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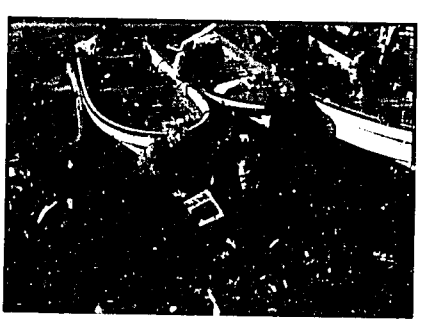
Monitoring and Evaluating The Impacts of Small-Scale Fishery Projects

Edited by Richard B. Pollnac



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MONITORING AND EVALUATING THE IMPACTS OF SMALL-SCALE FISHERY PROJECTS

Edited by

RICHARD B. POLLNAC

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INTRODUCTION

MONITORING AND EVALUATING THE IMPACTS OF SMALL-SCALE FISHERY PROJECTS

Richard B. Pollnac

Adequate monitoring and evaluation of the impacts of development projects is essential as a means of providing the information necessary to both adjust ongoing projects and formulate new ones. A reading of fishery project monitoring and evaluation reports from a sample of sources, however, reveals a great deal of variation in the methods and products of monitoring and evaluation. Some simply deal with disbursement of funds and use of personnel with little or no indication of accomplishments. Others describe the numbers of new technologies or other innovations introduced (e.g., motors, fish ponds, nets, cooperatives, etc.) but report nothing concerning their use (e.g., how they are distributed, who is using them, what are their impacts, etc.). In cases where impacts are discussed, the descriptions are frequently vague and/or unverified statements concerning impacts on production, income, and quality of life.

It has been more than a decade since Gerhardsen (1977) suggested that insufficient empirical evaluation of fishery development projects inhibits realization of expected benefits. In Chapter One of this volume, Trott points out that we still fail to conduct post evaluations several years after fishery project inputs are terminated; hence, we are unable to determine real, lasting project impacts. Obviously, the system of fishery development project monitoring and evaluation needs to be improved.

Development workers are aware of the need for improved monitoring and evaluation of projects, and this awareness has resulted in a number of recent and excellent publications on the subject (e.g., Casley and Kumar, 1988; Kumar, 1987; Norton and Benoliel, 1987; Salmen, 1987; White, 1986; Goldmark and Rosengard, 1985; Cernea and Tepping, 1977). Most of these

publications, however, are of a general nature. If a sector is emphasized, it is most frequently the agriculture sector. Little or no attention has been given to the fishery sector. This is significant because the special nature of the fishery sector in all economies creates the need for approaches to project monitoring and evaluation which differ significantly from those used in other sectors. The product is different, and except for aquaculture it is harvested from the wild with fishery operations taking place at sea, making some kinds of observations for monitoring and evaluation purposes difficult if not impossible. The resource is a natural resource; its variation subject to a number of recognized and unrecognized natural and man made influences. Assessment of stock sizes available for harvesting is made difficult by the fact that fish are mobile, unrestrained, and their underwater habitat presents observational difficulties. All of these factors necessitate use of special methods of information acquisition in the fishery sector. Several publications deal with the methodology for obtaining this type of information (e.g., Pollnac, 1988; Fox, 1986; Stevenson, Pollnac, and Logan, 1982; Smith, 1979; Roedel and Saila, 1979). These information acquisition methods and techniques can and should be made a part of adequately designed monitoring and evaluation programs for use in fishery projects. The papers in this volume are a first step in this direction.

The chapter by Trott is written from the perspective of one who works directly for a major international development agency. He points out how difficult it is to evaluate specific instances of training and technical assistance projects and suggests that measurement of impacts would be facilitated if expectations were clearly specified during planning and criteria for evaluating impacts developed before project implementation. Importantly, Trott indicates that funding for evaluation of projects several years after completion is usually unavailable.

Cost of evaluation is an excuse frequently used to justify its exclusion from many projects. While detailed, quantitative data collection and analysis with adequate controls is desirable (and expensive), many low cost information acquisition techniques exist which can provide useful, although incomplete information which is better than no information at all (cf. Kumar, 1987; Casley and Kumar, 1988; Salmen, 1987). Salmen (1987) notes that a participant observer evaluation technique applied to seven projects described in his book cost an average of $7000 per project for projects with an average cost of nine million dollars. That is less than one-tenth of one percent of total project costs--a relatively small portion to be set aside to determine project impacts and help to avoid future mistakes and waste of scarce development funds.

Chapter Two does not focus on fishery projects, but it is of relevance and interest here because it outlines procedures used by a private international development organization to develop a standardized impact evaluation system. In their chapter, Farrell and Franken discuss the role such a system can play in identification of goals, monitoring progress towards goal achievement, and evaluating the impact of program activities. Ideally, a standardized system will insure that data appropriate for monitoring and evaluation purposes will exist for all projects. Most of the authors in this volume note that the absence of necessary data (frequently baseline data) inhibited their ability to prepare adequate evaluations. Application of a standardized system may eliminate this problem.

The chapter by Molnar and Duncan focuses on collection and use of social science information in aquacultural projects. Their emphasis on the importance of broad-based participation, equity, and sustainable development should help make us more aware of this frequently discussed issue which is nevertheless rarely assessed as a part of project evaluation. Chapter Three is also important because it makes explicit the differences between aquaculture and agriculture and the implications of these differences for project monitoring and evaluation.

In Chapter Four, Pomeroy provides an excellent discussion of important issues associated with monitoring and evaluation in the context of a fisheries project in the Caribbean and an agriculture project in the Philippines. Integration of quantitative and qualitative data for the evaluation of the fishery project demonstrates how both types of data can be used. Techniques for dealing with the absence of baseline data are also discussed.

Morrissey's chapter clearly indicates how inadequate monitoring, poor data quality, and improper data analysis can hinder project implementation and evaluation. He discusses how application of operational impact assessment procedures could have improved the fishery projects he evaluated by providing a more dynamic, ongoing monitoring and evaluation of project impacts.

Both Crawford and Rice had extensive experience as Peace Corps Volunteers working on marine fisheries and mariculture projects in the Philippines. Their chapter provides numerous insights to the problems involved with evaluation of Peace Corps fishery projects. Their second case study illustrates problems noted in Chapter One with respect to identifying a "successful" impact (also see de Wit, 1988). In this case, although the technology was not successful, the extension agency used a new process to attempt the introduction. The application of the process was identified by the Peace Corps Volunteer as a successful impact. The sixth case study in

Crawford and Rice's chapter makes the argument that an evaluation is incompletely utilized if it is not readily available for future project planning.

In Chapter Seven, Croulet argues that fishery projects must be monitored and evaluated as small businesses. His analysis of a fishery project in Columbia focuses on project profitability assuming that it will improve standards of living and quality of life for participants. This is clearly an important aspect of fishery project monitoring and evaluation that must be examined in the total social context as emphasized in Chapter Three. It is important to be aware that profits may remain in the hands of a few participants and have little effect on the community as a whole.

Chapter Eight, by Brainerd, also focuses on the financial analysis of a fishery project, providing an excellent example of variables that need to be considered in such an analysis along with identification of potential problem areas. Brainerd, however, expands his analysis to relate it to the wider socioeconomic context and project objectives in Guinea Bissau.

Finally, Chapter Nine illustrates the importance of having a control group for evaluation purposes. Production decreased for both the project participants and non-participants, suggesting that normal fluctuation in availability of fish resources was probably responsible. Although we cannot be sure that the decrease was a result of normal year-to-year stock variations, we can at least conclude that participation in the project did not decrease productive ability. Additionally, Pollnac, et al. demonstrate the use of adequate baseline data as well as measurement and analysis of variables external to actual development inputs which may impact evaluation criteria.

Overall, the nine chapters in this volume examine an important range of issues associated with fishery project impact monitoring and evaluation. The chapters cover a diversity of project types in locations ranging from the Caribbean and Latin America to Africa and Southeast Asia. Various issues are raised in the different chapters, but as noted above, some issues reappear throughout the book. Both the diversity and communality of the studies in this volume should be of interest to those involved in the difficult process of fishery project impact monitoring and evaluation.

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1

A DEVELOPMENT AGENCY'S PERSPECTIVE ON IMPACT EVALUATION OF FISHERIES DEVELOPMENT PROJECTS

Lamarr B. Trott

INTRODUCTION

The Agency for International Development is one of many donor agencies worldwide that are responsible for development of fisheries in less developed countries. Such countries, with their at or near poverty conditions are unable to develop the potential themselves. Thus, they turn to the developed nations for ideas, expertise, and physical facilities to initiate such endeavors. Most developed nations have an "aid" function; however, they often have hidden agendas. Hence, a political element usually creeps in. The United States, although more altruistic than most, has a political agenda as well.

To qualify for A.I.D. funds, a developing country must have a per capita income of less than US$ 650 per year. Only a limited number of countries qualify for this, and the number is presently about 60, over half of which are in Africa. The Agency establishes a "Mission" in countries receiving aid, and some countries, such as Mexico, Brazil, and Malaysia are considered "graduate countries" as their per capita income exceeds the allowable level. In addition, some developing countries receive bilateral aid from the United States, and do not fall under the A.I.D. umbrella. The People's Republic of China is a good example of this.

The budget of the Agency for International Development is about US$ 3 billion, most of which is food aid. Note that military aid is not included in this figure. The budget for agriculture has fallen to $450 million from $750 million in the last three years. The fisheries portion of this, as fisheries comes under the agriculture sector, is about $15 million, or under 3%. As a comparison, the FAO budget for fisheries is 14% of that for agriculture. A.I.D. has about a dozen projects at present with a significant portion being fisheries, and half of these being centrally funded projects

from my bureau. The Bureau for Science and Technology (S&T) is primarily a research, albeit applied, branch of the agency. Missions are coordinated by regional bureaus, of which there are three: Africa; Latin America and Caribbean; and, Asia and Near East. The regional bureaus and missions are extension-oriented, meaning that they work directly with the host country to help develop projects that are mutually agreed to be of direct and more or less immediate benefit to the country. The Science and Technology bureau administers longer term research projects, like the CRSPs (Collaborative Research Support Programs), which were primarily mandated by Congress to support development efforts of U.S. Title XII (Land Grant College) institutions. Other projects support technical assistance and training. The projects in our present portfolio include:

1. A Resource Services Support Agreement (RSSA) with the National Marine Fisheries Service - this supplies two technical advisors and a secretary for direct assistance to the agency.
2. A CRSP with the University of Maryland, together with the universities of Rhode Island and Washington, on fisheries stock assessment.
3. A CRSP with Oregon State University, together with the universities of Hawaii, Michigan, Michigan State, and Auburn, on pond dynamics.
4. A cooperative agreement with Auburn University to supply technical assistance and training and to conduct research in aquaculture.
5. A cooperative agreement with the University of Rhode Island to supply technical assistance and training and to conduct research in marine fisheries.
6. A cooperative agreement with the Oceanic Institute of Hawaii to conduct research on the reproductive biology of milkfish.
7. A core grant to the International Center for Living Aquatic Resources Management (ICLARM).
8. A new project being designed on fish aggregating devices.

Expertise in fisheries comes from the RSSA (two), one direct hire position in S&T, and one fisheries officer in one mission - Indonesia. In contrast, most missions have an agricultural development officer. The lack of effort by A.I.D. in fisheries is directly tied to this lack of expertise.

For the most part, other donors are the same, having little expertise in fisheries, but stressing agriculture. The Overseas Development Administration of the United Kingdom has two central fisheries officers, West Germany has one, but

other countries, like Japan (the Japanese International Cooperation Agency - JICA) have a higher level of expertise. Our closest neighbor, Canada, has basically three agencies that deal with overseas development - CIDA (Center for International Development Assistance), IDRC (International Development Research Center), and ICOD (International Center for Oceanographic Development). The last uses CIDA money, mostly. IDRC has three regional fisheries specialists, one for each region, stationed in Bolivia, Senegal, and Singapore. The development banks have few experts in fisheries. For example the three experts in the World Bank have dwindled to one.

The major issue facing donor agencies in fisheries is coordination. The World Bank organized two meetings to discuss this recently in Paris and Abidjan. Although well-intentioned, it will be difficult to truly coordinate donor efforts. A political element is usually present. Japan funds tuna development and joint ventures in Indonesia, largely to insure greater export levels to Japan. Even the United States is not free of this bias, evidenced by half the foreign assistance budget being allocated to a combination of Egypt and Israel.

What has development assistance been in the recent past? Mostly infrastructure development. Roads, schools, and in fisheries, ice plants and ports. Vessels have been built to capitalize on an ocean resource thought to be unlimited. Overcapitalization leads to overfishing. There are a number of myths and realities related to fisheries; e.g., more boats will catch more fish (not true); more fishermen will catch more fish, and will have a concomitant higher catch per unit effort (also not true). The country of Indonesia alone is said to have one million people employed in the fisheries and fisheries support sector. Is this too many or too few? In actual fact, the present world catch of 86 million metric tons might increase with intense management practices and success in aquaculture, but the FAO estimate suggests an upper limit of 100 million metric tons. Figures of interest associated with this catch level show that half the catch is from developing countries and half that is caught by artisanal fishermen. Ten to twelve percent is the result of aquaculture.

Two factors have recently positively affected greater acceptance of the fisheries sector: Law of the Sea extension to a 200 mile jurisdiction, and health and nutrition recognition for seafood. Although the United States unilaterally declared a 200 mile jurisdiction for fisheries through the Magnuson Fisheries Conservation and Management Act of 1976, it did not support the Law of the Sea negotiations for other countries. A strong tuna lobby fought to exclude tuna from jurisdictional consideration calling them "highly

migratory." We therefore do not recognize the 200 mile exclusive economic zone (EEZ) of other countries and fish for tuna within their waters, sometimes to be arrested as pirates. For other species, we do recognize the EEZ. The major point here, however, is that most nations have new jurisdiction over area 200 miles from their coasts. For some, like the tiny South Pacific island nation of Kiribati, their jurisdiction suddenly becomes vast. The major problem for developing nations is that they have no idea what this new-found territory contains in the way of marine resources, both living and non-living. Developed nations needing greater fish harvests have entered into treaties or joint ventures with such developing countries, but many just poach. This is true of both developed and neighboring developing nations. Senegal is a fishing nation whose fishermen harvest resources of Mauritania to the north and Guinea Bissau to the south.

The second factor, health consciousness, is related to recognition of cardiac problems of polyunsaturated fats, at least in the United States. This has been a large part of the nearly 50% increase in the U.S. per capita consumption from 10 to 15 pounds of fish in the last 15 years. In developing countries, the issue is more that of protein consumption, where often 40% of the animal protein consumption is from fish. An issue at A.I.D. is the tradeoff between calories and protein, where calorie enhancement is considered sufficient. Both factors have led to greater recognition by the United States of the importance of fishery resources, but this has not been translated into fisheries projects in our major assistance agency.

There are other factors which are equally important, but the relationship to fisheries escapes recognition by the public and by policy makers. One of the more obvious is pollution. A.I.D. recognizes natural resource protection as an important element, and pays lip service to biodiversity, however aquatic resources have been largely ignored by the agency. There is a natural resources strategy for Africa, but it doesn't include aquatic or coastal resources. This is hard for aquatically-oriented people to believe.

The agriculture "focus statement" of A.I.D. states that we are to increase food availability, thereby increasing income potential, while retaining natural resources. Fisheries fit into this scenario quite well. We spend a great deal of our time in the agency selling fish. We now are beginning to use the term aquatic resources, sensing that this will sell better than fisheries and aquaculture.

IMPACT ASSESSMENT

Considering all the above, how do we develop fisheries projects? Then, how do we monitor them? And, finally, how do

we evaluate them? The first question that we can ask is what will the impact of the project be. This sounds like an easy enough question. However, it really is not, because you must consider who or what will be affected (impacted). Impact in the development sense is usually taken to mean the overall impact of the project. Since the emphasis has largely been toward increasing production, a project fails if it doesn't do so. Part of a project document in A.I.D. includes a "log frame" (for logical framework). The log frame for The University of Rhode Island's cooperative agreement with us says that this project will increase availability of marine foodfish in developing nations by 10%. This is highly unlikely, and shows little relationship to actuality. However, projects have been judged on this basis, the most recent example being the small ruminants CRSP.

How does one judge impact? Is it strictly based on economics? Anthropologists would argue that point. Most development projects are judged on production - aiming at increasing production, of course. Quantification is an important element. How many widgets can be produced, or how many more as a result of this project? This is why early development projects in fisheries aimed at increasing capacity. If you want to increase production in an aquaculture pond, often merely feeding more will yield larger fish faster. The same is true for fertilizing a crop or even your lawn.

RESEARCH

Since universities deal mostly with research, and indeed our office supports applied research together with technical assistance and training, the question of how research is judged is paramount. Research is judged mostly on peer review, and often by just numbers of resulting publications. If related to a development project, a positive impact for the country may not be forthcoming or evident at all. Evidence is another question. Does an impact have to be immediately evident? A negative impact is usually not evident until later. Many examples of this are found in early biological control efforts.

TRAINING AND TECHNICAL ASSISTANCE

Training and technical assistance are equally hard to judge. An LDC student trained at a U.S. university has several levels of choices after graduation. The first level is whether or not to return home. Often, there is no choice as he has been supported with the promise of return. On returning home, he has the choice of staying in his original job, usually research or extension, or taking an

administrative post. The latter pays more, and has more power and therefore more spinoff benefits, so the choice is easy. After serving his required term with the government, (which includes universities), he often finds the private sector to be more lucrative. Probably the best current example of this is with persons trained in shrimp culture. If this advancing bioadministrator stays with his government, he often moves out of the field of fisheries. What has been the impact of the training? Probably positive in the long term, as this fisheries-trained manager can affect his government's policies. However, he may have made a bigger impact if he had stayed a fisheries scientist. How does one measure this? One example I met recently was in Indonesia. A scientist trained in food technology returned home to be immediately elevated to head of the seafood research division in Jakarta. Loan funds became available to buy equipment for marine research, and he was put in charge of making up the list. Most of the equipment requested therefore was for chemical analysis - $160,000 for an HPLC, for example. He was the only one who was trained to use it. Before the equipment arrived, he was elevated to a higher position, therefore less likely to use this sophisticated equipment. Was the impact of his training negative? Or, was it still positive, as another Indonesian scientist was trained in fisheries. Another aspect becomes the political one - as he was trained in the U.S., he would be more disposed toward dealing with the U.S., its people, both scientific and lay, and purchasing our equipment with which he is familiar. Again, how do you measure this?

Technical assistance has the same positive and negative aspects, but is generally more positive, and results are more quickly evident. This brings up the issue of trade. The balance of trade in fisheries is third in our nation, following autos and electronic equipment. The level has doubled in the last four years to 5.5 billion dollars for edible seafood products. If non-edible products, like fish meal, oil, etc. are included, the figure is over seven billion. Technical assistance demonstrating U.S. equipment often results in purchase of that equipment for or by the developing country. For trade, there is the question of competition with U.S. industry. The only significant product imported in the U S. in fisheries that fits in this category is shrimp. We are providing assistance in shrimp aquaculture, and this does compete with U.S. shrimp interests. However, the demand is still so great that the market price has not fallen and the U.S. industry has yet to take notice. For comparison, the American Soy Bean Association lobbied for the Farm Bill to be rewritten to cease all agricultural assistance to developing nations. Although this ploy did not fully succeed, it resulted in a 14% reduction in the A.I.D. budget for agriculture two years ago. The trade balance issue will

be with us awhile, and we need to take advantage of it.

PLANNING FOR IMPACT

Perhaps it's too altruistic, but the best way to measure project impact is to have it built into the project in planning. Why do the project in the first place? It's like the scientific method - what is the hypothesis you want to test. In the development case, what will be the impact you want to have?

Why do we do development work, anyway? Frankly, for many it's another source of funding for research in U.S. universities. The National Science Foundation funds research as an institution building effort. The purpose is not wholly to gain knowledge. The CRSP program is much the same. Many of us get into development work because we have hope of making a noticeable impact. There's that word again! If the impact is to build up U.S. science or U.S. universities the measure will be different than if we provide more food or earning potential for a fisherman in Bolinao, Philippines.

Therefore, we must determine what we want to accomplish, not only in completing work designed in a work plan, but what will be the real and tangible result. We therefore need criteria. Studies have been completed on design criteria but little has been done with impact criteria. This could be a result of this workshop.

