981, an amendment to the original project was approved. In essence, the amendment provides for an 18-month extension to the life of the project as well as the addition of several activities. USAID funding increased from \$498,000 to \$978,000. Figure 1 outlines the present funding level of the program and includes the inputs of various other donors.

Under the amended scope of work, the two additional activities are boat-building/repair and oyster culture. The boat-building/repair consists of sheathing traditional fishing boats with fiberglass planking and in construction new vessels, primarily using a local design as a mold. Plans call for building one or two vessels and sheathing 5-10 smaller boats. Vessels repaired to date are well received and the fishermen are enthusiastic about production of new vessels. The oyster culture experiment consists of growing high quality oysters on floating racks for eventual sale in the local expatriate-oriented markets. The experiment will determine whether imported species will grow and whether the process can be successfully institutionalized. Initial results from this project activity are encouraging.

1.1 Project Goals

The goals of the technical assistance contract are specified as follows:

1. increase fish harvest by 10-15 percent;
2. establish the benefit of fishing gear provided and stimulate increased demand (15%) for additional purchases through the revolving credit fund;

	AID	GROD	FAC	IFAD
A. Technical Services	\$652,000	\$237,000		\$ 667,000
B. Commodities	216,000	60,000	\$150,000	1,140,000
C. Participant Training	9,000	5,000		
D. Housing	75,000			
E. Contingencies/ Evaluation	26,000	92,000		322,500
TOTAL:	\$978,000	\$394,000	\$150,000	\$2,129,500

FIGURE 1: AMENDED PROJECT/FUNDING BREAKDOWN

3. establish a self-sustaining credit fund to be capably managed by MOA Fisheries Division personnel;
4. If credit cooperatives are determined by the contractor to be workable, assist in the development of bylaws and credit fund mechanisms;
5. increase fish consumption by 10-15 percent;
6. conduct periodic demonstrations at retail outlets; develop and air T.V. and radio documentaries; determine the most effective advertising medium through periodic surveys;
7. increase fish distribution by establishing
 - a. six additional retail outlets,
 - b. improved transport,
 - c. additional storage facilities/methods developed in conjunction with other donors
8. train fifty fishermen and MOA Fisheries Division personnel, with consequent ability of Fisheries Division MOA to plan (in particular, to draft a five-year development plan) and to implement any new activities in artisanal fishing sector.

In order to achieve these goals, the following tasks are being conducted:

- o Conduct surveys of demand/consumption
- o Conduct surveys of existing market facilities
- o Conduct surveys and suggest improvement in existing production techniques and harvesting methods
- o Upgrade handling and storage
- o Conduct promotional demonstrations
- o Establish new retail outlets and improve transportation
- o Assess potential for cooperative development
- o Provide training in fishing techniques and cooperative management

- o Determine technical and economic feasibility of repairing and building fiberglass fishing boats
- o Determine feasibility of culturing oysters

1.2 Progress to Date

1.2.1 Production/Consumption

Since March 1979 the Fisheries Service has been compiling statistics on fish tonnage arriving at the Pecherie. An extrapolation based on an estimate of what is sold at the central market, and consumed by fishermen themselves, provides a base for annual catch. Increases in production statistics translate into concomitant increases in consumption since to date, all fish landed have been readily sold.

Figure 2 is a plot of total production of fish by month for the years 1979 through 1981. The vertical-dashed line indicates the time at which the Pecherie came under the active direction of the technical assistance project team. In addition to the large seasonal variation, which is to be expected, this graph well illustrates a rapidly increasing upward trend in catch since March 1981. Total production for 1979 was 251 metric tons. Production in 1980 was 313 metric tons, an increase of 25% over the production of the previous year. Production in 1981 was 385 metric tons, an annual increase of 23% over 1980. It is estimated that 1982 production may reach 450 tons, an increase of 17% over 1981 and an increase of approximately 80% over that of 1979.