A.I.D. has a definite structure fo project development, basically requiring a "concept paper", then a "project identification document", then a "project paper" before funding can be considered. There are planning grants to develop projects which can be awarded somewhat easier, but most have to be bid competitively. Indefinite Quantity Contractors (IQC) are selected through the bidding process, and then can receive contracts directly. Missions make major use of such contractors.

MONITORING

Projects may take several forms, but are primarily grants or contracts. Contracts have a deliverable product. Other than reporting requirements, grants do not. Many of A.I.D.'s grants are halfway between, and are called cooperative agreements. This allows much greater interaction between a project monitor and a grantee, still usually called a contractor. All A.I.D. projects have a project monitor, and the level of interaction varies with the type of project and the personality of the monitor. Other donor and granting agencies work in much the same way.

Monitoring is accomplished through site visits, report and work plan review, and interaction between the monitor and

contractor. Grants are sometimes peer-reviewed, but seldom have a major monitoring component.

Suggestions generated by this workshop as to how monitoring could be more effective will be useful, but must relate to the status of the project - whether grant, contract, cooperative agreement or whatever.

EVALUATION

Evaluation of projects takes a number of forms, depending on the project. CRSPs are reviewed every three years, other projects are reviewed a year or so before consideration of extension. There is also usually a terminal evaluation after the project is completed. What A.I.D. and most other funding agencies fail to do is a post project evaluation, several years after the project ends. This is where the real impact can be determined. What usually happens is that a tangible impact is evident in a physical facility, like a road, port, or building, but relation to the project that funded it is lost. This must be changed. However, funding is seldom available for such endeavors. Most available funds are used for new or existing projects. To build evaluation into the scheme would require cutting such projects and eliminating or postponing new starts.

Infrastructure without long term commitment leads to zero impact, or can even be counterproductive. Two examples that I have seen recently are research buildings in Indonesia funded by the World Bank that were shells without equipment, and four research vessels in Sierra Leone unable to move because of the lack and high cost of fuel. Such examples can be counterproductive, as policy makers want results. No results, regardless of the reason, gives them ammunition to downplay fisheries and give the money to other sectors.

Evaluation must be based on real impacts. Not just are the things done right, but are the right things being done? We in A.I.D. are in desperate need of "success stories" for fisheries projects. Our agency thrives on "breakthroughs." Research just does not work that way, but real accomplishments must be planned for a project, be they greater production, new discoveries, or recognition of participants - they do not usually just happen. Therefore, projects must be properly planned, with GANNT or PERT charts, objectives, and milestones. Then, proper reporting is essential. Then, you must be a good Madison Avenue advertising executive and sell your progress. Hopefully, this will not be an oversell, as has happened all too often. Otherwise, the fisheries sector, at least in the United States, will continue to be undersold.

One way to report new findings more often is to be on the cutting edge of a science. This is why new "bandwagons" are so popular. In A.I.D. such themes are biotechnology,

biodiversity, sustainability, and natural resources. Fisheries fit all very well.

CONCLUSIONS

The chapters in this book were prepared to help donor agencies do a better job of monitoring and evaluation in fisheries. In the United States, fisheries is not a major sector, hence less attention is paid to it. More impact oriented projects where real and tangible results can be shown will help the sector develop, both domestically and internationally. This book can assist in this process by providing guidance on:

a. Criteria for impact identification.
b. Criteria for monitoring.
c. Criteria for monitoring and evaluating research.
d. Suggestions on how monitoring and evaluation could be done more effectively.
e. Suggestions on development of recognition of the need for post-project evaluation well after completion.

2

A STANDARDIZED IMPACT EVALUATION SYSTEM FOR AN INTERNATIONAL DEVELOPMENT ORGANIZATION

W. Timothy Farrell and Henk Franken

INTRODUCTION

PLAN International (Foster Parents Plan International, Inc.), is a non-profit, non-religious, private international development organization with field program operations in over 70 locations in 25 countries. It is principally funded by private sponsorship donations from individuals in Australia, Belgium, Canada, Japan, West Germany, the Netherlands, the United Kingdom and the United States of America. Additional non-sponsorship funds from various governments cannot exceed 30 percent of total funds during any fiscal year. This ensures the autonomy of PLAN with respect to its definitions of policy and focus of work. In the past 10 years, the organization has more than trebled in size to the point where PLAN now is directly involved with nearly 500,000 sponsored families and an additional estimated 2 million non-sponsored families and their communities.

PLAN's approach is to work with sponsored and non-sponsored families and their communities to achieve common goals related to the improvement of the quality of life through participative and integrated programs and activities. To this end, PLAN has recently developed broad organizational goals in health, education, and livelihood. Field offices are responsible for operating programs consistent with these goals while incorporating community objectives and taking into account local environmental, economic, social and cultural realities.

For goals to be meaningful, mechanisms for monitoring progress towards goals and the impact of program activities are required. The purpose of this paper is to describe the evaluation system which was developed to meet this basic organizational need. It was pilot tested in 1988 in seven field offices in the South American countries of Bolivia, Colombia and Ecuador. This paper examines the development of

the Field Office Evaluation System (FOES) by focusing on the conditions which governed decisions relating to the methodologies employed.

BACKGROUND AND PROBLEM DEFINITION

Until recently, goals and objectives were largely field office specific. Within the broad concept of "development", they generally reflected the particularistic nature of the setting and the project interests of national and international staff, taking into account subjective assessments of the needs of the client community. Changes in staff were often accompanied by changes in both program emphasis and program approach, as well as in field office-specific goals and objectives.

In order to reduce instability with respect to program goals and objectives, a planning system was introduced that was intended to minimize subjective mid-stream program changes. This system, called the Situation Assessment and Goal Establishment Report (SAGE), sought to establish medium range planning (roughly 5 to 7 years) based on measurement of certain parameters relevant to the concept of development.

Evaluation of impact was largely limited to assessments of the magnitude of program coverage and fiscal accountability. Since there were no clearly defined and formally articulated organization-wide goals, the design of a uniform evaluation system was necessarily restricted. While general guidelines for the kinds of data required for the SAGE were established, no systematic baseline or evaluation procedures were instituted. The use of coverage and accountability measures implied that appropriate activities, covering a broad spectrum of the target population were sufficient to bring about desired changes and impact. Objective measurement of the changes was not formalized. The net result was that what was intended as an evaluation system often was actually transformed into a reporting function.

Thus a situation existed in which an organization in the process of considerable growth and manifesting a high degree of complexity and diversity was hampered by:

1. A lack of clearly articulated and formalized organizational goals· and,
2. No uniform system for determining an objective baseline data system or for measuring the impact of program activities within or between field offices.

In recognition of these shortcomings, PLAN undertook to establish organizational goals in the health and education sectors. Livelihood goals are being prepared for consideration for Board of Directors' approval. In addition,

in 1986, senior management made provisions for the establishment of a field office evaluation system that would be uniform throughout all Field Offices and would ensure comparable information to provide baseline data for planning and to measure progress towards goal achievement and long-term impact.

DEVELOPMENT OF THE FIELD OFFICE EVALUATION SYSTEM

REQUIREMENTS OF THE EVALUATION SYSTEM The conditions which governed the development of the Field Office Evaluation System are the following:

1. Management information requires that the information needs of stakeholders and its potential use be clearly identified and addressed.
2. The mandate is that this is primarily an impact system to assess the current situation (baseline), define quantitative and time bound objectives (planning), and measure progress towards achievement of objectives and goals. Thus it needed to function both as a formative and a summative system, i.e. a comprehensive evaluation system with an emphasis on impact.
3. Organizational-wide goals require that the system be uniform with respect to the measures employed. Uniformity implies that the items must be relatively "culture free" and deal with observable fact and behavior with respect to the goal concepts. Uniformity also dictates that operational items be reduced to minimal components that are more or less universal in character.
4. PLAN's operational requirement of client participation dictated that while the system must meet professional standards of methodological rigor, products and sub-systems must be designed to provide findings to community groups. This information must be comprehensible at the community level so that members can actively participate in the planning of activities for their own communities.
5. The mandate required that the system and its products meet professional standards with respect to evaluation methodology, sampling, research design and ethics.

These conditions and our decisions regarding them are detailed in the following sections.

MANAGEMENT INFORMATION AND STAKEHOLDER IDENTIFICATION Since evaluation data is primarily an information system, it was necessary to determine what information was required, why and for whom. Organizational analysis and agency philosophy

dictated that usable information be available for the following stakeholders:

1. The International Board of Directors and the Donor National Offices - Institutional wide assessment and broad policy matters.
2. International Headquarters Management - General management information and operational policy. Budget assessment.
3. Regional Management - Regional and Field Office specific performance assessment. Budget assessment.
4. Field Office Management - Program specific information for planning, implementation and budget preparation.
5. Clients/Beneficiary Planning Groups - Local participation in planning and implementation of projects and activities. Local resource assessment and allocation.

Figure 1 presents the relationships among the major stakeholders.

The purpose of the information is primarily for decision making at various levels at appropriate times. It was also determined that the same general kinds of information were relevant to all stakeholders at varying degrees of aggregation and sophistication. In other words, while the level of abstraction at which the concept of, say, immunization protection is considered will vary significantly between kinds of stakeholders, the important point is that all stakeholders are discussing the same concept and its operational measures (Figure 2).

COMPREHENSIVE EVALUATION SYSTEM - NOT CAUSAL ANALYSIS We are not attempting to engage in causal analysis. PLAN is principally an operational organization engaged in development activities. Aside from this constraint, there are other factors which inhibit the utilization of true experimental design. First, of course is cost in both financial and human resources. Second, as a humanitarian organization, we would find it ethically difficult to withhold "treatment" from a control group. Third, while sponsorship focuses on qualified families, major program thrusts such as primary health care, water, sanitation, education, and major infrastructure programs are targeted for the entire community. Thus randomly selected individuals or households within a community would not meet the requirements of "controls". Finally, is doubtful that even if there were no ethical or financial concerns, that we could identify matched "control" communities within reasonable distances from our program areas.

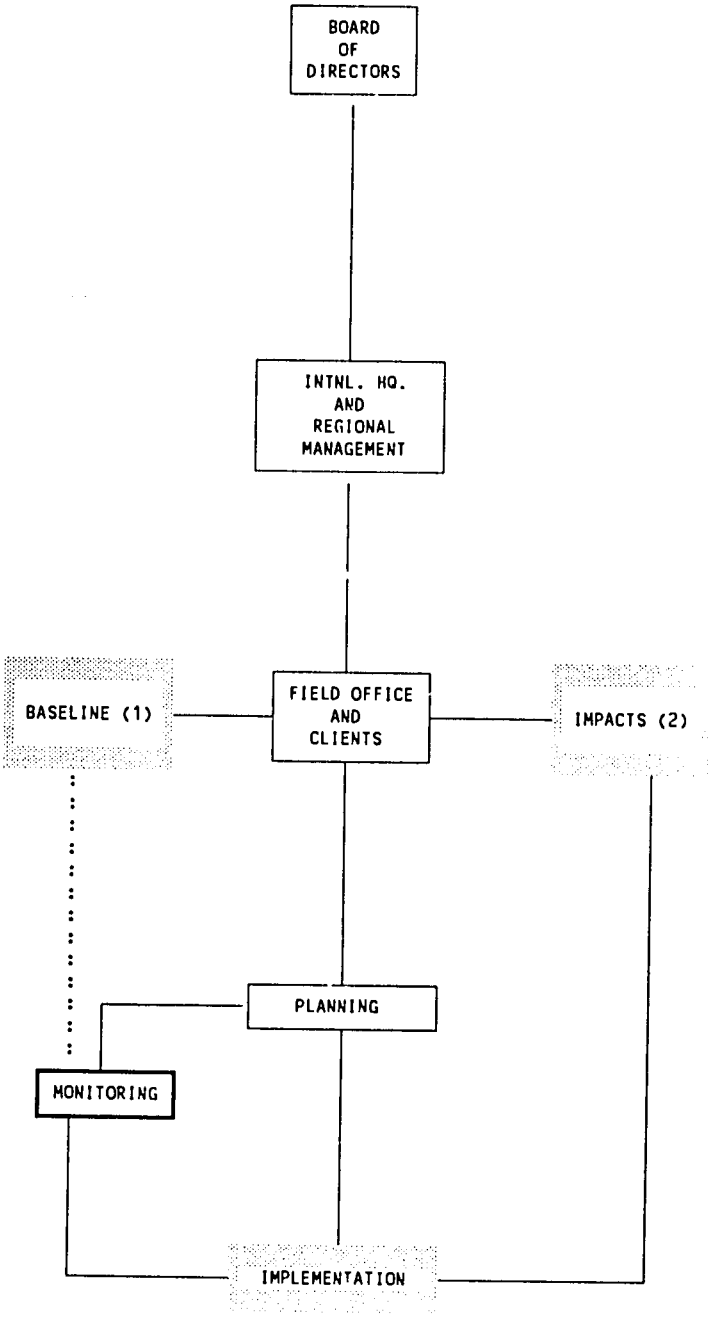

Figure 1: PLAN International Field Office evaluation System Stakeholders, Instruments and Use.

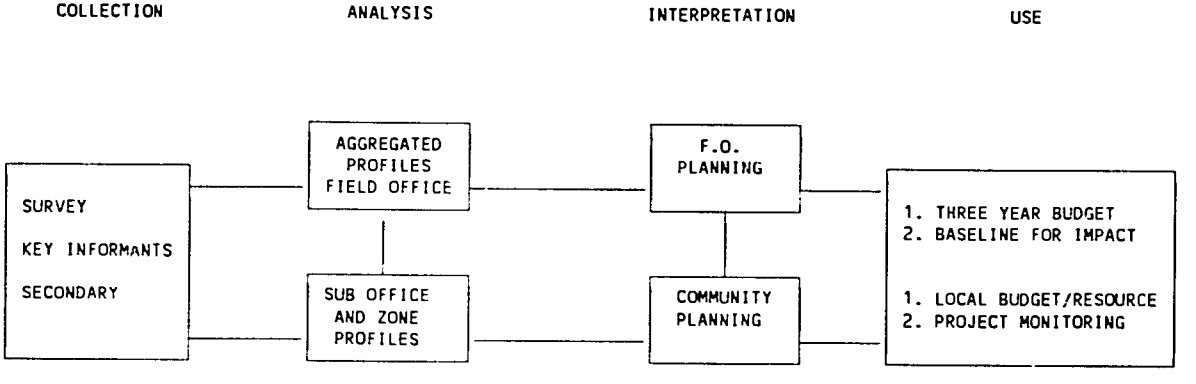

Figure 2: PLAN International Field Office Evaluation System Data Sources and Use.

On the other hand, PLAN does want to know if its funds are being spent in a way that increases the probability that measurable benefits are reaching the client population. We want to know if PLAN projects are empirically related to certain desired outcomes, i.e. improved quality of life as measured by organizational performance indicators. Thus, t_1 - $t_2 \ldots t_n$ is our best possible design element along with measures of intensity of participation and length of time of involvement with PLAN.

Current plans are that each field office will repeat the evaluation at approximately three year intervals. Because we are looking at field office wide results rather than individual outcomes, we intend to use new samples (sampling with replacement) at t_2, $t_3 \ldots t_n$.

ORGANIZATIONAL GOALS OPERATIONALIZED BY ORGANIZATIONAL PERFORMANCE INDICATORS As noted, goals in health and education have been established. Goals in livelihood are still being debated and considered. To proceed with the development of the system, the concepts in the goals statements needed to be operationalized for measurement. Eight cperational indicators were developed. Briefly, these are:

1. Nutritional status (measured by arm circumference, and weight for age)
2. Immunization protection
3. Access to and sufficiency of domestic water
4. Sanitation and waste disposal
5. Housing
6. Formal education
7. Adult Literacy
8. Income

UNIFORMITY OF INSTRUMENTS AND MEASUREMENTS Because the system, once refined, is to be implemented on a world wide basis, the pilot or prototype system had to be designed in such a way that its uniformity could be tested. To do this in a single region, it was necessary to pick sites which represented as much environmental and cultural diversity as possible.

It was decided to pilot test the system in the South American Region where there are 13 Field Offices in three countries: Bolivia, Colombia and Ecuador. These offices manifest a high degree of heterogeneity both culturally and environmentally. While this heterogeneity obviously does not compare with some other regions of the world, such as Asia and Africa, it gave us some sense of the degree to which common operational items (measures) could be used. The sites chosen also vary considerably with respect to the number of years of

operation. Given that this was designed as a pilot study, albeit one which we believed would immediately be useful for planning and budgeting, we wanted to include only about half of the field offices in the region so that we could provide the necessary on-site support to the participating offices. As a consequence, seven offices were selected on the basis of the following criteria:

1. Urban and rural
2. Coastal, valley, highland
3. Linguistic groups (Spanish, Quechua and Amayra)
4. Length of time of PLAN intervention
5. Field office willingness to experiment and to commit the necessary resources

The average size of a PLAN Field Office in terms of sponsored families in these offices is around 7,000. The seven chosen manifest a wide spectrum of heterogeneity ranging from Bolivar, Ecuador, where three distinct ecological zones and two linguistic groups are found, to the relatively homogeneous Altiplano of Bolivia. In addition, the Urban centers of Barranquilla, Buenaventura and Guayaquil (Guasmo) represent considerable internal heterogeneity but are subject to the same general forces of large urban slum environments.

CLIENT INVOLVEMENT AND PARTICIPATION Since one of the major stakeholder groups are the people in the communities where PLAN works, we are trying to incorporate them in the interpretation process. This will be perhaps the most difficult but most important element in the entire system. The objective is to formally include the target population in the specific definition of their situations and formulate their own plans of action and priorities for resolving the problems they themselves identify. One ultimate goal of the system is that communities formulate plans and priorities that will be directly incorporated into the budget process.

This process of involvement is taking the following steps:

1. Training of PLAN's community workers with respect to the meaning of the findings.
2. "Translation" of findings into a medium that is comprehensible to illiterate or marginally literate populations.
3. Working with representatives of the community, the community worker or promoter will develop a plan of action with priorities for meeting community needs.
4. This plan of action will be incorporated into PLAN's three-year budget cycle.

PROFESSIONAL STANDARDS The Evaluation System must meet professional standards. Thus the methodology must be designed to meet rigorous criteria and address the issues of validity and reliability, sample design and size, and a variety of other operational criteria such as cultural appropriateness, linguistic correspondence, optimal time of administration, etc. Details of these activities follow.

1. Definition of Techniques. Because of the need for quantitative data for setting objectives (i.e. baseline) and to measure progress towards objectives, the survey method was chosen as the principal tool for the system. Recognizing that survey research in non-western societies can be fraught with a number of problems, and further, that not all relevant information can be obtained by survey techniques, protocols were developed to permit data collection from key informants and secondary sources as well as the survey.

Operational items developed to measure the eight organizational performance indicators mentioned above were reduced to 158 behavioral and fact items. There are four subjective items on the survey questionnaire. These are the informants' opinion about the sufficiency of water during both the wet and dry seasons, and two items asking what they think is most important to them to improve the quality of life within their family and in their immediate community.

2. Research Design. A quasi-experimental longitudinal design using time as the basic control was selected. Since PLAN cannot directly influence or manipulate exogenous variables, we fully recognize that secular change probably plays a major role in whatever results we obtain. The variables we measured that we believe are critical for the quasi-experimental design and outcome influence are intensity of participation as measured by direct access to a variety of program activities and length of time of association with PLAN, i.e. number of years.

3. Sampling. It is well known that a number of factors affect the size and design of a sampling procedure. One of these is cost. Another is the number of subgroup analyses to be performed. Sudman (1976) has noted that regional surveys with few or no subgroups usually have a smaller sample size than those at the national level or with many subgroups. Most commonly, samples of 200-500 are drawn. While Sudman also notes that "the topic of the survey is not really the basic factor that determines sample size" (1976:87), a careful review of the categories of studies and associated sample sizes indicates that studies dealing with facts (e.g. financial) as opposed to attitudes generally have smaller sample sizes.

In the case at hand, we are dealing with few (3 or 4) subgroups and almost entirely with facts and observable behaviors. Many of the variables are directly observable such as house construction, household possessions, sanitation facilities, access to water, nutritional status and vaccination protection. Other items such as education usually have a high degree of report validity. Literacy of the principal informant was tested by means of a single sentence reading test. Economic and income data have several convergent measures.

Because of this, a sample size of 400 was chosen. This is based on the following formula:

$$\text{Sample Size} = \frac{Z^2}{(SE/\sigma)^2 + Z^2/N}$$

For N = 7500, with an assumed standard deviation (for male household head age) of 20, and the Standard Error set at 2, with 1-alfa = .95, the calculated sample size is 365. To protect against very small cells when disaggregating to three or four sub-offices (zones or regions), this was increased to a standard sample size of 400 for all field offices.