1.2.2 Existing Marketing Facilities

At the start of the project in March 1980, fish were marketed at the Pecherie facility at Boulaos, the central market and Ambouli market. The Pecherie is the largest retail and wholesale facility in terms of volume of fresh fish in Djibouti. It had been in the hands of private vendors until March 1981 when the facility was placed entirely within the

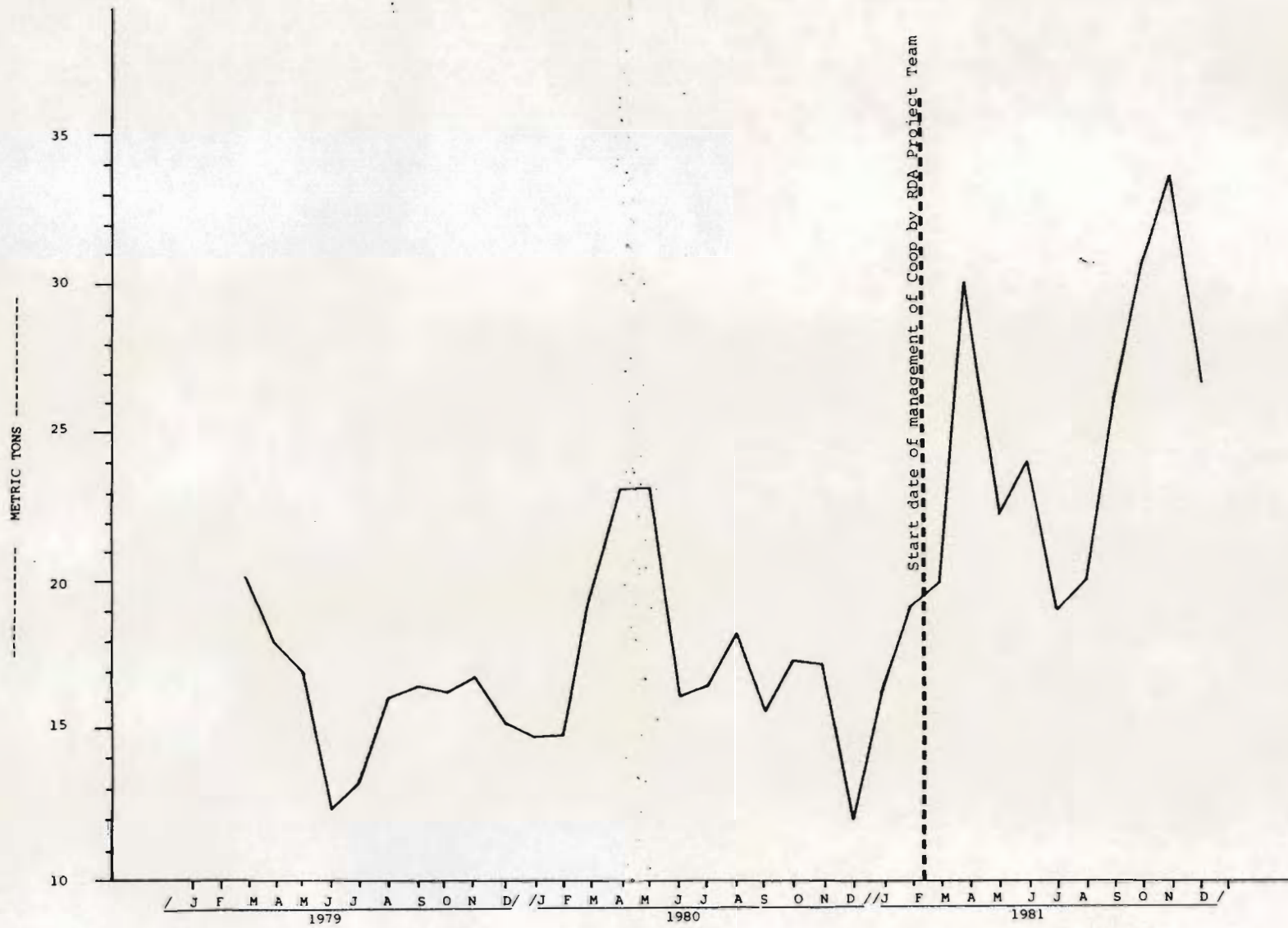


FIGURE 2
TOTAL CATCH BY MONTH (METRIC TONS)

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operational control of the Cooperative. This is probably the most influential factor to date in terms of Cooperative growth, fish production and marketing success.