"Stability tests" (Parten, 1950) have been used experimentally on other data (Farrell, 1976) indicating that with respect to means and standard deviations, stability appears to occur at around 350, even in large populations.

Proportional stratified random sampling was used to select the 400 cases. Stratification was based on each field office's sub-offices or zones. Usually these correspond to particular geographic areas which are more or less homogeneous. A point-interval selection procedure was used to select the cases from PLAN enrollment lists which are numerically sequenced. Thus the need for mapping was eliminated.

4. Pre-testing. A pre-test of the survey was conducted in March, 1988, taking a sample of 60 from each field office. The results indicated a number of corrections to be made and suggestions from the field office participants were used in the construction of the final protocol and instruction book.

5. Training. The pre-test indicated that significant training was required to successfully administer the survey instrument. Early on, two local outside consultant groups had been contracted to participate in the development of the system and in the training and supervision of the implementation. A training protocol and manual were prepared, and intensive one week training was provided to all field office staff involved. Usually this included 10-15 data

collectors (PLAN staff social workers), 2-3 supervisors, the evaluation supervisor, data entry clerks and coders, and in most cases the Field Director or Assistant Director.

The training included a complete review of the interview protocol and the instruction manual. The instruction manual included standard definitions of all terms used in the protocol and is a lengthy document. Local consultants used the instruction manual to prepare a brief and concise field manual for data collectors' field use, while the supervisors had access to the full document to use for final determination of coding, etc. In addition, training included the actual use of the protocol on a non-random population and supervisor rechecks. An error rate for each interviewer was calculated and repeated training interviews were conducted until an error rate of less than 5% was reached. This process of standardization is viewed as critical to training.

6. Implementation. Depending on the dispersion of the field offices, the data collection took two to three weeks About 10% of all interviews were rechecked by supervisors. Interviews took about 45 minutes to an hour depending on size of household. Interviews were conducted in Spanish for the Spanish speaking population. For the Amayra and Quechua population, interviews were conducted in those languages by PLAN staff. Outside translators were not used.

Although the forms themselves were pre-coded and scaled, coders were used to check the data and especially any arithmetic manipulations that were required. Questionable cases found by the coders were referred to the evaluation supervisor for decision to reinterview or final coding.

7. Data Entry. Data were entered as the coders and supervisors finished their review. A data entry program was written in dBase III+ that provided range checks. In other words, if a variable had a valid range of, say, 0-6, then any entry over 6 would not be accepted by the program. This provided range integrity, but of course cannot control errors within the ranges.

8. Data Analysis and Interpretation. NCSS (Number Cruncher Statistical System) has been chosen for field level analysis. It is menu-driven, and requires a moderate amount of training to successfully use. A training manual was prepared in Spanish, tested for clarity in two Field Offices, and then used to train in all seven offices. SPSS is being used to manipulate and analyze the data at PLAN International Headquarters.

Training in the analysis and interpretation of statistical data was conducted in the field. Because most field staff, both international and national, have little formal

statistical or research background, we have attempted to limit statistical applications to basic and intuitive procedures. These are measures of central tendency and dispersion, cross tabulation and difference of means (t-tests).

9. Monitoring. A monitoring system is being developed first focusing on primary health care activities such as vaccination coverage and nutritional surveillance. We intend that this will become a generic system that can incorporate most of the indicators defined as relevant to the organizational goals. Its frequency of application remains to be defined but will depend largely on the type of activity in which the field offices and communities engage and the maturity of those activities.

CONCLUSIONS

A dynamic, interactive and comprehensive evaluation system has been designed and implemented on a regional basis to permit formal planning and impact evaluation by a major private voluntary organization working in international development. This system will be introduced on a world-wide basis over the next few years. It has the following essential characteristics.

1. It addresses the different levels of information needs of a variety of stakeholders within the organization.
2. It is focused on providing information on which policy and management decisions will be made. The identification of the different types of decisions within the organization has been the starting point of its development.
3. It is comprehensive in that it combines both formative and summative evaluation techniques. Longer term impact is being measured while a monitoring system feeds back information about the implementation of program activities.
4. It is a combination of a planning and evaluation tool.
5. It is participatory. Different stakeholders have participated in the development of the system and are responsible for its implementation and management and the interpretation and use of the findings. These are used to identify specific beneficiary needs and set priorities over a three year budget cycle.
6. Secondary source material and key informant interviews are systematically incorporated into the system. This provides the environmental and cultural context for the interpretation of data and is essential for its understanding.

7. The system has been implemented by field personnel with little or no formal training in evaluation. This required a vigorous training program. Approximately 140 local staff from seven field offices from three countries were trained in the basics of evaluation research, data collection and analysis and interpretation.
8. Much of the success of the implementation of the system is due to the use of local professional consultants. PLAN is in the process of a regionalization experiment that emphasizes the decentralization of key management and technical support capacity. Local professionals played major roles in training and technical management of implementation. This provided greater management coverage at a lesser cost. As important, it has established on-going relationships with local professional groups that will enable the system to be sustainable without heavy central office staff involvement.

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3

MONITORING AND EVALUATING AQUACULTURAL PROJECTS

Joseph J. Molnar and Bryan L. Duncan

INTRODUCTION

The purpose of this paper is to review systems for monitoring and evaluating aquacultural projects both in terms of the dimensions and dilemmas that the culture of water-based species shares with other farm enterprises, as well as the unique and characteristic features of aquaculture that require special attention in the assessment process. The need to balance the costs of monitoring and evaluation with the need to document nutritional benefits, enhanced income flows in the household, and improvements in the rural economy are discussed. A major objective of the chapter is to show how social science can contribute to the practical success of aquacultural projects. Sociologists are particularly interested in enhancing the degree to which such projects are characterized by broad-based participation, equitable distribution of benefits, as well as the sustained pursuit of fish culture as a viable farm enterprise.

Aquaculture is the husbandry of aquatic species. Farming in aquatic environments may be accomplished with many different types of organisms in warm or cold waters, in fresh, brackish, or salt waters, and with variable management intensity (Costa-Pierce, 1987). As most of the developing world exists in tropical climates, most interventions intended to introduce or enhance aquaculture focus on warm-water environments in inland, riverine, or coastal situations.

In general, aquacultural projects are intended to: (1) bring about changes that would not otherwise occur (for example, ' e culture of fish where none had been grown in the past); (2) accelerating some changes that already were occurring naturally, but at a slow rate (such as the use of better species or production techniques); and (3) redirecting endogenous changes toward more desirable outcomes (such as the culture of a more vigorous species or better utilization of

farm water resources) (Glaser, Abelson, and Garrison, 1983:15).

Improved technology is expected to expand food production, increase incomes, improve well-being for rural people, and in some cases have certain stabilizing and revenue-generating consequences for the national economy (Molnar and Jolly, 1988). Aquaculture is an intervention often intended to enhance rural incomes, nutrition, and overall food security for smallholders (Ben-Yami, 1987). In more capital-intensive versions for larger-scale producers, aquaculture may be primarily motivated by the need for foreign exchange to be obtained through the export of high-value commodities such as shrimp (Bailey, 1988). The intentions or objectives of the intervention define in part the terms for assessing the relative success or worth of the endeavor.

AQUACULTURE AS AN INTERVENTION

BACKGROUND FOR AQUACULTURE Although aquaculture has been a long-standing practice in some parts of the world, it may be introduced as an entirely new enterprise in other locales where indigenous knowledge systems do not exist (Molnar, Duncan, and Hatch, 1987). In Asia, sophisticated and complex culture systems have been in place for many centuries. Such systems often integrate land animal production and gardens with culture of fish.

In Africa, enclosed animal husbandry is not a frequently encountered component of indigenous farming systems. Regular attention to enclosed animals represents a new behavior pattern to be taught and reinforced. When farm water systems have been used primarily for stock watering, irrigation, or casual harvest of naturally occurring fish populations, intentional culturing of fish is often a novel concept. The initiation of aquaculture in this context requires substantial investments in training, demonstration, and infrastructure development to support the introduction and spread of aquaculture as a farm enterprise.

Fish as a crop represents a new set of parameters to be perceived and monitored by farmers. Water quality, oxygen requirements, algae growth, and other aquacultural issues are novel concepts to most non-Asian developing-country farmers. Smallholders may have generations of experience with soil and climate conditions; nevertheless, it may take some time for traditional farmers to develop a feel for the complex interactions of water, season, sun, inputs, and fish (Molnar and Rubagumya, 1987; 1988). As such, interventions intended to advance the adoption and efficiency of fish culture may require a great deal of front-end investment in training and overall system development to support aquacultural activities.

Aquacultural interventions are generally comprised of activities intended to enhance or establish physical structures and services to support aquacultural development. The social suitability and sustainability of a project are central issues in the identification and design phase of project development (USAID, 1980), although most attention is often directed to the infrastructure that must be established to support aquacultural development. Typically, government hatcheries provide seedstock for farmers and subsequently to private sector hatcheries that may be established as the industry grows (Cholik, et al., 1986). If they are inadequate or nonexistent, steps must be taken to ensure a supply of seedstock for the region or locale of the project. Some efforts to introduce tilapia culture explicitly endeavor to foster on-farm seedstock production to avoid dependence on government services to sustain the enterprise (Lovshin, et al., 1986).

The project also may focus on upgrading and expanding human capital in extension and research institutions to support problem-solving, adaptive research, and on-the-ground assistance to producers. The supply of innovative materials and information must be established in advance of efforts to stimulate demand for the innovation; inadequate infrastructure otherwise stifles the propagation of fish culture (Moehl and Hishamunda, 1988).

IMPLEMENTING AQUACULTURAL DEVELOPMENT Once facilities have been defined or constructed and the basic concept has been grasped, knowledge of operating parameters, responses to typical problems, and other practical considerations can be acquired through low-intensity operation of the system. Natural processes of emulation, competition, and word-of-mouth communication accelerate participation in aquaculture. Given adequate support, examples of productive success, and the existence of markets for products, fish culture is a popular activity.

Marketing is a signal concern in aquacultural development (Kent, 1987). Home consumption is generally not sufficient to satisfy internal rate of return requirements of donor agencies. Basic questions about the acceptability of the species in local diets must be considered as prerequisites to any aquacultural development program. Assembly, processing, and transport of fish to consumers are essential components of the intervention.

MONITORING AQUACULTURAL PROJECTS

INFORMATION AS A FOCUS Monitoring refers to the flow of information on the resources (staff, equipment, money, and so

forth), stage of preparation of infrastructure and services, availability and supply of inputs, the contact with targeted beneficiaries, and the environment as it affects the implementation of the project (Casley and Kumar, 1988a:5). Monitoring, as an aspect of the implementation of development projects, is only one of several entrance points for sociological knowledge. Cernea (1987:9) points to five stages of the project cycle including: identification, design, feasibility assessment, implementation, and evaluation. Monitoring is a central aspect of implementation.

Monitoring systems provide intelligence on what is happening in the project and to what extent it is going according to plan. The task of a project's monitoring system is to generate operationally-useful know-how. Central monitoring issues in an aquacultural project might be: which and how many extensionists are being trained; how are they progressing; what is being constructed and when it will be finished; how many farmers have dug or refurbished their ponds; how many have the new species; and how well are they following recommended practices.

ROLE OF THE SOCIOLOGIST Generating basic social science information as well as data on behavioral compliance with project recommendations is a useful entrance point for the sociologist. Nevertheless, the role of supplier of descriptive information allows the sociologist little influence over what is done with the information; whether it is used at all; or whether it is consequentially incorporated into the project (Cernea, 1987:11).

Monitoring the project's progress generally focuses on the flow of financial and physical resources (Casley and Kumar, 1988a;1988b). Events or milestones in the cycle of the project are timed and have interrelated dependencies. Management-oriented monitoring is a continuous, analytical process through which the agency director and technical managers receive frequent updates on activities, results, and sources of delays or difficulties (Murphy and Marchant, 1987:1).

A project's monitoring system may have long-standing importance if it is laying the groundwork for a more enduring management information system for the developing country's Ministry of Agriculture or extension service. It becomes doubly important to institutionalize the kind of data system that will focus on key technical issues but also on the social and cultural items that influence the course of innovation adoption and sustained use. Such systems may be resisted when they represent increased behavioral scrutiny over the activities of extensionists or middle-level officials who are not accustomed to meaningful reporting systems tied to farm-level accomplishments. Murphy and Marchant (1988)

provide detailed guidelines for the formulation and operation of such a monitoring system. Monitoring systems draw on sociological skills in designing systems for regular collection of data from human subjects in villages, in the extension corps, and in the organizational structure of national government.

Monitoring generally is not a role for a short-term consultant if the project is of any size or scope of impact. Coordinating the flow of information within a project requires technical as well as social understanding. Unfortunately, these roles often gravitate to technical personnel. Selecting sites, digging ponds, constructing hatchery facilities, overseeing the filling and initial stocking of ponds -- these are tangible activities that tend to preoccupy the project staff because they are visible and their completion brings a sense of accomplishment to the individuals involved. Social issues tend to be treated as incidental complications to be dealt with on a situational, common-sense basis, much as a pond site that is unexpectedly porous must be treated with extra amounts of clay until it holds water.

Resources are scarce and social scientists are often viewed as the marginal expenditure to be cut when priorities within the donor agency cause activities to be scaled back. One less long-term person or one less consultant often means the demise of systematic involvement of sociologists in projects. Such responsibilities often are relegated to a technical person whose discipline legitimates their retention as a long-term participant. At the worst, the kind of information that is generated is blind to the impacts and deficiencies that threaten the sustainability of aquaculture in the village as well as in the national infrastructure that supports research and extension.

SUSTAINING AQUACULTURAL INTERVENTIONS The major issues of concern in aquacultural project evaluation and monitoring turn on the institutional lodging of the intervention and its incorporation by farmers into their farming system. Interventions that fail to sustain support and sponsorship within the national bureaucracy are destined to wither and dissipate. Production schemes that fail to win the confidence and enthusiasm of farmers will not generate food or revenue. The central evaluative question is the extent to which the project concept is embraced by members of the target population.

Compliance with project recommendations can be observed through checklists assessing weed control, evidence of pond fertilization, and maintenance of water quality (Beebe, 1984; Chambers, 1985). Production and yield data require sustained efforts to monitor reproduction and growth in an often widely-dispersed network of ponds. Yields in terms of weight

of fish per unit of pond area are primary indicators of success for the farmer and the project, yet they are subject to measurement error at harvest time and losses through theft and partial harvest in the course of the growing season. Certain criteria for siting and construction of ponds can be assessed on an observational basis, although other qualitative aspects of facility construction require closer determination.

Monitoring systems are important because they are a vital part of accomplishing the physical construction aspects of a project. When monitoring data include systematic data on farmer progress and activity, the information can make important contributions in later efforts to assess the nature and kinds of impacts associated with the project.

EVALUATING AQUACULTURAL PROJECTS

ASSESSING UTILITY OR WORTH Evaluation is considered to involve at least three major stages: design, implementation, and utilization of results. Evaluation involves some judgment or assessment about the overall worth or utility of the investment (Rossi and Freeman, 1985). Donors have well-established frameworks for financial accounting and the calculation of certain ratios or indicators that are considered telling about the relative standing of a project (USAID, 1980).

Sociological data about rates of adoption and differential impacts of a project among different population segments are difficult to summarize in a single index. More significantly, the central merits or defects of a project may not be readily demonstrable by linear relationships among project variables; instead critical benefits or negative impacts may be demonstrable as interactions among sets or sequences of factors that are only indirectly quantifiable.

Attention to needs for socioeconomic compatibility does pay off in economic terms -- among others -- in economic rates of return twice as high as those in socially insensitive and inappropriate projects (Kottak, 1985: 326). But again, such indicators may not show the social worth or benefit of a project. For example, rates of return to tilapia production in Rwanda are difficult to interpret due to the many shadow prices which must be estimated and assumptions that have to be made about labor, inputs, and other factors that are not readily assessable or comparable to Western economic frameworks (Moehl and Hishamunda, 1988).

Some of the critical benefits of fish culture lie not in marketplace returns but in food security during the beginning of the rainy season when commodities are often scarce. Similarly, fishponds generate significant secondary benefits when they precipitate irrigated gardening and other types of

animal husbandry that have complementary relationships to fish production. These related benefits need to be taken into consideration when monitoring and evaluating project impacts.

Donor agencies have fairly well-established guidelines for evaluating projects and these are readily generalizable to aquaculture (USAID, 1980). There are, however, some ways that the implementation of fish culture may not be adequately portrayed by these frameworks or evaluation criteria. Some types of aquaculture may involve rather dramatic transformation of resources. Shifting swamps to shrimp production may displace previous users and alter the tenure standing of fishermen and others residing or working in the affected areas (Bailey, 1988). Such projects also have the potential to create a whole new class of wealthy people exacerbating inequality while increasing the overall level of wealth and income in an area.

ORGANIZATIONAL ISSUES A major impact of aquaculture relative to the tenure and access to common property resources has been observed in the Philippines, Indonesia, and elsewhere. Bailey (1988) details some of the disruptive social impacts of such changes. The introduction of pens for raising fish in heretofore open lakes disrupts fishermen and may precipitate conflict with elites able to secure legal title to space over smallholders, who sometimes resort to violence to enforce their claims.

Traditional agricultural development projects generally do not dramatically alter the value or standing of resources, or precipitate the social alterations sometimes associated with aquaculture. Thus the worth or value of aquaculture may generate low or high rate of economic return, while its consequences or indirect impacts may generate considerations that must weigh heavily in providing some summation of the worth or value of the investment.

Evaluation of aquacultural projects often must proceed on a more holistic plane due to the complexity and pervasiveness of the intervention. Aquaculture can have quite definite impacts on the relative role of men and women in terms of labor provision and receipt of cash income. Systematic biases in extension and other government services also are found in aquaculture (Nash, Engle, and Crosetti, 1988; Veverica, 1988).

When introduced in an environment where little or no fish culture had been underway, success must be judged in terms of establishment of the support infrastructure, extension system, and marketing apparatus. The intensification or improvement of traditional agricultural enterprises can focus on farmer participation as well as the performance of the new breed or varieties, taking much of the rest of the system for granted. Aquacultural projects often represent a much more complex array of interventions, bureaucratic transitions, and

fundamental shifts in farm practice and decision-making (Molnar, Duncan, and Hatch, 1987).

Organization and management play an important role in aquacultural development (Pollnac, 1985:207). Evaluation of such projects must be particularly sensitive to organizational issues as they pertain to the establishment and improvement of extension systems to serve aquaculture, but also the infrastructure that serves aquacultural producers. In some locales seedstock is produced by the public sector that oversees its distribution and utilization by fish producers. In such situations, the overall effectiveness of the national program in aquaculture turns on the efficacy of the hatchery system to generate seedstock. At later stages of development differentiation may occur among producers and better farmers may become seedstock suppliers in their local areas. Nevertheless, early phases of project success and expansion turn on the ability of supporting entities like hatcheries and extension services to function in a predictable, orderly manner. Data and measurable outcomes are available, but the overall design of aquacultural evaluations must be more flexible and far-reaching to integrate the diverse elements that drive the overall success or failure of a project (Pollnac, Peterson, and Smith, 1982).

Another organizational dimension becomes salient in aquacultural evaluations when aquaculture is undertaken as a group or cooperative enterprise (Schwartz, Molnar, and Lovshin, 1988; Molnar, Schwartz, and Lovshin, 1985). When access to land or project services is premised on participation in a pond group or cooperative, an additional array of organizational and management issues is introduced. The internal dynamics of a group has a great deal to do with the quality of management and overall success of the farm enterprise.

Groups are associated with certain costs and delays in decision-making that undermine their efficiency relative to the individual owner-operator form of organization. Panamanian experiences documented by Schwartz and his colleagues suggest that local leadership and community social inequality affect pond group proficiency. The literature on group farming suggests that family-based groups are reinforced by natural hierarchy within the family that facilitates decision-making and the distribution of rewards (Molnar, Schwartz, and Lovshin, 1985; Schwartz, Molnar, and Lovshin, 1988).

In Rwanda, preliminary studies suggest that both farmers and local officials may perceive group-based aquaculture as a means of access to land and income in that land-short, densely-populated nation. Group farming also may facilitate resource allocation decisions by local authorities who find that farm plots allocated to groups satisfy 8 or 12

individuals and their families, while use-rights grants of communal land to a single individual can be a source of controversy and criticism (Molnar and Rubagumya, 1987; Robins, 1985). In either case, evaluation presents a much more complex array of issues than an assessment of the progress of a new crop variety.

QUANTIFYING BENEFITS Economic evaluation of aquacultural enterprises is an often difficult undertaking as many of the costs and benefits are difficult to quantify (Engle, 1988). Established procedures exist for imputing shadow prices and other approximations to quantitative values (Gittinger, 1972; Squire and Van der Tak, 1975). Each type of aquaculture generates a unique investment, costs, and returns situation for the donor, for the government, and for the farmer undertaking the enterprise. Unfortunately, USAID evaluation criteria center on internal rate of return as an economic criterion for judging the long-term worth of an intervention.

In aquaculture, such budget analyses focus on capital investment, production costs, labor, yield, and returns. One assessment of an aquaculture project in Panama found that integrated systems involving complementary relationships with other farm enterprises were economically viable for farmers (Lovshin et al., 1986). The chicken-fish alternative yielded highest net return and integration of fish culture with other livestock enterprises increased net returns in each case; yet fish culture was not economically-viable as a stand-alone enterprise in this project. Internal rate-of-return calculations showing the relative efficiency of capital use over the life of the project showed similar though not identical patterns.

Clearly such economic analyses do not include social benefits or secondary impacts as reflected in community solidarity, nutritional security, or the utilization of excess labor that is otherwise treated as a cost. Aquaculture is a polyvalent intervention. That is, it can become a means for precipitating farming system improvements on many fronts. The Panama project clearly demonstrates the benefits associated with the initiation and facilitation of other activities that accompany implementation of aquaculture as a farm enterprise.

Under the broader concepts of water harvesting and water management, aquaculture can be a mechanism for augmenting on-farm capacities for stock watering, garden irrigation, and household waste disposal for pond fertilization and fish culture. Such benefits have been attributed to tilapia culture in Rwanda, yet these tangible benefits do not readily lend themselves to budget analysis indicating the general profitability of an activity by comparing the average costs and returns in a given year.

Although economic frameworks have been devised that

endeavor to make adjustments in the calculations of economic profitability on the basis of income distribution considerations (Balassa, 1976), such methods only further advance the generic problems of economic analysis. Such problems include but are not limited to assumptions about human rationality and the role of community and normative-affective factors in shaping choices and farmer decisions (Etzioni, 1988). The quality of data obtainable about relative prices, yields, and farmer practices further clouds the utility of single-coefficient summaries of the relative worth of a project. Such analyses generally focus on statistical means with little sense of the underlying distributions of experience or situations that the measures of central tendency are supposed to summarize.

CONCLUSION

This paper has considered a number of issues related to the monitoring and evaluation of aquacultural projects with respect to collection and application of social science information in project implementation and assessment. The ideals of participation and equity in development are often compromised in the efforts by development agencies to introduce aquacultural interventions into a locale. Much of the effort and attention devoted to monitoring and evaluation is couched in the framework of investment analysis. When agencies do explicitly require attention to the role of women in aquaculture, the nutritional consequences of fish culture, or the interactive or secondary benefits of fish in the farm enterprise, these findings remain secondary to certain economic determinations that drive the movement of funds and administrative actions within the bureaucracy.

In periods of short funds and high aspirations, social science input into development projects tends to be truncated, delayed, or ignored. In many cases the information and findings that social scientists have to offer beg the question or simply complicate the basis for otherwise mechanical administrative decisions.

The challenge to researchers involved in monitoring and evaluation is to understand the set of incentives and data needs confronting the project personnel and donor agency administrative staff, as well as the kinds of information necessary to assess participation, equity, and sustainability.

Project staff may be primarily concerned with finding people who will effectively participate in an intervention and may know little about those who do not. Those interested in production may be less sensitive to who gets a chance to produce fish, who is producing fish, and who makes the best of the opportunity when they get it. On the other hand,

project personnel may be aware of shortcomings in equity and participation, yet may feel powerless to act given a lack of systematic data documenting the problems as well as some sense that the neglected constituency has little sympathy in the host country bureaucratic apparatus anyway.

The tendency to suboptimize by focusing on material success and not human impact is quite understandable given the complexities of developing countries. Nevertheless, the outcomes and impacts of evaluation turn on the hard questions of benefits to the poor and less able, to women, and to children.

Sustainability is the ultimate objective or measure of success for a development intervention. If people continue to grow fish and are emulated by their neighbors and by other communities, aquaculture will have made a difference in people's lives and furthered the cause of development and food security. Social science effort and involvement in monitoring and evaluation must be judged on the extent to which we increase the likelihood that projects can be and are sustained, and that their benefits are widespread.

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4

MONITORING AND EVALUATION OF FISHERY AND AGRICULTURE PROJECTS: CASE STUDY AND DISCUSSION OF ISSUES

Robert S. Pomeroy

INTRODUCTION

Monitoring and evaluation are important learning and action-oriented management tools for both improving on-going project activities and for future planning and decision-making. The contribution that monitoring and evaluation can make to successful project implementation and to successful transfer of project innovations is being more widely recognized. Yet, while achieving a higher level of recognition, formal project monitoring and evaluation has yet to be universally accepted as an integral part of most development projects. There are several reasons for this, including lack of a single method or technique that can serve all purposes and types of monitoring and evaluation; the time and cost involved in monitoring and evaluation; and, lack of understanding of the uses of information generated by evaluation.

Gerhardsen (1977) has stated that one reason why there has not been as much progress as expected in the field of small-scale fishery development is perhaps the dearth of empirical evaluation. Success in one location or with one innovation has often led to duplication of the project elsewhere. Often, however, the initial assessment of the innovation has not been followed by a thorough evaluation of its secondary and/or long-term impacts resulting in less than successful replication. There have been few evaluations of the full impacts of a project, especially its impact on a community or the limits to which an innovation can be duplicated elsewhere, given available fishery and other resources. It is felt that adequate evaluation of both small-scale fishery development projects and of evaluation design, methods and techniques can improve this rate of progress.

This paper will begin with a brief review of the basic

framework of project monitoring and evaluation. This review will be followed by two case studies of monitoring and evaluation methods used in projects in which the author is currently involved. One is a small-scale fishery development project in St. Kitts, West Indies and the other is an evaluation of the economic viability of a farming systems technology in the Philippines. These case studies will be followed by comments and suggestions based on the author's experience with monitoring and evaluation of projects.

MONITORING AND EVALUATION: THE BASIC FRAMEWORK

Monitoring is the provision of information, and the use of that information, to enable management to assess progress of implementation and make timely decisions to ensure that progress is maintained according to schedule. Monitoring assesses whether project inputs are delivered, are being used as intended, and are having the initial effects as planned. Monitoring is an internal project activity and part of day-to-day management. Evaluation assesses the overall project effects, both intentional and unintentional, and their impact in light of the project objectives. It involves comparisons requiring information from outside the project either in time, area, or population (World Bank 1981).

The monitoring and evaluation functions are related but distinct. Monitoring can provide an on-going flow of information about the project effects and provide warnings of the need for any mid-course corrections in project design or implementation. Evaluation will utilize the information generated by the monitoring, as well as outside information, to assess overall project impacts. Monitoring is an internal part of the project management, while evaluation is not necessarily such an integral component. Monitoring will normally be conducted by project management and staff, while evaluation may include both project management and staff and outside consultants.

The design of a monitoring and evaluation system revolves around project objectives and the identification of the users of the monitoring and evaluation information. Monitoring and evaluation systems must be designed to reflect the achievement of the project objectives as expressed in targets to be met over time (World Bank 1981). The precision of targets and timing to be achieved must be balanced with what is possible to achieve in terms of cost and other constraints and contributions to be obtained from the monitoring and evaluation effort. Monitoring and evaluation systems must also be designed to meet both the needs of the users and the range of potential users. These user groups must be identified at the beginning of the project so that their information needs are included within the monitoring and

evaluation system design.

The monitoring system should be designed to be as simple and straight-forward as possible so that the information it generates can be delivered to decision-makers in a regular and timely manner. A minimum number of objective parameters on administrative and financial progress should be recorded regularly over time.

Unlike a monitoring system which requires a rapid assessment of information, an evaluation system requires the development of time series data which should begin before the project is implemented and continue well past completion of its implementation period. Additionally, evaluation may require in-depth studies of certain assumptions integral to the project. Data collected for evaluation should be kept comparable over time by maintaining a consistency of method and analysis. The main methods of evaluation design of social-action projects are a) survey, b) case study, and c) experimental. Each method has different strengths and weaknesses for use in quantitative and qualitative data collection which must be understood before a choice of method is made (Casley and Kumar 1988). Quantitative data are needed when a number , rate, or proportion related to the target population must be estimated or a variable such as fish catch must be measured. Qualitative data are needed when the attitudes, beliefs, and perceptions of the target population must be known in order to understand its reactions to project inputs.

The two projects to be discussed below are both currently on-going. These are smaller projects, funded in the $70,000 to $100,000 range.

CASE STUDY 1: A PROJECT TO IMPROVE THE ECONOMIC VIABILITY OF THE ST. CHRISTOPHER/NEVIS FISHING INDUSTRY

PROJECT BACKGROUND The government Fisheries Division and expert consultation has recommended a small-scale approach for development of the St. Christopher/Nevis (these two islands will be referred to as St. Kitts through the rest of this paper) fisheries sector rather than a highly capitalized "industrial" fishery. The potential of developing small fishing businesses was of particular interest. Fisheries development in St. Kitts was felt to be constrained by a variety of interrelated factors. Particularly significant were:

a. adherance to traditional fishing technology which has resulted in overexploitation of traditional stocks and has served as an obstacle to exploratory fishing and harvesting of non-traditional resources;

b. occupational multiplicity which allows for a reduction of risk in income sources but leaves little time for innovation as a part-time fisherman;

c. the marketing system is rudimentary resulting in periods of shortage and glut, limiting the distribution of benefits from fishing, and adding yet another element of uncertainty to the fishing occupation; and

d. lack of access to the formal economy as a result of being viewed as a poor financial risk.

In view of these constraints, it was felt that simply providing credit to small-scale fishermen will not solve the problem; the viability of the fishing operations per se must be improved. In order to develop new fishing businesses, fishermen must a) be introduced to local fishery resources which are underexploited, b) acquire experience with techniques needed to harvest these resources, and c) develop the fiscal and managerial skills needed to effectively operate a small business. This project was designed to assist local fishermen with meeting these requirements and to improve their ability to participate in the formal economy.

OBJECTIVES The objective of this project was to improve local fishermen's ability to participate in the formal economy and to access associated business services. To realize this objective, activities were undertaken to improve technical capability within the fishing fleet and economic management within the fishery sector as a whole.

PROJECT INPUTS This project was a collaboration between the St. Kitts Foundation for National Development (FND), the government Fisheries Division and the South Carolina Sea Grant Consortium (the project coordinator is associated with the Consortium) with funding from the Inter-American Foundation. The FND has overall project management responsibility. The FND has responsibility for monitoring, fiscal management, the business component (with assistance from Fisheries Division staff and project consultants) and evaluation. The Fisheries Division and Sea Grant Consortium has responsibility for the technical component.

The project has two core components - technical improvement and business improvement. The core of the technical improvement component is the provision (on a loan basis) of equipment and instruction in techniques needed to diversify and improve current fishing operations. A fiberglass fishing boat was constructed locally based on traditional design. The boat was equipped with electronic and mechanical hauling gear to allow fishermen to harvest

underutilized stocks in deeper, offshore waters. This boat is made available on a rotating basis to fishermen. Each crew is allowed sufficient time to become proficient in new techniques as well as to actually operate the vessel and gear as part of a viable fishing business. A series of training seminars were prepared to acquaint participants with the equipment and techniques. In addition, provision for postharvest processing through cold storage on the boats and assistance in developing new marketing arrangements were made.

The business improvement component was directed toward improving fishermen's ability to operate a small fishing business. This involved business/financial management training of fishermen through workshops and a recordkeeping system. A recordkeeping system served as the primary training method. The fishermen are taught budget preparation, recordkeeping, basic accounting and business management. The ability to use these skills would reduce the financial risk of fishermen to lenders and allow them to have greater access to the formal economy.

MONITORING Operational targets to reach project objectives were prepared through a project workplan. These targets included those related to financial accounting and progress of the technical and business components. Indicators were chosen for measuring target levels and the units in which they were to be measured. These indicators were chosen to be focused so that regular, timely and decision-oriented data could be delivered to project management. Staffing target levels were included for project consultants. All other project staff were involved with the project from the beginning so no targets were established.

Through the project workplan, target dates to accomplish certain activities were established. These dates included such accomplishments as completion of boat construction, training seminars on equipment and techniques for fishing and for business management, and vessel availability to fishermen for use. This project workplan also included dates for financial accounting and reporting. The data for measuring progress against these target dates came from the records kept by project management, staff and consultants.

Operational indicators for the project also included target levels for number of fishermen contacted about the project and number of cooperators. A contacted fisherman was someone who was reached in person either through individual contact and/or in a workshop and who was provided information about the project. In a small island/state such as St. Kitts, it was felt that all fishermen could be contacted. Cooperators included those fishermen who actually took part in technical and business training and those who utilized the boat. The primary group of project cooperators were those

fishermen who were members of fishing cooperatives. From this group and secondarily from the other fishermen in St. Kitts, cooperators were selected based on their desire to participate in the project and recommendations of the project staff. A target level of cooperators from each fishing village was established based on project resources.

Direct feedback from the fishermen to project staff and consultants provided information on beneficiaries' attitudes and reactions to the project. The direct, hands-on nature of this project and the daily interaction of staff with fishermen allowed for continual monitoring of fishermen reaction. This allowed project staff and consultants to have a good indication about whether project inputs were being delivered as planned, how well they were being received, and the initial effects that they were having. Records and notes were kept by project staff and consultants on this progress and discussions were held frequently among these individuals as to needed changes or other recommendations to meeting project objectives. Due to this close interaction between staff and fishermen, no formal interviews were conducted to measure progress.

EVALUATION This project is still ongoing, so the discussion will focus on the framework of the evaluation system. Evaluation was stressed as a primary component of this project. Responsibility for evaluation rests with the FND. A goal of the project evaluation was not only to assess project effects and impacts but to produce a set of guidelines for economic development and investment in fisheries based on the experience and results of the project.

At the outset of the project, several indicators were selected to evaluate the progress of the project towards meeting the objectives. These include:

- number of fishermen who have obtained loans from formal financial institutions,

- attitude of formal financial institutions towards making loans to fishermen,

- number of fishermen keeping business/financial records,

- ability of fishermen to conduct business/financial management,

- number of fishermen using non-traditional fishing equipment and techniques,

- ability of fishermen to utilize non-traditional fishing equipment and techniques,

- increased level of income from the fishing activity, and

- increased landings of non-traditional or underexploited fish species.

At the pre-implementation phase of the project, a baseline survey was conducted of randomly selected fishermen in each fishing village. This survey provided general data on demographic and socioeconomic characteristics of the fishermen and fishing community, capital assets, alternative income sources, and attitudes and constraints toward change and the project objectives. This survey was designed to not only learn more about the fishermen and their community but to identify any potential outside influences which may affect the progress of the project and have an impact on its objectives. This was supplemented by direct observation of fishing and community activities.

Each cooperator selected for participation in the project was interviewed using a semi-standardized questionnaire to learn more about their socioeconomic condition and about their attitudes and perceptions toward the project objectives and their participation in the project. This survey was conducted before project implementation. This initial survey was to serve as baseline data on social and economic variables to be used to measure the effects and impact of the project. Two subsequent surveys were planned. These other surveys were to be conducted after the cooperator had completed all training and at the end of the implementation period. This would serve to measure any changes in social and economic conditions and the fisherman's attitudes toward participation in the project and the training.

Managers of potential lending institutions for fishermen in St. Kitts were interviewed before the project was implemented to assess their attitudes toward lending to fishermen. These interviews provided baseline information on needed changes fishermen would have to make in their business practices to gain access to these credit sources. Managers are encouraged to participate in business/financial management training sessions for fishermen to better acquaint themselves with the economic potential of improved local fishing and business practices. A follow-up interview is planned with these managers after the implementation of the project to assess changes in their attitudes toward lending to fishermen and toward the project.

A recordkeeping system served as the foundation of the business/financial management training, economic analysis of the new fishing technology, and the evaluation. As a first phase of the project, fishermen/cooperators were given training in how to keep daily records of the fishing activity and how to interpret the results. These record forms were

collected weekly and the data was transferred to a data management program on a computer at the FNB. The records provided daily data on time fishing, gear used, area fished, costs, species of fish caught, amount sold and kept for own use, and price received. Use of fishing records will allow for an assessment of the effectiveness of the project. The records will provide time series data for evaluation of number of fishermen participating in the project, their ability in business management, and the usefulness of business records.

The recordkeeping system will provide the opportunity to collect a great deal of data which will serve a variety of purposes. The information collected will serve to analyze the impacts of the new technology. Catch, effort and earnings of the fishermen will be analyzed before, during and after use of the new technology. This will provide for a comparison of the profitability and productivity of the new technology versus the traditional technology. The data collected will allow for an analysis of resource capacity and the harvest efficiency of the new technology. This information will allow decisions to be made on management of the fishery.

Through the recordkeeping system, fishermen will be taught budget preparation, basic accounting and business management. This will allow them for the first time to have business records for use in applying for loans.

A post-training questionnaire will be given to each participant at the technical and business component sessions to assess the effectiveness of the training. Project management, staff and consultants notes, records and reports will also serve as useful data sources for evaluation.

The project staff and consultants have discussed the need for a long term evaluation of the project. Recordkeeping will allow data on fishermen to be evaluated over time. It has been suggested that a survey of project participants be conducted at yearly intervals to evaluate technology adoption and maintenance of business management practices. It has also been suggested that a random survey of fishermen on the island be conducted at regular intervals to assess transfer of project innovation to fishermen outside of the project. These suggestions are still being discussed.

OVERVIEW Operational targets related to financial accounting and to progress of the technical and business components were prepared through a project workplan. Target dates to accomplish certain project input activities were established. Target levels of cooperators were established based on 11 available project resources. Direct feedback from fishermen to staff and consultants on attitudes and reactions to the project allowed for an assessment of progress. Due to direct, daily interaction with cooperators, no formal interviews were conducted to monitor progress.

The project studied here utilized a concurrent type of evaluation. The method of evaluation was a combination of direct survey and case study to collect both quantitative and qualitative data. Surveys and recordkeeping were used to collect the quantitative data. In-depth interviews and participant observation were used to collect qualitative data. The evaluation relied on a set of output and economic indicators as a criteria for evaluating the effect and impact of the project. The fishermen/cooperators were selected through purposive sampling. No control group was identified for the project.

CASE STUDY 2: EX-POST FACTO EVALUATION: ECONOMIC VIABILITY OF THE SLOPING AGRICULTURAL LAND TECHNOLOGY ON SMALL UPLAND FARMS IN EASTERN VISAYAS, PHILIPPINES

PROJECT BACKGROUND The Philippine government, with the support of the U.S. Agency for International Development (USAID), initiated the Farming Systems Development Project-Eastern Visayas (FSDP-EV) in 1982. The purpose of this project was to establish a proven mechanism for adapting rainfed agricultural technologies to the resource conditions of small farmers in the Eastern Visayas. The project was expected to test improved rainfed farming systems, specifically sloping agricultural land technology (SALT), for wider application. SALT involves preparing contours across the slopes in the uplands and planting hedgerows with fast growing legumes such as Leucaena. Six sites on the islands of Leyte and Samar were chosen for introduction of the new technology.

In 1987, USAID funded the current project to determine the economic viability of the SALT based on the work of the FSDP-EV.

OBJECTIVES The overall objective of this project was to evaluate the economic impact and viability of the SALT for small upland farmers in the Eastern Visayas. Specific objectives were:

1. Assess the pattern of adoption of the SALT among the small upland rainfed farms,

2. Determine the changes in farm productivity, household incomes, and resource use attributable to the adoption of the SALT, and

3. Assess the long term viability of SALT and make recommendations for further development and transfer of this technology.

METHODS As stated in the project objectives, this was an evaluation project of a technology already transferred through a large agricultural development project. The purpose of the evaluation was not to evaluate the project, but to evaluate the technology. As the investigators began to identify sources of secondary data from the project to use in the evaluation, it became evident that no quantitative economic data had been collected from cooperators in the FSDP-EV. The only time series data available for use was qualitative data on level of living indicators for the small upland farmer/cooperators at the FSDP-EV sites. This data had been collected at the beginning of the FSDP-EV. Thus, there was very limited baseline data available for use in the current project.