The central market is the largest produce and meat market in Djibouti. Inside this market is a section with stalls reserved for fish sellers. The numbers vary, but at any one time, there may be 10-15 fish vendors there. In addition, there may be an additional 10 sellers who sell on the ground near the stalls and about 5-10 sellers of shrimp.

There is a stall at the Ambouli market operated by an independent fisherman. There are no cold storage facilities present. Two new facilities will be constructed for the Ambouli area under the FIDA project.

1.2.3 Production Methods

The project team has surveyed local techniques and has devised several approaches to improving production and harvesting. A project workboat was procured to serve as the mechanism for demonstrating and, to the extent feasible, for training fishermen in the use of improved fishing techniques.

This boat, a Yamaha, was a stripped version of a popular inshore Japanese fishing boat, 27 feet overall, and powered with a three-cylinder diesel engine. In order to better serve the training and exploratory objectives of the project, several improvements were made to the vessel and it was rigged for various types of fishing.

Of the many techniques of fishing and types of fishing gear that would be practical to use in Djiboutian waters, the Yamaha boat is capable of several. Fortunately, the methods and gear to be used on this boat are the ones most easily adaptable to the present fleet and fishermen. The fishing program to be carried out aboard the Yamaha boat falls in six categories. In order of priority, they are:

- (1) bottom fishing with manually-operated reels
- (2) subsurface trolling
- (3) surface trolling
- (4) crab and lobster trapping
- (5) fish trapping
- (6) trawling

Fishing methods that could be undertaken by a larger and more adaptable combination fishing boat would include among others:

- (a) gill netting, surface and bottom,
- (b) long-lining, surface, midwater and bottom,
- (c) Lampara/ring net fishing,
- (d) purse seine fishing,
- (e) deep water trawling,

as well as the methods and gear to be used on the Yamaha boat.

1.2.4 Handling/Storage Upgrade

Fish spoils rapidly at high temperatures. Sound handling techniques at the production end should include immediate evisceration and storage in ice as quickly as possible after capture. Observations of fish coming into the Pecherie (then a private concern) made in March 1980 showed uneviscerated fish and little use of storage in ice. These fish then were either sold immediately or placed in the Pecherie's cold storage facility. Even in cold storage, the fish would spoil in 24 hours if not sold.

In January 1981, the Service de Peche opened its flake-ice plant (FAC-SEP funded) at the Pecherie. The flake-ice was made available to all Cooperative members at no cost. There was immediate acceptance by fishermen. Fish observed coming into the Pecherie were well iced.

The quality of the fish coming in also improved after the Cooperative took over commercialization activities at the Pecherie in March 1981. The Cooperative

insisted that all fish be properly cleaned and iced or it would not be purchased. The fishermen's concern for losing weight at the balance was offset by the adoption of new price structures for purchasing fish and the Cooperative's program of trying to stimulate production levels. Previously, under private hands, the Pecherie was selective in the amounts and kinds of fish it would buy. Under the new Cooperative management, wholesale activities have been expanded, and include sales to restaurants, hotels, military, and ship chandlers. More fish, other than only those sold over the counter were needed. The Cooperative instituted a policy of purchasing as much fish as its cold storage facilities could handle. This coincided with rapidly expanding wholesale and retail operations.

Fish handling from receipt, storage, freezing and presentation to the public has greatly improved since the Cooperative took over the management operations. Fish stored in plastic fish boxes and iced down have been stored up to one week with no problem. Frozen filets, frozen flat on racks and stored in plastic sacks are stored successfully for up to six months. Future plans include (when more cold facilities are made available) sorting all fish and storing them by species, both fresh and frozen.

1.2.5 Promotional Demonstrations

Using fish as an educational tool, CRS/Djibouti and UNICEF/Djibouti propose to cooperate in an intensive nutrition, education/fish promotion project. The project will operate through the infrastructure already created within the Djiboutian PMI system for the CRS food and nutrition program. The project's goal will be to introduce fish - Djibouti's only domestic food source - into the diets of the Djiboutian family. A UNICEF-sponsored coordinator and fish demonstration training team will carry out fish demonstration activities.

CRS and the RDA technical assistance team have collaborated in demonstrational programs in the interior of the country at Ali Sabieh, Dikhil and Wea. The project manager has given advice to the CRS team as to fish selection and storage techniques. CRS has designed posters and signs to promote the consumption of fish, and newspaper ads were taken out in September 1982. Once the new market facilities are in place, a more intensive publicity campaign will be implemented including radio and T.V. spots. Also, the demonstration team will do demonstrations in fish preparation at each new sales outlet. A Cooperative logo was supplied in sticker form to be placed on vehicles and Coop boats. T-shirts bearing this logo have been supplied to the Coop and are being sold through the RCF.

1.2.6 New Retail Outlets and Improved Transportation

Based upon a funding request from the Government of Djibouti, IFAD proposes to finance the construction of new retail outlets in Djibouti City. IFAD, rather than RDA, will assume prime responsibility for outfitting these outlets.

It is envisioned that the RDA technical assistance team will play a greater role in developing rural markets. RDA and CRS have already established provisional markets in Dikhil and Wea. The provisional Dikhil market will be replaced eventually by a permanent structure funded by IFAD. In the meantime, the project manager has been working closely with rural fish vendors, arranging for training at the Pecherie, designing storage facilities, fish selection, and bookkeeping techniques. By the end of 1982, it is envisioned that there will be interior markets in not only Wea and Dikhil, but in Ali Sabieh, Arta, Tadjoura and Obock as well.

To further support the maximum extension of the cold chain market system, USAID purchased two insulated trucks (0.5 and 2 mt capacity). These vehicles have proven to be crucial to expanding the availability - hence, ultimate consumption of fish. For example, in the middle of summer when

temperatures reach as high as 120^oF, iced fish has been transported to Ali Sabieh, Dikhil, and Mouloud.

1.2.7 Cooperative Development

At the beginning of the project, it was the contractor's task to assess the potential for Cooperative development. The Government of Djibouti, prior to the contractor's arrival, had formulated a set of Cooperative bylaws which were approved and signed into law by the President of the Republic in May 1980. The Cooperative, as envisioned, would be one that made available fishing gear and materials to the fishermen. There was nothing in the bylaws that mentioned that the Cooperative would be involved in the buying and selling of fish.

Today, however, the Cooperative has extended its function to fish procurement and sales, thus permitting it to utilize profit therefrom, to reinvest in materials for the revolving credit fund, and eventual purchase by Coop members. There seems to be no doubt that a Cooperative, owned and operated by its members, rather than in the control of a single private citizen, can be a meaningful mechanism for increasing fish production and employment in Djibouti.

1.2.8 Revolving Credit Fund

As envisioned in the Project Paper, the RCF would be an extension of the Service de Peche, managed by the Project Manager. With the creation of the ACPM, the contractor urged the government to extend its functions to include the RCF in hopes of further reinforcing the Cooperative through capitalization.

Upon GROD concurrence, the contractor set up the principles of the RCF as an internal bylaw to the Cooperative. Rules and loan criteria were established. From October, 1980, to December 31, 1981, the RCF has generated gross sales of \$9,033,420. FD. Of this sum, \$5,364,965 has been reinvested in

material purchases and loans to fishermen. (A fishermen's aid fund was established within the RCF to make cash loans to fishermen in need.)

From October, 1980, to December 31, 1982, thirty-four (34) credit purchases (limited to boats, outboard motors and nets) were made. Of these, 14 have been paid back completely, leaving 20 outstanding. Some fishermen prefer paying a large amount down, as much as 50 percent (50%) of the purchase price; whereas, RCF rules state that only a minimum of 10 percent of the purchase price need be paid in advance. Ten percent (10%) per year interest is charged on all credit purchases and is rebated when the fisherman pays back in a shorter period of time than the year repayment deadline. To date, all donor commodities have been capitalized within the RCF structure.