In order to overcome this lack of baseline data, structured survey methods were used to collect quantitative data and in-depth interviews and observation were used to collect qualitative data. The evaluation relied primarily on an adoption survey to assess patterns of adoption of the SALT. Such patterns would involve variations of the SALT with different mixes of crop and livestock enterprises. Adoption is used as a proxy for the success with which the message of technology transfer was delivered and of the viability of the technology. The survey includes farmers representing cooperators in the FSDP-EV, other farmers who have adopted SALT, and also those who have not adopted SALT. Reasons for the variations in adoption are analyzed along with those for nonadoption. In-depth interviews were held with each farmer, both adopters and non-adopters, to further assess adoption patterns.

Survey and in-depth interview methods were used to collect recall data from the farmers for evaluating cost structure, farm productivity, labor requirements, household income, and resource use changes attributable to the SALT. A survey was used to determine the cost of constructing and maintaining the contours and the hedgerows. Structured interviews were conducted to assess changes in output, income, labor and costs. In many cases, concerning production, farmers can, if the interview is well-timed and the questions appropriately phrased, give estimates that - within certain rounded limits - reflect reasonably accurately the true value of the output, income or inputs. There is a tendency to feel that such estimates are so biased as to be valueless, but there is some evidence from the Philippines and elsewhere that farmers estimates are sufficiently accurate for evaluation purposes (World Bank 1981).

Data on the level of living indicators developed by the FSDP-EV served as the baseline data against which changes will be measured. An in-depth interview with farmer/cooperators from the FSDP-EV using the same level of living indicators

will serve as the only measure of comparison. Additional resource input and production output data on selected farms will be collected through recordkeeping during the project period (six months) to acquire a partial understanding of the current costs, returns and labor structure associated with the adoption of the SALT.

It is felt that farmer adoption of the technology will be the most sound measure of assessment of the impact of the project and of the SALT. Quantitative and qualitative social and economic data can be obtained through recall survey and interviewing of the farmers. While no substitute for baseline and time-series data, it does seem possible to collect useful data for ex-post evaluation purposes. These same methods should prove applicable to evaluation of fishery projects where no or limited baseline data exists.

MONITORING AND EVALUATION: COMMENTS AND SUGGESTIONS

The author's experience with monitoring and evaluation has been limited and based on work on smaller fishery and agriculture projects. These comments and suggestions are thus biased based on this experience.

Monitoring is a primary tool of project management. A monitoring system will exist in most projects even if it is just financial records or an informal discussion among project staff. A balance has to be maintained in project monitoring between the amount of information needed for management and cost. As much as possible the monitoring system should be integrated into project activities of the staff so that it becomes a regular practice. The recording of progress toward operational targets by project staff and their subjective impressions can become the essential data source for the system. This can be done at little monetary cost and with little time cost to the staff. In order to do this there must be direct feedback and a free flow of information between beneficiaries, staff and management. In a project where there is day-to-day interaction between staff and fishermen, it is possible to get daily information on fishermen's attitudes, perceptions and needs. In projects without this daily interaction, more emphasis should be put on developing a personal relationship with the fishermen so that they feel comfortable in expressing their ideas and feelings. Where project staff is in the field, more regularly scheduled meetings between staff and management, use of records and use of operational targets will provide for improved monitoring. The maintenance of good project records by project staff cannot be overemphasized. The records can be as simple as daily diaries of activities and perceptions of the staff member. These records have use both in monitoring and evaluation.

Management must be willing to respond to suggestions from staff and from beneficiaries. There must be flexibility in response to needed changes in project design and implementation. When fishermen feel they are involved in the project there is a greater chance for success. Often times if management will get their "hands dirty" by going into the field they can get a better impression of progress of the project and input from the fishermen.

It is felt that surveys and formal interviews should be kept to a minimum in project monitoring unless there is a need to fill specific information gaps. Surveys and interviews are costly and too many of them can cause problems with the fishermen. If needed, it is suggested that they be combined with surveys or interviews being conducted for evaluation.

The use of operational targets through a project workplan are essential for monitoring financial, input and staffing progress. These operational targets should be specified with precision so that they are relevant for measuring progress. Through the project workplan, target dates can be established for delivery of inputs, training, etc. These target dates must remain flexible for problems and unexpected developments do arise (an understatement!). Records should be kept on successes and problems in meeting these target dates for use in evaluation of the project. Target indicators specified for operational level use by staff need to be developed. These can include such target levels as number of fishermen to be contacted by a certain period of time, technical parameters such as size and species of fish caught, or economic parameters such as price.

It is the author's feeling that the single most important factor in project monitoring is the maintenance of a flow of information between fishermen, staff and management. The collection of this information usually has very little cost and it is normally timely and relevant for monitoring needs.

Effective planning and policy making is dependent on information. The purpose of evaluation is to provide this information by measuring the effects and impacts of a project against the goals it sets out to accomplish. At the outset of a program there must be a clear, specific and measurable goals statement. These goals need to be agreed upon by those involved in the process so that it is understood by all what the project is trying to accomplish. Most goal statements are developed from problems and concerns about a particular issue. In an evaluation effort, understanding the causes of problems can be helpful in focusing actions to alleviate problems.

As important as it is to evaluate the planned benefits of a project, there are often indirect beneficial and adverse impacts which accrue as the result of a program. These impacts are usually unanticipated and can have far reaching implications, even overshadowing planned project benefits.

These impacts may occur in the short- or long-run and should be of major concern in program evaluation. While it would be nice to be able to measure the outcome of all goals and potential impacts there are constraints which make this impossible. Due to lack of time, complexity and cost the choice of which goals and impacts to evaluate will depend on their importance, usefulness and practicality.

It is therefore useful to develop indicators whereby project achievement and impacts can be measured. In the small-scale fishery context, problem alleviation is a useful focus as a basis of evaluation. Problem statements and their causes provide a workable behavioral indicator and a greater opportunity for remedial action. These indicators can include the effect of the project on fishermen's incomes and employment; the effect of the project on fishing effort; and the effect on quantities landed. In the case of resource outcome problems, objective indicators could measure changes in environmental or resource-use conditions over time. In the case of organizational process problems, indicators for evaluation are more descriptive and qualitative, and therefore involve close observation of an organization's operations.

Successful evaluation will require the use of a mix of methods to collect both quantitative and qualitative data. The author's experience with project evaluation has been limited and has primarily relied upon the use of survey, case study and interview methods. For the particular circumstances of these projects, these methods seemed most appropriate. Two other methods, however, need consideration as well. These are evaluation research or experimental design and cost-benefit analysis.

The key to evaluation research is the testing of a causal hypothesis. In technical terms, we hypothesize about how an independent (cause) variable may influence a dependent (effect) variable. In reality we are often concerned with a number of independent variables acting on a dependent variable.

When testing any causal hypothesis there will be plausible alternative explanations for the results that are observed. There may be other plausible rival or alternative hypotheses for the observed results. There is a need to control for these plausible rival hypotheses or for validity. Four categories of validity have been identified - internal, external, statistical conclusion and construct. The concerns of internal validity are the most important in any study because they raise questions about whether the results obtained can be interpreted causally.

Research designs which control for plausible rival hypotheses in the internal validity category and provide the primary basis for evaluation research studies, differ in the way they do this. There are three major types of research

designs - 1) true experimental, 2) quasi-experimental, and 3) nonexperimental. Of importance to these research designs is the use of time-series, control groups and randomization. Without going into a great deal of detail on the characteristics of each design, the quasi-experimental design seems to have the most applicability to small-scale fishery project evaluation. The true experimental design has significant conditions to be satisfied which appear to limit its usefulness. These conditions include the need for equivalent control groups and random assignment. Another concern was the part-time nature of small-scale fishing and the possibility of dropouts from the project.

Quasi-experiments have been defined as "experiments that have treatments, outcome measures, and experimental units, but do not use random assignment ... comparisons depend on nonequivalent groups that differ from each other in many ways other than the presence of a treatment whose effects are being tested. The task...(then) ... is basically one of separating the effects of a treatment from those due to the initial noncomparability between the average units in each treatment group" (World Bank 1981).

There are two basic designs for quasi-experiments. The first is a nonequivalent group design. It retains the idea of a control and treatment group (or a number of treatment groups), but without random assignment. The second type is an interrupted time-series design. In its simplest form this merely involves a before and after comparison of a treatment group. This later design may be the best for small-scale fishery projects. It will have best results when regular time-series data are available and when the treatment is sharp and of short duration. It is used to detect changes in levels and rates. Since these changes may not occur until a good time after the treatment, the post-implementation survey should be conducted at a time sufficiently long after treatment to measure effects and impacts.

There are a number of potential problems with applied evaluation research which could arise in the small-scale fisheries context. These include a) adequate measurement of indicators, b) ethical questions such as withholding treatment and confidentiality of information, and c) organizational resistance.

Small-scale fishery development projects are usually implemented based on a project analysis utilizing cost-benefit analysis. Formal cost-benefit analysis of applied evaluations are rare because good cost data is often difficult to obtain and benefits are often difficult to define and value. In many small-scale fisheries projects, many benefits will not be received in the short-run or may not be quantifiable in monetary terms. There are now methods available to deal with the issues of defining and valuing costs and benefits. There

appears to be a class of evaluations that is amenable to cost-benefit analysis but more serious attention is warranted. The more general point is that the benefits of the information ought to be anticipated whether or not they are measurable.

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5

OPERATIONAL ASSESSMENT OF FISHERIES DEVELOPMENT PROJECTS

Michael T. Morrissey

INTRODUCTION

Fisheries development projects can be broken down into several stages. These stages include the planning, implementation and evaluation stages. These are broken down further to the ex-ante, ante, monitoring, post and ex-post evaluation stages. In terms of large development projects such as those that occurred in the fisheries sector in the 1970's and early 1980's, the emphasis was placed on the ex-ante and ex-post evaluation stages. Ex-ante analysis would occur 3-5 years before the program was to begin and would be the justification of the request for funds or loans. The normal procedure would be for an in-country assessment team, including experts from FAO or consultants hired by donor institutions such as the World Bank, to join forces to study the fisheries potential. Short surveys that often only measured the marine resources or aquaculture potential for the country were reported to both the donor organization and the country's government agency. It could be argued that many of these early assessments were overly optimistic and did not take into account various environmental impacts, socio-economic factors nor the dietary preferences of the targeted populations. Because of pressures from various sources, this has changed somewhat in the sense that a priority is the sustainability of the resource as well as a new emphasis on benefits to the small-scale fishermen and not only production.

The focus of planning in fisheries development has been redirected through the efforts of several scientists who have studied the inherent problems in the area. Christy (1987) has pointed out that the special characteristics that distinguish fisheries from other natural resources need to be understood before exploitation of the resource begins. These special

characteristics are important in the evaluation of fishery projects as well. Also important are the fisheries management practices that need to be employed to assure sustainability of the resource itself. Bailey et al. (1986) have also brought attention to the fact that capital intensive industrialized fisheries development has had an adverse effect on small-scale fishing communities throughout the world. Production oriented technology has in itself created problems in the management of the resource and its allocation. Planning is now more of an integrated process using several disciplines and should provide methods for proper monitoring of the project.

Monitoring of many fishery projects has been inadequate in the past. Post evaluation, which occurs immediately following project completion and ex-post evaluation, which is undertaken two to five years after the last financial disbursement has been made, are the stars of the show. Evaluation of the completed project can be done in shorter time periods, utilizing the data that has been collected during the project, and have a degree of focus on the end results and putative benefits of the project. Conventional wisdom holds that it is easier to analyze what went right or wrong with a development project than to run it. However there is a certain fallacy in this as well. The post evaluation is only as good as the data that is collected during the project monitoring stages. Often data collection is left to the executing agencies which may not be equipped in manpower nor in training to do an adequate job.

In the projects described in the following pages, inadequate monitoring hindered project implementation as well as its evaluation. The projects described are large scale projects that deal with infrastructure, training and marketing. Because of the scope of the projects and potential impacts on the small-scale sector it is instructive to study their monitoring apparatus. In all aspects of both projects, poor record keeping and monitoring hindered proper management.

PROJECT DESCRIPTIONS

An example of the poor status of the monitoring of fisheries development projects is demonstrated in two projects in Latin America. Fisheries project #1 was a large multi-million dollar project in the later half of the seventies and was intended to modernize the fisheries of the country and improve the marketing of fishery products. Project #2 was smaller in scope whose broad objective was to strengthen the role of industrial fisheries in the country's economy through improvements of fleet and on-land infrastructure so that the government-owned fishery operation could operate at an optimal level. This project's time period was in the early eighties.

The broad objectives of project #1 were to increase the production and productivity of the country's fishery sector by means of renovating and enlarging its fleet and training its fishermen. It also included the improvement of the basic infrastructure, including distribution and marketing channels to achieve adequate supply for the domestic market as well as increase the exports of selected products.

Included in the specific objectives of the project were the following:

Fleet - Construction of more than 300 new fishing vessels including shrimp boats (20 meters), sardine boats (25 meters), trawlers (22 meters) and smaller bottom fishing boats (16 meters).

Marketing - The renting or building of numerous distribution centers (retail and wholesale) for fresh and frozen fish.

Training - Construction of a training center that would provide for boarding students who would be trained in two different programs: a) fishing operations and b) repairs and services. Training vessels were constructed to compliment on-land activities.

The overall coordinator of the project was the Ministry of Fisheries, and several executing agencies were given specific responsibilities. The political situation in the country was essentially stable although several important decisions affecting the fisheries did occur and are worth mentioning. Early in the program, fishing for shrimp became the sole right of the cooperatives. This caused a delay in construction of the boats as the transfer of ownership of the shrimp vessels from the government-run industry to the cooperatives had to occur. Because of the large amount of small-scale fishermen in the country who were being excluded from the project, a separate project financed by the government was established to provide small boats and motors to this sector.

Overall the project had some limited successes. There is no doubt that an infusion of capital and boats of this magnitude had a significant impact on the policies, fishing technology and way of life of many of the fishermen. From 1977 to 1985 the number of employees in all aspects of fisheries doubled to more than a quarter of a million fishermen and workers. Many research programs that were directly related to the fisheries expansion were initiated by the government as well. Much of the fishery shifted from artisanal fisheries to industrial fisheries during this period. Shrimp cooperatives became very powerful due to the increased number of boats and fishermen. This is in spite of

the fact that the shrimp catch did not significantly increase during the project period. Overall fish harvest did increase throughout the execution of the program. This increase however was due to the great success of the sardine boats as the capture of small pelagics increased six-fold from 1973 to 1981 and represented 50% of the total capture. Only a small percentage of the remaining increased capture was attributable to the fleet in the loan program. The trawlers and the snapper boats were, for the most part, underutilized and their contribution to the fishing activity during this period was restricted. This was due to competing development programs in the small-scale sector as well as inadequate training in these new fishing techniques.

The construction of the training center was delayed due to bureaucratic inefficiencies. After its construction, the center continued to operate under severe budget limitations and continues to have insufficient funds to buy and maintain proper equipment for the type of training that was to occur. The training vessels that were integral to this part of the project (the training in various new fishing techniques such as trawling for demersals) were not on-board until after 1980. By then the training center had essentially failed and the boats were leased out to cooperatives who would agree to take a compliment of students on shrimp fishing excursions. The center lost sight of the goals for which it was originally intended and currently serves only the immediate region in training fishermen to trawl for shrimp.

There were several irregularities in the commercialization subproject. By 1977, forty retail centers and two wholesale centers had been established in the country. Other distribution centers, funded by the government's marketing sector were also established. Within a two year period, the majority of the centers had closed down due to financial losses. Some of the reasons given were poor planning concerning the location of the centers, lack of consistent supply of good quality product, lack of incentives for personnel to promote the sale of fish, poor understanding of the dietary preferences of the domestic consumer, and general mismanagement of the executing agency. Several of the general managers of this subproject resigned at various stages during the implementation stage and took their files with them. There are lapses in the records of months at a time of what was really happening in this sector.

Needless to say the monitoring of the project, especially a project of this size and impact, left a lot to be desired. The basic setup is to have the donor agency's in-country liaison office in charge of the monitoring with periodic review done by the parent office itself. In this case the person in charge of the in-country monitoring was an irrigation specialist who was in charge of several

agricultural projects as well. Very little pressure was put on the executing agencies for the reporting of good production and economic data. The monitoring of boat construction was quite good, even to the point of employing full time personnel to oversee construction of the vessels in foreign countries (e.g. sardine boats constructed abroad). Defects in the boats were often litigated at the builders expense. Detailed record keeping of this aspect was good, and evaluations were helpful in explaining several aspects of the project.

When the boats were actually fishing, however, the reporting system appears to have broken down. There appears to be insufficient interest on the part of the donor agency to do in-depth follow-ups of data collection for proper cost-benefit analysis. Even worse, when the small amount of statistical data was reported it was recorded as fleet data without designation of which boat was fishing what and where and what the costs were for each of the vessels. This data was available at the regional offices and could have been broken down systematically for proper analysis. The in-country office appears to have been content with the data presented by the Central offices at the Ministry of Fisheries. In simple term it was inadequate and gave a false picture of what was really happening in the fisheries.

Nonetheless, data for the fleet was more complete than that reported for the training center or the marketing subprojects. Hard data for these two components was essentially nonexistent so reporting was anecdotal in nature. Because of this it was difficult for the parent organization to determine the impacts of the program and what could be done to help remedy obvious failings. The reviews that were done appear to have had little input into the implementation of the project itself. This is unfortunate as several managerial decisions could have been made that may have had a positive effect on the project.

In project #2 we have several similarities in overall project goals. Its main objectives were to consolidate the state owned fisheries into one conglomerate and to initiate an expansion program of the fleet and distribution system. The financial benefits would come from increased shrimp and fin fish exports. An increase in fin fish production would also meet domestic demand for fish and contribute to the overall food supply of the country. The expansion would also allow for an increase in employment in the fisheries sector. More specifically the project included:

- the purchase of new shrimp trawlers
- the adaptation of old shrimpers into bottom fish trawlers
- improvement of the state-owned processing plant
- the purchase of refrigerated trucks

There was a recognition by the granting agency that the national technical and administrative resources were limited. For this reason a concurrent program was established to provide technical and administrative assistance while the country expanded their fishing capabilities. This input was provided by a European firm over the duration of the project. During project implementation the consultant agency prepared 33 reports and made 95 official recommendations to the state owned company.

This project had defined requirements for data collection. Within 18 months of the signed contract, the executing agency was to provide initial baseline data that was to include: number and types of boats in use, catch per boat, destination of the production, prices, production costs, labor force by level of qualification and salary, and construction inputs. Project indicators were to be reported in all these categories on an annual basis until four years after the final money disbursement. By the time of the project's ex-post evaluation the baseline data were still incomplete.

Furthermore, much of the data reported in the annual reports was in variance with data reported by other agencies and at times with data reported by the same executing agency in earlier reports. The data was often lumped together rather than categorized, spotty and with no reported methodology of data collection. For example, the methods for determining labor force employment level were stated as to be determined by analysis of payrolls. The number and type of boats recorded were in variance to those recorded in the Ministry of Fisheries annual report. These and other discrepancies in the data reported by the executing agency are a major constraint to any type of evaluation.

An evaluation is only as good as the data and observations allow. The contract between the donor and executing agencies must provide guidelines for how and what is to be collected. The guidelines need to be project specific and need to be broken down into categories that contribute to basic cost-benefit analysis. This groundwork needs to be established at the planning stages. Careful planning is required so that benchmark indicators can be set for the monitoring of the project. The breakdown in monitoring in project #2 was at the planning stage and the first few years into the project. Monitoring of the project was hindered by managerial problems in the administrative staff of the executing agency. These problems were never addressed properly during project implementation even though they hurt the overall objectives of the project.

The project met with few successes. By the time the full fleet was in operation in 1985, export sales were lower than those recorded the previous year. Fish landings also fell (down 21%) overall from the previous year although shrimp

by-catch landings improved substantially. Diversification into high valued demersal species did not occur because the trawlers designated to be refurbished for the targeted species proved to be too old to convert. Distribution of fish throughout the country improved substantially during the project, as fish was supplied to several cities and rural communities on a regular basis.

Reported increases in employment in the state run processing operation, however, proved to be a two edged sword. In the processing plant and administration sector, increased employment did not necessarily reflect increased productivity. The processing plant was underutilized throughout the project due to poor productivity of the fishing vessels. Nonetheless, the number employed in the plant remained as if it were at full operating capacity, thereby driving up the costs of the limited processing that was done. This employment policy was not only a financial drain on the company, but prevented the introduction of salary incentives to boost moral. There was constant turnover (as high as 250% for technical assistants) of trained personnel to other jobs, which placed the state run operation in a precarious position. The shortage of capable managers, supervisors and technical staff hindered the efficiency of the whole fishing operation.

The state run companies of both projects #1 and #2 continued to lose substantial amounts of money through their inefficient operations. Fishing is a risky business and only the heavily subsidized or the most efficiently run operations survive. Although small gains were brought into the average household (increased fish availability, increased employment for some), for the most part they lost much more than they gained. The financial burden of the loans for these two projects will ultimately be borne by the taxpayer. Moreover, the loss of confidence in the state run operations, which is readily published in the press, erodes the faith in government. These financial and morale losses accumulate with time, and there is a general skepticism about development aid, especially in the private sector.

Mismanagement is a difficult problem to deal with. It should be addressed in the planning stage. In project #1, mismanagement occurred because of poor administration and lack of trained personnel in the fisheries sector. In project #2, this was to be remedied through the use of outside assistance on both the technical and administrative level. In-country managers and supervisors were to receive on-the-job training that would allow a certain degree of continuity once the foreign consultants left. This never occurred due to the high turnover rate of trained personnel at the state run company. Furthermore, there was no ongoing evaluation of the training. The reasons most often given for employee self-termination was to move sideways into the private sector for more pay. This

needed to be addressed at an early stage to assure the company sufficient trained manpower to run an efficient operation. Data is presented in terms of persons trained and when they left the company, but there was no evaluation of type of training, evaluation of the trainees, or interviews with the trainees themselves.

OPERATIONAL IMPACT ASSESSMENT

Operational impact assessment (OIA) as described by Horton (1988) is a more active form of monitoring development projects. It allows one to be flexible and make adjustments as the project develops. A certain amount of latitude is permitted and encouraged as the research situation is a dynamic one and unexpected results influence the day to day decision-making process. The situation with fisheries development projects has similarities to the research situation. Although not viewed as being as dynamic as research activities, development projects undergo changes that occur through interactions with government agencies, natural phenomena, new research developments or policy changes.

An example of this in the fisheries sector may be the changing of project research funds in one area that has proven early on to be a dead-end to the research needs of another area. If, for example, research in product development for certain species of fish shows that the product(s) will not sell due to biological or economic factors (inconsistency of supply, high costs of harvest, poor trial acceptance in the marketplace), then there is value in having a mechanism for OIA and redirecting project goals or methods. Unfortunately, the mechanics of alteration are not often a part of development projects, and interaction between the donor institution and the executing agency are usually too cumbersome to allow for rapid change.

A proper OIA will only be as good as the project itself allows. Many authors have pointed out the special characteristics of the fisheries sector. Several prerequisites are necessary and should be addressed in the planning stage. These prerequisites are:

Clearly defined project goals - Poorly defined goals such as the improvement of national nutrition status through fishery products, increased employment or increased fish production in some cases are poor indicators for OIA. Goals need to be more reflective of defined benefits, have a reasonable time schedule and have sufficient base line data to be measurable.

Data collection methodology that is appropriate - Many assessments and evaluations are steeped in anecdotes rather than data. Although it has a place, non-factual information should be backed up by reports from the executing agency or others. The data collecting methodology that will be done by the in-country personnel should be established.

A built-in mechanism for project modification - The ability to change or abandon what is obsolete or unproductive will prove healthier to overall project objectives and implementation than perfunctory completion of the project.

Sustainability of project - In fisheries projects this is an important concept in terms of impact of resource and investment policy.

The OIA should be viewed as a managerial tool that will affect project implementation. Often, monitoring of projects is left as simple data gathering for the post evaluation. This is unfortunate in the sense that if ongoing evaluations (operational assessments) can be made, problem areas can be studied, remedied or abandoned depending on the prognosis. There are several positive aspects to this point:

Accountability - Operational assessments can increase the responsibility of project managers and in turn they may be more responsive in the running of the project.

Flexibility - If assessments are made on a regular basis, donor and executing agencies should be more at ease with the idea of in-project changes that are responsive to project development.

An OIA can be looked at as a monitoring system with a bite to it. The officer in charge of the OIA needs to determine in the initial phases if there is enough baseline data at the beginning of the project so that subsequent OIA's can be realistically accomplished. In the above described fisheries project #1, it would have been obvious from the beginning that insufficient baseline data had been collected and that there was no efficient data acquisition mechanism in place; hence, there would be no hope of doing OIA's. This should have been addressed in the first few years of the project because of the adverse cascading effect that the lack of reliable data had on all subsequent evaluations. Both post and ex-post evaluation suffered from poor project monitoring and the inadequacy of the data collected. A significant amount of evaluator's time was spent traveling to regional offices for data collecting

purposes which were sometimes successful, sometimes not. A more valuable use of time would have been traveling to these same offices to interview fisheries personnel and fishermen about impacts that had occurred during the project implementation.

Proper OIAs would be extremely helpful in the actual administration of fisheries development projects. Allsopp (1985), in his book about fishery development projects in both large and small scale fisheries, cites numerous examples of poor or inadequate management that contributed to the failures of such projects. Mismanagement of development projects occurs in agriculture development projects as well as fisheries. In an analysis by Horton (1988) concerning agricultural research, he states that "In many instances, poor management, not funding, is the principle constraint on research impact." In a review of World Bank projects in all sectors Israel (1987) concludes "In the reviews of difficulties and delays in implementation, managerial or institutional problems emerge as the most important causes (of failures), although their exact nature is seldom defined and analyzed." The World bank itself recognized this when they carried out their own review (1983) and "found marked inadequacies in several countries in their resource allocation to and among research and extension, reflecting weaknesses in planning and monitoring processes in those countries."

Part of the problem is that fisheries project management confronts diversity as it deals with fishermen, middlemen and handlers, marketing specialists, researchers in fisheries, food scientists, economists, and sociologists among others, and these different constituencies have political implications in many developing countries. Furthermore, managers often have to respond to budget controllers, international donor organizations and various other special interest groups. All of this, while trying to make a profit, is a formidable task. How can a manager monitor and evaluate the operation of a fisheries development program?

Several people who work in the field insist that there is no one methodology that can accomplish all these ends. The problem lies more in the selection of the best methodology for the existing situation. There are basic questions that need to be answered before a method can be chosen:

- Who are the clients for the project? Potential clients include the fishermen, consumers, the government, or special target groups.

- What is being done in the project to meet the clients' needs? What technology is being transferred, what is the availability of products produced and the cost effectiveness of the program?

- How are the needs being met? Do they have socio-cultural soundness; is enough understood for decision making; how are these factors being measured?

- Are the solutions for the needs adopted by the clients? Do they perceive economic gains and risk aversion; are there motivational factors that will assure sustainability?

- What are the potential long term impacts? Are they ecologically and economically sound; are there cross-over effects into other groups?

How are these questions addressed in an OIA? Koppel (1988) states that two distinctions need to be made from the beginning: explicit objectives and implicit objectives. Explicit objectives are clearly stated and can be measured objectively, such as, "the acceptance of technology was found to be x% in this fishing village." Implicit objectives are more ambiguous and less clear but are important to the project's overall scope and need to be addressed, such as, "the acceptance of the technology was x% by fishermen without disruption to their role in family and community." His family and community role are the implicit objectives. As the project develops, implicit objectives become clearer and need to be evaluated.

Figure 1 is a schematic diagram illustrating how one might go about evaluating the goals and methods in reaching these goals. As we have mentioned before, we have divided them into explicit and implicit objectives. The inputs are what go into the project itself: boats, motors, equipment, extension agents, etc. The transfer refers to the changes that occur as the inputs yield outputs. Extension agents can improve fishing capabilities which result in money and food. The extension agents, in an implicit example, may have also been instrumental in beginning a fishermen's organization that brought certain benefits to the fishermen and the community. The outputs measure what is needed for the record keeping, the number of times fishing, the number of visits by the extension agent, etc. They are a direct result of the inputs. The effects are the outcome of the project outputs, such as how many fish were caught that are a direct result of project design and the increased earnings for the fishermen. The impact is understanding the changes that are attributable to the project. How has it affected the fisherman, his community, his working environment? The assessment would be the evaluations of the previous categories. Did we produce the outputs we wanted, are the effects the desired ones from these outputs, what are the real and potential impacts that occur?

FIGURE 1
OPERATIONAL IMPACT ASSESSMENT

	PROJECT DOMAIN					
	INPUT	TRANSFER	OUTPUT	EFFECT	IMPACTS	ASSESSMENT
EXPLICIT						
IMPLICIT						

An example of the application of this type of system in the small-scale fishery sector would be the introduction of monofilament line to inshore demersal fishermen. We may find the output positive in terms of adaptation and use of new fishing technology, the effects positive in terms of increased catch, but impacts negative in terms of potential of overfishing. An assessment of all these categories may force us to redirect the project goals to proper management of the fisheries to assure the sustainability of the resource. If we wait until the ex-post evaluation stage for this assessment, we may find ourselves with no resource to manage. Conversely, in a training program we may find the outputs low in terms of number of trainees but the effect very positive and the impact significant, especially if those trainees show strong ties to the community and will apply what they have learned in the training to better the fishing community. This program may be assessed positively even though the outputs are low.

Implicit objectives develop as the project develops. They can be looked upon as spin-offs from the project itself. Project activity and development in the fisheries sector may awaken the government to understand the importance of more formalized training and research to satisfy the country's needs. The realization of the crossover in development activity from one sector to the next creates many of the implicit objectives that are not stated in project planning. There are many assumptions in the beginning of a project that prove to be invalid. Budgets are cut, policy is changed, and domestic and international markets can greatly influence project direction. Assessment of implicit objectives allows us to go over and above the main project goals and look at impacts in fisheries and other sectors.

Along these same lines a case can be made for monitoring the decision making process itself. In this case the emphasis is on the "how" of the objectives. In this area, Koppel

(1988) has defined a formal and informal process. If fishermen are "prescribed" in the formal process to be involved in the decision making process, it is necessary to describe the "actual" process. In any fisheries development project there is a certain degree of both formal and informal decision making going on for the basic reason that not all of events during implementation could have been foreseen in the planning stage. Pollnac (1987) has stressed the importance of the participatory process in successful planning of development projects. If changes are to be made in the project direction due to an assessment that, for example, determined non-acceptance of a technology by the fishermen, we had better include them in the decision making process when adapting our project strategies. Any development project undergoes a certain degree of give and take. These come out as compromises that hopefully add to the integrity of the project. These changes in project methods or objectives have a better chance for success if the decision making process includes the fishermen and others who are directly affected by the project. OIA would be used to develop new objectives if policy decisions or environmental impacts occur that require the program to take a new direction. If this indeed occurs, a more in-depth analysis and assessment of the situation may be necessary than had been programed in the initial OIA.

On a smaller scale, minor or new options may come to light during the regular OIA. An example of this would have occurred in project #1 if OIA methods were used. The rapid success of the sardine fisheries and relatively inoperable conditions of shrimp bycatch utilization, for socio-economic reasons, should have allowed for more emphasis on sardine utilization programs for human consumption at the expense of the other program. In project #2, it was apparent from the beginning that a formal training program in data collection and the use of computers (which were purchased under the project) was needed for good operational procedures. Such an option could have been formally incorporated into the program if such decision making was allowed. Both of these small changes in objectives could have substantially improved the project and turned some of the failures to successes.

Can an operational impact assessment of the implicit-explicit objectives and the formal-informal decision making process have a positive effect on the management of the project itself? If it is done with a purpose in mind and not just as a method of generating reports then the answer is yes. OIA is a tool that should be used to improve project management and implementation. Management has a decision making orientation, and an OIA of the decision making process and an assessment of the explicit-implicit objectives should allow the evaluating team a good understanding of whether the objectives are met. In many cases the methods of meeting the

objectives are the main constraint. Major objectives, in these cases, need not be redefined but the means to reach these objectives may need to be changed depending on the suggestion of the OIA team. There is no question that if a proper OIA had been done one to two years into the above example projects, and if there was a mechanism to utilize the assessment in the managerial framework, both of these projects would have benefited. Better management would ultimately translate into more efficient mechanisms of research, technology transfer or training. It is too late for changes during the post evaluation stage.

CONCLUSIONS

This paper has demonstrated the need for improved monitoring of fishery development projects in less developed countries. This monitoring should not be done merely to fill the requisites of a development loan program. Monitoring should play an important role in the actual project implementation and is termed Operational Impact Assessment (OIA). It is operational in nature in that it occurs during the project development and it should be directed to assess the impacts of the objectives as they are partially met during the program. It is also considered operational in that project managers should look toward this assessment to help them determine the appropriateness of both the explicit and implicit objectives. The decision making process should be evaluated as well, as it will have a direct impact on the methodologies used to achieve these objectives.

Development projects succeed or fail primarily for managerial reasons. The OIA is meant to be used as a managerial tool that will improve accountability of project implementation and provide the project with a certain degree of flexibility and responsiveness. Fishery development projects should be thought of as dynamic in nature, as the scientific, sociological, economic, and political crossovers require managerial skills and expertise at several levels. OIA will allow for these interactions, and the assessment should provide administrators, supervisors, trainers, and fishermen with increased participation in reaching the project's goals. For a proper OIA to work we need: 1. clearly defined project goals; 2. appropriate data collection; 3. mechanism for project modification; and 4. project sustainability.

The methodologies used in OIA are project specific and need to be defined in the project planning stages. Identification of the project client or target population, definition of how needs will be met, the adoption of introduced systems by the target population and analysis of

long term impacts need to be assessed on an annual basis. A schematic diagram is presented in figure 1 which allows us to describe and analyze the inputs, transfer of inputs, outputs, effects, and impacts for proper assessment and evaluation. The assessment is then fed back into the managerial loop and changes are made within the limits of the project itself.

There is a new awareness on the part of donor institutions and large development banks of the importance of operational assessment during project implementation. Furthermore there is an increased sensitivity to the impacts that their programs have on various aspects of society as well as the environment itself. However, there must be a willingness on the part of the donor institution as well as the receiving country to set up a proper monitoring system that will allow for objective analysis. OIA needs to be well defined in methodology and operation and budgeted into the project. There must also be a willingness to be responsive to the needs of the targeted populations and the environment on a year to year basis so that project goals can be redirected when necessary to best fit these needs.

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MONITORING AND EVALUATION OF PEACE CORPS MARINE FISHERIES AND MARICULTURE PROJECTS IN THE PHILIPPINES

Brian R. Crawford and Michael A. Rice

INTRODUCTION

This paper investigates approaches to monitoring and evaluating Peace Corps marine fisheries programs from various perspectives. It is approached from the viewpoint of the Peace Corps organization, the Volunteer, the host country agency, as well as from the standpoint of the fishermen, mariculturists, and the coastal villages with which Peace Corps Volunteers work. It covers the entire range of the program cycle including programming, recruitment, training, Volunteer service and post service. The paper is targeted at several audiences: Peace Corps staff responsible for marine fisheries and mariculture programming, Volunteers serving in the field, as well as other individuals from government and non-governmental organizations who may be interested in developing similar types of fisheries programs.

The Peace Corps, as mandated by congress, has three goals. Two of these goals are cross-cultural in nature, and are designed to provide a better understanding of the American people on the part of those people who are served, and for Americans to have a better understanding of the people in the nations served. This paper focuses on the third of these goals, which is to provide trained manpower, sometimes under conditions of hardship, to the poorest of the poor, in the nations served.[1] The focus of this paper in no way tries to minimize the importance of the first two goals mentioned. On the contrary, it is our premise that those goals can best be met through the successful implementation of the third goal of providing trained manpower to people in need.

The paper focuses on marine fisheries programs in the Philippines. Although mariculture is generally considered a specialized branch of aquaculture which focuses on the culture of marine organisms in brackish and marine waters, it has traditionally been included under the Peace Corps Marine

Fisheries Program in the Philippines. The freshwater fisheries program focuses primarily on freshwater aquaculture. In addition, there is a small inland fisheries program dealing with lake capture fisheries and stock assessment. The term marine fisheries, for the purposes of this paper, will refer to marine and estuarine capture fisheries as well as mariculture activities as the program is defined in the Philippines.

Peace Corps Marine Fisheries Programs extend worldwide. Volunteers from these programs have been assigned to countries in Africa, The Caribbean, Latin America, Asia and The South Pacific. This paper uses the Philippines programs as a model since it is the country where the authors served as Volunteers and trainers. In addition, the Philippines represents one of the largest Peace Corps countries in terms of overall number of Volunteers as well as the number of Volunteers who serve in the marine fisheries program. The Philippines also has a Peace Corps Freshwater Fisheries Program which offers interesting comparisons to the marine fisheries program. The Philippines therefore, has a larger scope of fisheries programs than any other country where Volunteers serve. The Philippine Peace Corps fisheries programs started in the early seventies and have been running continuously for over fifteen years. These fisheries programs have consistently received strong support from the host country agencies, and in particular, from the Bureau of Fisheries and Aquatic Resources. It seems appropriate therefore, that a systematic approach towards monitoring and evaluation of these programs is required. Although this paper focuses on the Philippines, the issues and approaches have applications for Peace Corps Fisheries Programs worldwide.

Volunteer programs are developed based on requests from a host country agency. The process can take a number of years from the time of an initial request to the actual placement of Volunteers in the field. Once a request is made, a Peace Corps representative will undertake a series of negotiations and discussions regarding the proposed Volunteer's role. Peace Corps will determine if the job falls into one of the various centralized programs such as forestry, fisheries, health, education, etc., whether the proposed job role can realistically be accomplished by a Volunteer, and whether there is a real need for Volunteers to fill this role. A final program is agreed on by the host country agency and the Peace Corps and is often formalized in some form of memorandum of understanding or project agreement signed by representatives of both governments.

VOLUNTEER RECRUITMENT Once a program is agreed on, information regarding the appropriate background, experience and qualifications of prospective recruits, along with a brief

job description is passed on to the Peace Corps Washington D.C. office in what is referred to as a Trainee Assignment Criteria (TAC) sheet. Recruitment is conducted by area offices throughout the United States. Recruits are then nominated to a particular assignment area such as marine fisheries or freshwater fisheries. The office of placement in Washington D.C. then invites nominees to specific country programs. Most Volunteers who enter the marine fisheries program are men and women whose average age is in their mid-twenties. They often have newly or recently awarded bachelor's degrees in the biological sciences or a related discipline. Some individuals have specialized backgrounds with either graduate degrees in the biological sciences, fisheries sciences, ecology or oceanography, or are skilled trades people such as boat builders, marine engineers, mechanics, fisheries technologists or commercial fishermen. Historically, most of the fisheries recruits have backgrounds in biology (B.S. or B.A. degrees) and a smaller amount with Master's degrees in marine biology or oceanography. On the other end of the spectrum are recruits with more vocational skills such as fishermen or mechanics. The latter type of recruits fill what is often referred to as "scarce skills positions" due to the difficult nature of recruiting Volunteers with this type of special background.

Applicants go through an extensive selection procedure requiring numerous letters of recommendation, medical, dental and legal clearances, as well as matching the applicants background, experience and skills to the appropriate Peace Corps program, and then to the appropriate job within a specific country as outlined on the TAC sheet. This recruitment and selection process can take anywhere from a few months to a year or more before the recruit enters training.

VOLUNTEER TRAINING: Trainees undergo an intensive pre-service training program of anywhere from eight to twelve weeks prior to being sworn in as Peace Corps Volunteers and being assigned to their respective field assignment. Peace Corps training focuses on a triad of language, cross-cultural, and technical skills, knowledge and attitudes. None of these components can be isolated from one another, and all are important to accomplishing Volunteer success. Hence efforts are made to integrate all these components in the training design.

The technical component of the training program is dependent on the background of the trainees and the job roles they are requested to fill as marine fisheries Volunteers. Emphasis is placed on experiential training methodologies. In addition, training attempts to build on existing skills of trainees and prepare them to be self-directed at the completion of training. The technical training design is a

balance between content and process: facts on local fisheries dynamics and information about the agency to which they are assigned versus situational problem solving in ways to identify the felt needs of a fishing community, to develop extension techniques, and techniques of networking to find technical information as well as human and financial resources. Typically, the total duration of the in-country technical training component is approximately 100 hours of instruction time divided between classroom and field activities. This is a relatively short period of time equivalent to two to three full weeks of continuous technical training activities. The technical training time is staggered with language and cultural training time and extends throughout the pre-service training program. Since the technical training time is so limited, there is only so much that can be realistically accomplished within this time frame. Volunteers must be recruited with a substantial proportion of the background technical skills and knowledge required to perform their jobs.