1.2.9 Training

Training falls into two categories: fishermen training and Cooperative and management training. Fishermen training will include the introduction and use of new fishing gear. The Master Fisherman is programmed to hold weekly seminars in the use of trolling lures, net construction, vertical long lines, and fish traps. Also, as new gear is tried out and proved successful, fishermen will be invited out on the project boat for demonstrations.

Cooperative and management training is perhaps the most important aspect of training. Future Cooperative personnel training needs include:

<u>Persons</u>	<u>Training Needs</u>	<u>Responsibility</u>
1 Manager	Simple accounting, numerical skills	RDA - USAID
1 Accountant	All accounting methods	RDA - USAID/IFAD
1 Warehouseman	Inventory Control	RDA - USAID
3 Mechanics	Diesel-outboard motor repair	IFAD
2 Refrigeration Technicians	Refrigeration/ice machines	IFAD
2 - 3 Carpenters	Fiberglass and wood-making	RDA - USAID
1 Statistician (Service de Peche)	Statistics	Red Sea Regional Project
1 Biologist (Service de Peche)	Fishery Biology	Red Sea Regional Project
2 Master Fishermen Pilots	Fishing/Piloting	RDA - USAID/IFAD
1 Extension Worker	All aspects of general commercial fisheries	RDA - USAID/IFAD

1.2.10 Boat Building and Repair

The extension to the present project is implementing a boat repair and boat building sub-activity which utilizes a patented fiberglass process called C-Flex. The C-Flex sheathing system was designed to protect the hulls of new and old wooden boats from rot and marine parasites, problems that cause the majority of layups of the Djibouti fleet. It is a simple process that covers the hull with a high-strength skin of fiberglass that will greatly increase the life and strength of the hull and will dramatically reduce the cost of maintenance.

Most of the boats now engaged in the fishery are old, and many are badly in need of extensive repair. The reconditioning of some of these boats using conventional methods now employed in Djibouti is financially unrealistic. In addition to the operational boats that are in need of immediate and

extensive repair, there are several beached boats for which the owners have abandoned hope to ever repair. Each one of these boats recommissioned would equal the productivity of a new boat. These boats can be sheathed with a minimal amount of woodworking.

To the present, three wooden boats have been sheathed, one fiberglass boat has received major repairs, and one new prototype boat has been constructed. Thus, a total of 5 units have been added to the working fleet of an estimated 42 boats, a gain of about 10%.

The feasibility of building new boats and sheathing existing boats has been proven. It remains to be determined if fiberglass repair and/or construction is cost-effective. This coming year, cost analysis will be instituted to determine the long range viability of the Cooperative managing such a program and/or its potential for replication in the private sector.

1.2.11 Oyster Culture

Using oyster seed imported from hatcheries in the U.S., the project team has initiated an experiment to determine whether high quality oysters can be technically and economically cultured in Djiboutian waters. Using tethered free-floating rafts, two species of oyster, C. gigas and O. edulus, are being cultured.

The experiment has been encouragingly successful to date. While there have been mortalities, this is not unexpected considering the circumstances and characteristics of the new environment. Survival has been excellent for the C. gigas. Only a few of the C. gigas have died due to natural causes. Growth has been very good and, while all do not grow at the same rate, they have been sorted into groups of similar size and each size range is growing at a progressive rate.

The shipment of O. edulus has not survived. While it is not possible to determine the direct cause of death, it has been suggested that they were too large (old) to adapt to Djiboutian waters, having reached a physiological condition that made them incapable of adjusting to the new environment. Since O. edulus are noted for their ability to adapt to a wide range of conditions, it is planned to make another shipment of smaller sizes of the species at a later date in an attempt to see if they will survive and grow.

At the time of actual harvest, some of the more interested Cooperative fishermen will be encouraged to watch the harvest and the sales transactions. If even 80% of the oysters survive to marketable size, wholesale value should approach \$10,000. One of the most difficult parts of transferring this technology to the Djiboutians is to convince them that they must forego short-term gains to obtain much greater long-term gains. A profit of this magnitude from such a small operation may well convince them.