A number of special skills training (SST) programs in Marine Fisheries were conducted in the U.S. and Puerto Rico. The SST program in marine fisheries was started in 1981 and discontinued after 1986. Only the first SST program included individuals bound for the Marine Fisheries program in the Philippines. These SST programs involved 8 to 10 weeks of intensive technical training. In addition, there is a 10 week SST program for the fish culture program. A large percentage of fish culture Volunteers assigned worldwide undergo the SST. It is interesting to note that in the more narrowly defined fish culture program, technical training is considerable including the extensive SST. However, few freshwater fish culture Volunteers who served in the Philippines have gone through the fish culture SST.

The job of the technical trainer is simplified where the job roles of the Volunteers are somewhat uniform. A narrowing of the job focus means that the technical training time available will be more likely to allow coverage of the scope of skills and knowledge that the Volunteers will require as well as allow the training to go into more detail and depth. It is here that interesting comparisons can be made between the freshwater and marine fisheries programs.

The freshwater fish culture program in the Philippines is highly focused with Volunteers acting as extension agents with goals to increase tilapia pond production, fingerling production, and in some cases rice-fish culture production. This has also resulted in better success rates of freshwater fisheries Volunteers based on post-service interviews, as well as interviews of Peace Corps staff. The technical training places major emphasis on tilapia fingerling production, pond production, rice-fish culture and extension techniques.

Volunteers in the marine fisheries program are usually assigned to jobs falling into the following general categories:

1. Applied research
2. Extension
3. Teaching (fishermen training centers and fisheries colleges).

The greatest number of Volunteers by far, serve as extensionists. Within the above mentioned broad categories, Volunteers have worked with the following types of programs: boat building; fish capture technology; fish processing, handling and preservation; fishermen's cooperatives; loan programs; alternative income generation; development of artificial reefs; fish aggregating devices; mariculture of mussels, oysters, seaweeds; finfish cage culture, fisheries stock assessment; coral reef research; and conservation education. This list is by no means complete and illustrates how the job roles of the marine fisheries Volunteers can vary considerably. The dilemma for the trainer is that not all Volunteers engage in only one or two of these selected activities. The group typically covers the whole range with each Volunteer focusing on different topics at their job site or the actual focus left open but which could include any of the above list of topics. The content focus of the training therefore tries to provide skills and knowledge in each of these areas to all the trainees, and where possible, provide some individualized training. The process focus of the training looks at general strategies for fishing community development and extension techniques.

VOLUNTEER SERVICE Trainees are sworn in as Peace Corps Volunteers at the end of the training program and are sent to their site of assignment for a period of two years. Their sites are often in rural coastal villages with few amenities such as running water and electricity. In other cases, they may be assigned to a provincial capital and work out of a district or provincial office. In-service training programs are periodically arranged during the Volunteer's service where they have the opportunity to enhance their skills in an area related to their job, and meet with their Peace Corps and host country agency supervisors to discuss progress and problems that may have arisen during their service.

RETURNED PEACE CORPS VOLUNTEERS Most Volunteers complete their service after two years but some extend their service for an extra year or two. They return to the United States and reenter life back home. Many returned Volunteers have pursued careers in public service and can be found in the

halls of congress, the Department of State, the United States Agency for International Development, non-governmental international development organizations and institutions of higher education. These individuals have had considerable impact on their organization's programs based on the understanding of development they achieved during their Volunteer service. Many Volunteers continue on in domestic careers related to their program of service and others move into unrelated fields. In all cases, the Volunteer experience remains as an extremely memorable period in the individual's life.

EVALUATION OF PROGRAMMING

For the purpose of the following discussions, Peace Corps programming will be defined as the total process by which Volunteer job roles are defined, initiated and implemented. This involves developing initial linkages with host country agencies, as well as selecting, training and placing Volunteers in appropriate sites.

The success of the Volunteer in his/her project is highly dependent upon the quality of the pre-project preparations and evaluative groundwork. To illustrate this, The Peace Corps Freshwater Aquaculture Program as it is implemented in the Philippines provides a good example to compare with the Philippines Marine Fisheries Program.

Small-scale technology for producing freshwater fish such as tilapia is readily available, and is quite adaptable to most locations in the Philippines. The host country agency, the Bureau of Fisheries and Aquatic Resources (BFAR) has a strong institutional commitment to freshwater aquaculture. There are adequate in-country training centers for extension training operated by BFAR as well as many capable and skilled technicians and extension personnel. There are also a number of BFAR facilities devoted to production of freshwater fish fry/fingerlings. What BFAR does lack is a sufficient cadre of adequately trained extension personnel willing to serve in many of the rural and often isolated areas of the country. The majority of Volunteers recruited to serve as freshwater aquaculture extensionists are newly graduated from a four-year university with a bachelor's degree in biological sciences or a related discipline. Many of the skills which are related to fish production are biological in nature, such as detecting and simply treating disease or sexing the fish during the pond stocking process. Hence, Volunteers enter training with strong background skills and knowledge necessary for working as fishpond extensionists. The training program for a freshwater aquaculture extension Volunteer is well focussed in that most of the basic skills necessary can be imparted in a

three to four week period. After the Volunteer is placed in his/her site, objective monitoring and evaluation of Volunteer effort and accomplishment is a simple process of enumerating new fishponds, or increases in the amount of fish produced. Since the typical project cycle for the development of a fishpond is on the order of one year, the limited time that the Volunteer would be present would not hamper the project. For all of the above favorable conditions, the freshwater aquaculture program worldwide has been very successful (Gregory, 1978). However, little information of the types mentioned previously to quantify program success has been gathered for the Philippine's freshwater fisheries program or for the marine fisheries program.

The freshwater aquaculture program can be used as a model for evaluating programming in the marine fisheries/mariculture sector, however there are distinct differences between the programs. The first and most striking difference is that within BFAR there are a multitude of project areas all directed toward marine fishery development. Project areas include but are not limited to the following: alternative boat designs, fish capture technology, fish preservation, subsidized loan programs for boats and gear, marketing cooperatives, artificial reef development, fishery stock assessment, coral reef and mangrove swamp conservation education, and mariculture of mollusks, crustaceans and finfish. As a direct result of the broad interests of BFAR as an institution, they have frequently requested Volunteer assistance in all of their project areas. It is critical for Peace Corps to recognize that it is very limited in its ability to provide quality assistance in all of these areas. Peace Corps is limited in the number of Volunteers it can provide, the types of Volunteers it can regularly recruit, and in the time and content of Volunteer training. It is also limited in that project cycles must reflect the turnover rates of Volunteers and Peace Corps staff. Due to these limitations, it is highly doubtful that a direct effort by Peace Corps to supply Volunteers in all of the BFAR project areas would lead to successful Volunteer experiences.

Recognizing that it cannot deliver all that is requested by the host country agency, it is imperative that Peace Corps undertake a process of self-evaluation in an effort to identify exactly what Volunteer skills can be delivered. In this context, the task falls largely on the shoulders of the Regional Associate Peace Corps Directors (RAPCDs), who deal directly with the host country agencies. The regional versus sectorial (program) organization of Peace Corps in the Philippines, means that most RAPCDs do not have the background in fisheries or aquaculture to make these decisions adequately. They are considered generalists and supervise a number of diverse Peace Corps programs in health, agriculture,

forestry, and education as well as fisheries. Peace Corps Philippines is one of only two countries that has RAPCDs. By contrast in most other countries the Associate Peace Corps Directors (APCDs) have a specialized technical expertise in one field such as agriculture, forestry, health or fisheries and are responsible for only one program area which is the field of their expertise. As a result, the RAPCD must rely heavily on the recommendations of BFAR since they often have no specialized expertise in fisheries. It must be recognized however, that the host country agencies often have certain priorities. It is often helpful to seek the assistance of outside agencies which may have different points of view to give supplementary information to RAPCDs who are charged with the task of selecting appropriate project areas for Volunteer involvement. In the Philippines, there are a number of highly respected national and international agencies with interests in marine fisheries and mariculture development which could be consulted. These agencies include the College of Fisheries and the Marine Science Institute of the University of the Philippines, the International Center for Living Aquatic Resource Management (ICLARM), and the Southeast Asian Fisheries Development Center (SEAFDEC).

The background of Volunteer recruits and the capabilities and limitations of Peace Corps training procedures are additional factors which influence the decision as to which project areas will receive Volunteer assistance. In recruitment literature designed to describe the Peace Corps marine fisheries programs, individuals are sought with a wide variety of specialized skills as well as generalists with a biological science background. These broad recruiting qualifications are directly related to the wide skills requirements inherent in the project areas requested by host country agencies worldwide which are responsible for marine fisheries. Historically, the majority of Volunteers recruited for the marine fisheries program are quite similar in background to Volunteers recruited to serve in the freshwater fisheries program. As previously mentioned, these Volunteer recruits typically hold a bachelor's degree in biological sciences or related discipline and are 22 to 25 years of age. Volunteers of retirement age are not uncommon and Volunteers of all ages in between can be found. On a less frequent basis, Volunteers are recruited who have graduate degrees or specific trade skills such as boat building, marine engineering or gear technology.

Recognizing the historical pattern of Volunteer recruitment into the marine fishery program, it can be suggested that a number of project areas may be generally inappropriate. For example, with regard to the BFAR project areas listed previously, few recruits would have a background in boat building or naval architecture, so introduction of

alternative boat designs may be a poor choice for Peace Corps involvement. Likewise introduction of new gear technologies may be risky for the same reasons. Volunteer involvement in project areas such as subsidized loan programs for fishermen and marketing cooperatives require skills in the fields of economics and business. Recruitment efforts directed toward individuals with these skills may not be considered when an individual is expected to work in a general fishery-related situation. Naturally, if an individual is recruited who possesses an unusual skill, every effort should be taken by Peace Corps and the host country agency to place that Volunteer in a specially tailored project.

Peace Corps training programs cannot be a substitute for years of experience. Typically, pre-service training programs (PSTs) are 10 weeks in duration, and contain elements which are technical, language and cross-cultural in nature. The technical aspect of the marine fisheries training rarely exceeds 30 percent of the overall training curriculum content. It is unreasonable to expect that specialized skills such as boat building or the theory and techniques inherent to stock assessment problems could be covered in three weeks. The role of technical training in most cases should therefore be to impart a body of knowledge and skills which is focussed, very project specific and should not be overly ambitious in terms of its expected outputs.

Another major consideration which should be addressed when evaluating project areas for Volunteer involvement is the limited amount of time which the Volunteer will be present to participate in the project. Typically a Volunteer serves for two years. Approximately 25 percent extend their stay by one year. Extendees beyond three years are exceedingly rare. In addition, the American staff such as the Country Director and the RAPCDs are assigned to a country for no more than five years. In the Philippines, frequent realignment of the regional assignments of the RAPCDs has tended to make long-term linkages/contacts with the host country agencies very difficult. As a result of this very transient nature of individuals in Peace Corps, projects which cannot be monitored and evaluated within an 18 month or 2 year cycle may not be successful.

In some cases, Peace Corps looks at program and project cycles from a 6 to 8 year perspective where each two year cycle of a Volunteer is considered part of a longer continuum. For instance, if fish culture is to be introduced into an area where no fish culture activities took place previously, a two year time frame may not be adequate for the principles and concepts of fish culture to be understood and applied to achieve a level of self-sufficiency in the area. Initial Volunteers may need to concentrate on fishpond construction techniques with subsequent Volunteers focusing more on pc

management and fingerling production.

There are disadvantages for this type of long term program planning. A certain percentage of Volunteers in any program terminate their service before their two year service commitment is completed. Replacement Volunteers may not be reassigned to vacated sites for a period of a year or more. Such discontinuity of personnel can have negative implications for project success. Even when there is a smooth transition to new Volunteers, the new Volunteers often require up to a year before they are able to adequately speak the local language and understand the cross-cultural dynamics sufficiently enough to feel capable of contributing anything substantial. These factors must be taken into account in evaluations of program planning if time frames longer than two years are to be incorporated in program or project designs.

Regardless of project time frames, they should be monitored throughout the project cycle to gauge how well objectives are being met. This allows adjustment in development strategies, or even in project objectives. An 18 month to two year time frame for collection and analysis of data for project monitoring and evaluation fits in conveniently with the Volunteer service cycle time frame. In fact, a shorter annual or semi-annual time frame for project monitoring and evaluation may be even more appropriate. Programs with modest goals, such as to increase production levels of existing mariculture farmers, may be more appropriate in the Peace Corps context given the rapid turnover of personnel than more ambitious programs that require longer time frames.

Efforts have been taken to develop a long term development strategy within Peace Corps Philippines. For example in 1979 and 1980, the co-directors developed a five-year plan in which a first Volunteer would enter a site and spend his/her service preparing the groundwork for two successive Volunteers to follow-on, the final Volunteer completing the project. This experiment would have allowed a longer term Peace Corps commitment to a particular project. Unfortunately this experiment failed for two main reasons. First, Volunteers were not really willing to follow another Volunteer into a site. Comparisons were always made by the local villagers at the site to the previous Volunteer which is distasteful to most Volunteers. It is for this reason that many Volunteers want to be assigned to "virgin" sites, which are extremely rare considering that Peace Corps has been in the Philippines since 1961. The second reason for failure of the five-year plan was that two years after conception of the plan, a new Country Director was assigned to the Philippines and the plan was scrapped.

Considering the various strengths and limitations of Peace Corps for marine fisheries projects, specific suggestions can

be made as to which of BFAR's project areas might be targeted for Peace Corps involvement. The first suggested project area is small-scale mollusk, crustacean and finfish mariculture. Project cycles for mariculture projects in the Philippines are on the order of one year and much like freshwater aquaculture, training skills are straight forward, which makes for focussed training and simplified mid-project and post-project evaluation. The biology background of the typical Volunteer is critical for projects of this type. Other projects which may be amenable to general Volunteer involvement might be introduction of community artificial reefs or fish aggregating devices (FADs) which are known in the Philippines as payaws. Such projects may serve to improve fish habitat, which would improve the artisanal fishery. The training requirements and expected project cycles fall within the previously outlined guidelines. Fish preservation may be an acceptable project area, however in most coastal areas villagers are familiar with a host of fish preservation techniques. Training for, and evaluation of this type of project activity are acceptable and project cycles are within the prescribed limits.

We emphasize again, however, that the Peace Corps recruiting process will occasionally result in a few Volunteers with special skills. Special effort should be taken to work with the host country agency to find an appropriate project so that when such talent is recruited, it will not be hidden for two years.

SITE DEVELOPMENT AND PLACEMENT PROCESS Beyond determination of appropriate projects for Volunteer involvement and the recruitment and training process, a key element of project success is the site development process. The site development process, or the evaluation and selection of a location for a project with Volunteer participation, most optimally involves input from the host country agency, BFAR. This of course does not exclude the possibility of input from local government officials and other community leaders. Many BFAR officials at the provincial level have had experience with Peace Corps Volunteers as well as other foreign Volunteers, such as the Japanese Overseas Cooperative Volunteers (JOCV). For the most part, Peace Corps has made a favorable impression among these provincial level officials, who are often eager to participate in the site development process. The Peace Corps individuals responsible for site development are the RAPCDs. Sources of ideas for new Volunteer sites have been BFAR, other Host Country Agency officials and experienced Volunteers in the region. On several occasions, BFAR officials have participated in the site development process beyond the initial site recommendation stage. BFAR officials have participated directly in the site development process by assisting in site

visits and making initial contacts with municipal officials. At this early stage of the project cycle, the partnership role of BFAR at the local level is established and a sense of "co-ownership" of the project is developed.

Historically the site development process has been a time consuming process. This stems from the recognition by most RAPCDs that this is a very critical stage of the project cycle, and that a few hours at the potential site discussing Volunteer projects with municipal officials is rarely sufficient to obtain a complete or accurate picture of the site. At the very least the individual performing the site check should stay overnight. Most often site development activities are required once a year, but on occasion two groups of new Volunteers are placed into a region annually. For each site development cycle, 35 to 40 sites per region are typically suggested as potential sites. Assuming that one night is spent in each of these potential sites, more than one month of the RAPCD's time is spent on site checking. Because of the many other responsibilities of the RAPCDs, they often find it difficult to devote adequate time to site checking. In the past, RAPCDs relied heavily on the use of reliable, experienced Volunteers in the region for evaluation of potential sites. This system worked well, but it was necessary to temporarily call the Volunteer from his/her site. In addition, an experienced Volunteer who had completed at least two years of exemplary service was chosen by the RAPCD to assist him as Regional Volunteer Coordinator (RVC). The RVCs assisted in site checking, liaison with host country agencies and served as an emergency contact for Volunteers who were often in very remote areas. The use of Regional Volunteer Coordinators was discontinued since it is a Peace Corps policy for Volunteers to spend as much time as possible at their sites assisting the communities in which they live. In addition, it was deemed that RAPCDs should be responsible and accountable for programming and site development. This does not mean that currently serving Volunteers cannot be consulted for inputs and recommendations. Another possibility for the RAPCDs who require assistance in the site checking process is to find reliable individuals in the host country agencies who have had a long relationship with Peace Corps. The more information and pre-project evaluation that can be gathered during the site checking process prior to the Volunteer assignment will assist greatly in his/her project.

After projects are selected and sites chosen, individuals are trained prior to being assigned to the field. It is during the preservice training program that individual trainees are matched to particular sites in a process referred to as site placement. At present, the RAPCDs are solely responsible for making site placement. It is usually accomplished on the basis of one or two interviews between the

trainee and RAPCD. The RAPCD then tries to balance the desires of the trainees (i.e. preferred job focus, rural verses urban, or an isolated verses accessible type of site) and his/her background experience and skills with the needs of the site, host country agency and community. There is little if any input by the host country agency in the site placement process.

In the early eighties, one RAPCD approached site placement from a different perspective. Host country agency personnel participated in trainee interviews along side the RAPCD, and a decision as to which trainee should go to which site reached on a consensus basis. This process was particularly appreciated by the host-country agency and tended to reduce initial friction between Volunteers and their host agency. Much of the current development literature argues strongly for a participatory approach at all levels of project cycles as offering the best chances of project success. This is also the development philosophy that Peace Corps encourages Volunteers to follow. Simple methods of participatory development strategies are usually incorporated into training design. This participatory approach can be incorporated into the site placement process by inviting a representative of the host country agency to participate with trainee interviews. The individual could be a representative of the regional director or the chief of the regional extension division. The RAPCD can reserve the right to making the final decision if a consensus cannot be reached and in a case where there is confidential information (i.e. medical considerations) which cannot be readily shared with host country agency personnel due to rights of privacy of the individuals required by U.S. law.

A participatory approach to site placement has several advantages. It sets an example which trainees can emulate in the projects they will be involved with. Secondly, it shifts a certain degree of accountability and responsibility onto the host country agency towards ensuring that Volunteers are properly placed where they have the best chances of success. Finally, "practice what is preached," particularly if it is felt participatory approaches are the favored paradigms for development.

Once pre-service training is completed Volunteers are sent to their sites. At this point many potential problems may arise. Frequently the village in which the Volunteer is assigned is not prepared for the Volunteer. Often such basic plans as a place for the Volunteer to stay on arrival are not worked out. In some cases, the municipal officials who consented to the placement of a Volunteer in their town may no longer be present and news of the Volunteer coming to town might not have been relayed to others. Experiences of this nature are not uncommon to the dismay of many newly sworn-in

Volunteers. In 1983-1984, a system was worked out with host country agencies, including BFAR, in northern Luzon to invite the Volunteer's agency supervisor to participate in the training and swearing-in ceremony. The aim of this was to provide a setting to encourage the host country agency supervisor to accompany the new Volunteer to his/her assigned site in order to assist in the settling-in and orientation process. In addition, this was another mechanism which tended to build a sense of partnership between the host country agencies and Peace Corps. The process of host agency participation has continued since.

MONITORING AND EVALUATION

Monitoring and evaluation should be considered as an integral part of the entire Volunteer project cycle and look at all of its various components including programming, recruitment, training, the Volunteer's service, as well as post service impacts. Although each of these components is often evaluated in isolation from one another, a well developed monitoring and evaluation program should view the components in an integrated approach. Of all the components, monitoring and evaluation of the Volunteer's project at his or her site after they have left is least likely to occur. Programming is probably one of the most critical stages since recruitment, training and the Volunteer's service are very much dependent on the job roles, tasks, and relationships with the local community and host country agency which are initially defined during the programming process.

In this paper, the word "program" refers to the overall country program in marine fisheries or the freshwater fisheries program. The word "project" refers to the actual project a Volunteer works on at his or her site of assignment. Examples of Volunteer projects could be a demonstration oyster culture project or a project to introduce a new type of fishing gear.

SETTING GOALS AND OBJECTIVES There are two key factors which are important to monitoring and evaluating marine fisheries programs and individual Volunteer projects. First, the overall program goals and specific project objectives must be clearly defined and prioritized. Examples of overall program goals typically include the following types of statements.

1. Increase fisheries or fishfarm production.
2. Increase fishermen or fishfarmer incomes.
3. Increase exports.

4. Improve nutrition of coastal villagers.
5. Increase employment in the fisheries sector.
6. Increase awareness of the importance of marine habitats (e.g. coral reefs).
7. Improve the standard of living in coastal communities.

Program descriptions often include most if not all of the above mentioned goals. In a country such as the Philippines, with a tremendous diversity among the regions, different regions as well as provinces of the country will prioritize these goals differently. For instance, most areas of the country are overfished and these areas should have priorities geared towards mariculture and increasing people's awareness of the importance of marine habitats (conservation education). It is highly unlikely that in overfished areas, goals of increasing production from the capture fisheries, increasing employment in the capture sector, or increasing incomes of fishermen from capture fisheries can be successful. In underfished areas however, increasing production could be a high priority. Compiling all of the varying regional priorities winds up with an all encompassing list of program goals. This is one reason why the job roles of the marine fisheries Volunteers vary so widely and why the TAC sheets are written so broadly.

All these goals sound adequate in isolation from one another but often one can be in conflict with the other, since it is difficult to maximize more than one factor (or variable) at any one time. Hence, there is a need to prioritize a frequently long list of well intended program goals.

Prioritizing goals at the national level helps to narrow the definition of potential Volunteer job roles and helps to simplify and ease programming and training tasks. This means, however, that certain regions of the country may not have marine fisheries as a high priority among Volunteer programs since national priorities may not be appropriate within a given region. On the other hand, resources can then be directed to priority areas where they may be most needed.

Program goals should be refined into specific objectives at the project level which can be easily quantifiable. Examples of project objectives can be grouped as follows:

Production objectives

Increase production of individual fish farmers.
Increase area under production.
Increase total production per unit of area.
Increase production of individual fishermen.
Increase production per vessel.

Economic Objectives

Decrease operating cost.
Increase profits/revenues.
Increase annual income of fishermen or fishfarmers.
Increase family income.

Social Objectives

Increase fish protein in diet of coastal villagers.
Increase number of people employed in mariculture.
Increase number of people employed in fishing.
Increase number of people aware of the importance of coral reefs to the local fisheries.
Increase the number of people aware of the negative impacts of destructive fishing techniques such as dynamite fishing.

Quantifiable objectives means they have to be measurable. For instance, increased production of individual fish farmers can be measured in annual production (kilograms) per hectare. Increased income of fishermen can be measured in annual, monthly or daily net income from fishing. Some objectives may be more difficult to measure such as in areas of public awareness and conservation education. In this case, we may want to measure the number of public education programs presented in local schools and the number of people who attended. This does not tell us however, what changes have occurred in attitudes. We may also want to measure changes in the average number of articles written each month in local newspapers expressing concern about the marine environment, or the percentage of people who perceive dynamite fishing as a practice that should be stopped, both before and after an information campaign. A Volunteer might also monitor the average daily number of dynamite blasts heard from his/her porch as a means of gauging changes in the frequency of dynamite fishing over time.

QUANTIFIABLE DATA A second key factor is the importance of quantifiable data to objectively evaluate program and project success. Typically, programs and projects are evaluated on an ad hoc and subjective basis based on short visits to the Volunteer's site by a supervising Peace Corps Associate Director who engages in discussions with the Volunteer, community members with which he or she works, host country agency co-workers and supervisors. In order to make use of any quantifiable data, it must be collected at a minimum of at least two different time periods: baseline data gathered at the beginning of a Volunteer project and a second set of data at some future time such as just prior to a

Volunteer's completion of service. Ideally, data is collected and analyzed throughout a project's life at various stages in order to monitor it's impact and make adjustments and improvements as necessary. In addition, data should be collected at a period of time after a Volunteer has left, in order to monitor long term or what is often referred to as sustainable impacts.

Follow up data is rarely collected. If it is, it is usually of a qualitative or anecdotal nature. RAPCDs rarely have available time since they are constantly occupied with preparing sites for new Volunteers, visiting present Volunteers at their sites as well as undertaking a host of other duties such as meeting with host country agency personnel, attending Peace Corps staff meetings and training programs, etc. It is suggested that the Peace Corps Associate Directors conduct follow up surveys in sites where Volunteers have completed their services as part of the site development process for incoming Volunteers. Surveys would be relatively easy to conduct if a project's evaluation design, including a questionnaire, has been set up by the outgoing Volunteer. This would provide a structured activity enabling the RAPCD to talk with a large number of villagers and gain a better understanding of the local situation, as well as determine whether or not another PCV should be assigned in that locality. Not only would such post project evaluation assess the impact of the previous Volunteer's activity but it could also provide pre-project data for an incoming Volunteer as well as help in determining whether a new Volunteer should be assigned to the community.

In addition to the need for baseline data and data at other points in time, a parallel set of control data must be gathered. This is extremely important in determining whether an impact is the direct result of a Volunteer project or whether it would have occurred regardless of the Volunteer intervention. For instance, would an increase in fisheries production be the result of a Volunteer's introduction of a new fishing gear design, or would production have increased anyway as evidenced by similar increases in production of fishermen who did not adopt the new gear but continued fishing with traditional methods?

DATA COLLECTION AND ANALYSIS Data can be analyzed in a number of ways and often a simple rough inspection of the data can give an indication of the impacts as evidenced in the fabricated examples in Table 1.

In the first case it is not clear whether the adoption of a new gear introduced by a Volunteer actually was directly related to an increase in production, whereas the second case suggests that fishermen who adopted the new gear certainly benefited in terms of increasing their production over those

who did not adopt the gear. The third case raises an equity issue as to whether the benefits of the group of fishermen who adopted the gear was at the expense of those who did not. This is a perfectly feasible explanation given that capture fisheries are in most cases, open access, common property resources. A similar situation of one group benefiting at the expense of another is highly unlikely in mariculture or aquaculture programs. This illustrates another fundamental difference between capture fisheries and aquaculture programs which complicates not only the programming process, but monitoring and evaluation of such programs as well.

It is also important to collect control data in aquaculture projects in order to determine whether a Volunteer's interventions were the cause of an impact and not due to some other factor. For instance, an increase in the price of fish in the marketplace or a decrease in the price of fertilizer could lead to increased profits and incomes for fishermen who adopt Volunteer innovations as well as those who did not.

Often such data is not so clear cut in terms of interpretation, and more sophisticated means of analysis are required. In addition, what seems to be a significant difference in the data could easily be a difference due to random chance. Hence, it is best to analyze quantitative data using statistical techniques to insure that differences are not due to random chance. Much of this type of simple data can be statistically analyzed on inexpensive hand held calculators. Methods for utilizing these techniques can be found in virtually any basic book on statistics and can be easily taught to Volunteers in training as well as Peace Corps program managers, host country agency supervisors and co-workers.

Analysis of data for project impact evaluation can only be as good as the data collected. Thus, much care must be taken in using appropriate means of data collection. Whenever possible, random sampling techniques should be used in determining who is interviewed. For instance, when collecting data on fishing households a random sample of households should be selected.

Care must be taken in phrasing of questions. Collection of annual production and income data from artisanal fishermen can be used to illustrate this point. Artisanal fishermen rarely keep any written records of catch, expenses or earnings, nor do they usually fill out income tax forms as most individuals do in the United States. Fishermen may not accurately know their annual catch or income, and may suspect that the data will be used to levy taxes. A question which directly asks their annual catch or income may be met with a fabricated answer based on what the fishermen think the interviewer may like to hear or not be answered at all.

Table 1
Fabricated Examples of Project Impacts

Case 1. Average Daily Production (Kgs)		
	Before	After
Fishermen who adopted new gear	6.9	10.2
Fishermen who did not adopt new gear	6.3	9.6

Number of fishermen sampled = 23

Case 2. Average Daily Production (Kgs)		
	Before	After
Fishermen who adopted new gear	6.9	10.2
Fishermen who did not adopt new gear	6.3	7.2

Number of fishermen sampled = 21

Case 3. Average Daily Production (Kgs)		
	Before	After
Fishermen who adopted new gear	6.9	10.2
Fishermen who did not adopt new gear	6.3	3.6

Number of fishermen sampled = 32

Questions which ask on average what a fisherman catches and earns daily (revenues less expenses), how many days a month a fisherman fishes, and during what seasonal periods (i.e. monsoon) fishermen are not able to fish, can be used to

construct estimates of annual catch and income. Data could also be reported on daily, weekly or monthly catch rates or earnings. Information on sampling and data collection techniques for capture fisheries are available (Stevenson, Pollnac, and Logan, 1982).

Data must be collected at the local level where projects occur and therefore should be directly related to Volunteer project activity. If properly trained, Volunteers can collect and analyze data for monitoring and evaluating their own projects, the sum total of evaluations of individual Volunteer projects can then be used to gauge overall program success. Peace Corps program managers at the supervisory level can aggregate data for all Volunteers as a means of monitoring and evaluation for decision making at the programming level. Examples of program evaluations could then read as follows. "Ten out of twelve Volunteers increased pond production of cooperating fishfarmers over other fish farm operators in the region. Increases in production per hectare of cooperating fish farmers averaged 10% per annum over non-cooperating fishfarmers," or "All twelve Volunteers were able to introduce a new fishing gear design to cooperating artisanal fishermen, but only one out of the twelve Volunteers was able to significantly increase net incomes of cooperating fishermen over other fishermen in the community." Overall program success should be viewed in terms of prioritized Peace Corps program goals set in the early stages of the programming process in addition to national goals set by the host country agency for it's own development programs.

Many local level, community based development projects are taking participatory approaches to project design, monitoring and evaluation. In these projects, the local community or project recipients are fully involved in formulating project objectives as well as in the process of collecting and analyzing data for monitoring and evaluation purposes. The benefits of such an approach can be significant and include greater ownership of the project by intended beneficiaries, improved accuracy of data collected, as well as a better understanding by the local community of development project planning, implementation, monitoring and evaluation through a learning process approach. It can have long term impacts in terms of improved local level human resource skills for sustainable development activities. Volunteers should be encouraged to incorporate this approach into their own project designs and for project monitoring and evaluation.

In addition to community level participation in the project cycle, participation of the host country agency is equally important. BFAR has been a model agency by integrating Volunteers directly into agency projects. Throughout the service period of Fisheries Volunteers in the Philippines, BFAR has committed money for project supplies and

travel. Although these funds are frequently very modest, the mere fact that there has been a monetary commitment to Volunteer assisted projects suggests that BFAR has taken their partnership role very seriously. BFAR was one of the few government agencies that provided such support to Volunteers. As a result of this monetary commitment, BFAR has insisted on a certain degree of Volunteer accountability. Most Volunteers are expected to file monthly, quarterly and annual reports to their BFAR supervisor just as their BFAR co-workers are required. These reports to BFAR consist of an enumeration of cooperators served and other similar data. For some types of projects, and certainly not all, these data may be a valuable resource for evaluation of Volunteer accomplishment. Nevertheless, some Volunteers found the preparation of required paperwork overly bureaucratic and were reluctant to cooperate with these procedures.

VOLUNTEER IMPACTS Post-project evaluation of Volunteer projects can give some indications of impacts of a Volunteer on his/her community. Obviously, the direct effects of a production oriented project can be readily quantified. Usually, increased production capacity results in secondary impacts which are much more difficult to assess. These secondary impacts can include improvement of the nutrition or economic well-being of the community or indivlduals within the community resulting from the Volunteer's project.

Often these underlying secondary impacts are the real reason that Volunteer projects are undertaken, but it is unlikely that after two years of Volunteer service these impacts on the community could be objectively assessed. One possible method of assessing the underlying secondary impacts of a Volunteer project may be to maintain records of past projects. This might include data collection which aims to assess income levels or incidences of diseases related to poor diet. While developing sites for future projects, the RAPCDs might make inquiries as to the status (whether ongoing with community management, or completely forgotten) of the previous projects. This may be several years after the Volunteer had completed his/her service. Other indirect Volunteer impacts such as building community organization are even more intangible and probably require an even more extended period of time for positive effects to be realized. Again, with the highly transitory nature of Volunteers and staff, a system of project records may assist in the long term evaluation process.

In addition to potential impacts of the Volunteer on his/her community, the Volunteer often has impact upon the assigned host country agency. The impacts may be a direct transfer of knowledge and skills to host agency co-workers. Infrequently, Volunteers have been asked by BFAR at the

regional or provincial level to give seminars to extension agents during regularly scheduled meetings. Most often, experiential skills are transferred to junior BFAR extension agents as they participate in Peace Corps/BFAR sponsored projects.

Volunteers may also effect indirect impacts on the host country agency. The indirect impacts on the host agencies, much as the indirect impacts on the Volunteer's community, are difficult to quantify. These indirect impacts stem from the cooperation between BFAR staff and Volunteers and may be simply the generation of enthusiasm within the ranks of the agency. The junior BFAR staff learn from the example of the Volunteer who successfully works on his projects while complying with agency requirements. The enthusiasm of the veteran BFAR staff may be rekindled by the enthusiastic Volunteer.

CASE STUDIES

In order to illustrate several typical projects in marine fisheries, we present 6 mini-case studies. In some cases, the projects were successful in that there were tangible outputs. In others, the projects were apparent failures but valuable information was gained. In the case of apparent project failures, it is of critical importance to maintain records of project evaluations so that succeeding Volunteers do not unnecessarily repeat the same mistakes. The available literature on Peace Corps Marine Fisheries Programs is frequently based on scattered documents in the Peace Corps files and anecdotal narratives by returned Peace Corps Volunteers. There is one document that compiled brief case histories of marine fisheries programs from various countries around the world (Charkoff and DuBois, 1981). However little quantitative data is presented to substantiate judgements of program impacts and success. In some of the cases presented below, it is evident that there is little hard data to measure the impact or success of the projects. In most cases they are gleaned from the memories of the authors and other returned Peace Corps Volunteers from the marine fisheries program in the Philippines. It demonstrates an institutional memory based primarily on an oral history of most Peace Corps programs and points to the need for a better developed and systematic approach to monitoring and evaluation of Peace Corps programs.

CASE STUDY #1: VESSEL SUBSIDY PROGRAMS From 1979 to 1981, the highest priority project of BFAR was the implementation of a fishing boat subsidy/loan program. This program known as

the Biyayang Dagat Program (Bounty of the Sea) was a result of a Philippine presidential decree aimed at improving the incomes of artisanal fishermen and increasing the domestic supply of fish protein. This program utilized a national capital fund which was distributed from the Central Bank to branches of the Philippine National Bank and the Rural Banking System. Loan payments were to be used as further capital to sustain and expand the program. BFAR was designated as the lead agency for providing assistance to artisanal fishermen in their application for the loan. After the loans were granted, BFAR personnel would supervise the acquisition of boats and gear and then conduct an extension education program on their proper use and maintenance. Since BFAR had a shortage of trained extension personnel, they solicited the aid of Peace Corps. Several Volunteers were assigned to Biyayang Dagat Program loan/extension projects as agents of BFAR.

Without exception, the Volunteers assigned to the Biyayang Dagat projects completed their service with very little in the way of direct, positive accomplishment. In addition, the entire national loan program was bankrupt after two years. Several factors contributed to the general failure of the program, which included overfished stocks incapable of supporting the increased fishing effort. The catch of fish did not adequately provide sufficient profits to the fishermen which led to massive loan defaults. The initial feasibility studies were inadequately prepared with unrealistic assumptions regarding number of fishing days and expected catch. In addition, occasional irregular arrangements between BFAR officials, banking officials and gear vendors placed another burden upon the capitalization funds. In the specific projects of the Volunteers, very few individuals had an adequate background in finances and banking to offer much help in loan processing since most were biologists.

Under the Biyayang Dagat program, many of the artisanal fishermen were also encouraged to form fishery cooperatives as a condition of the loan. The Volunteers often did not have a background in business which is critical to successful cooperatives. The Volunteers also had very little practical experience with the small scale fishing gear of the Philippines. Because of this, they lacked credibility as extension educators among the fishermen who often had decades of experience with traditional fish capture gear. As a result, most of the Volunteers assigned to Biyayang Dagat projects found other projects in their communities or elsewhere for their involvement.

Many of the difficulties experienced by the Volunteers assigned to Biyayang Dagat program could have been avoided if the process of project development in concert with BFAR were followed. Proposed job roles for Volunteers must correspond with Volunteer background and training. Although there may be

very high priority projects within the host country agencies, Peace Corps program planners must recognize the limitations of the Volunteers. Negotiations with the host country agency will often yield projects of lower priority with the agency which may be more appropriate for Volunteer involvement.

CASE STUDY #2: INTRODUCTION OF NEW FISHING VESSEL AND GEAR DESIGNS A Volunteer assigned to the northern part of the country was asked to work with a group of fishermen who had just received a vessel loan subsidy for fiberglass fishing vessels. The fishermen were to use a fish aggregating device for tuna fishing locally known as a payaw along with a few other gears including a ring net and hook and line fishing. The fiberglass boat was designed and built in Manila and the fishing technology recommended by the boat builder, a chemical engineer. The fiberglass boat, which was essentially the same design as the traditional outrigger, cost approximately eight times as much.

Payaws were not used in this part of the country and no one was sure how they were actually designed or constructed. The Volunteer, with a background in biological oceanography, was asked to work with the group of fishermen to help them deploy a payaw, undertake fishing operations and help them set up a business system which would allow them to repay the loan. Based on oral interviews with individuals who had seen payaws in the south of the country, a payaw was designed and deployed. The payaw started to attract fish after a few weeks and the fishermen claimed to be catching more fish than they had ever previously caught. The fishermen noticed the payaw drifting significantly, and following the first major storm after deployment it could no longer be found. The fishermen had no more funds to construct another, and the other multiple gears purchased with the vessel, which included an outboard engine and ring net, had fallen into the hands of local elites who demanded the gear and equipment in return for their assistance, which was essential, in obtaining the loan. It was also deemed that payaws were not appropriate for the area (at least the design attempted) due to unusually strong currents. An alternative design based on local sea conditions was never tried. In addition, it was discovered at a later date that the initial payaw was poorly designed and created more drag in the water than actual designs in the south. A design similar to that used in the south would have probably been successful if tried. Other problems also started to plague the project. The used diesel engine in the boat started to break down frequently, and the fishermen were not adequately trained to repair it. In addition, the fiberglass in some of the seams of the vessel started to crack. Finally, income from fishing was far below what was required to repay

the loan. In less than six months the project was considered a failure and was abandoned.

In addition to numerous political problems, a large number of problems were identified with the initial project design and implementation including preparation of the financial feasibility study and selection of vessel design and fishing technology. A new program was suggested by the Volunteer which would test a new fishing technology and vessel design for one season prior to any introduction to fishermen. An FAO catamaran design was selected based on reports of its successful introduction in the South Pacific for tuna fishing. Since the tuna stocks were considered underexploited, it was proposed that this vessel design be tested with a number of multiple fishing gears for tuna fishing including a tuna drift gillnet, hook and line, and troll lines. A naval architect modified the FAO design to incorporate locally available materials and building techniques traditionally used by fishermen in the area. Funds were obtained to build the boat and local boat builders hired to construct the vessel with assistance of the naval architect. The boat was constructed, and local fishermen were invited to fish on the vessel with a tuna drift gill net. In return, they would obtain a share of the catch consistent with the local share systems in use. Shortly after the vessel was completed and the fishing trials initiated, the Volunteer who had started the project left feeling confident that the host country agency counterparts could continue the project on their own. The Volunteer was not replaced with another Volunteer at that site or with that project.

The local fishermen praised the stability of the catamaran design as a fishing work platform. The combination of vessel and gear proved to be able to increase catches, but the fuel costs were so high that trips were rarely profitable enough to repay the loan for vessel construction, accompanying outboard engine, and the tuna drift gill net. In spite of this, the local agency involved with the project continued activities at least temporarily. Alternative designs initially planned to be used with the vessel, including auxiliary sails and trolling lines, were never attempted since the initial funds obtained for the project were not sufficient for these additions. In addition, the boat started to leak significantly after a few months of use and was soon abandoned as unseaworthy.

Catamarans were never introduced into the area and therefore the attempted introduction of the new vessel design was considered unsuccessful. Conversely, the Volunteer reported the project to be a success. The project objectives were to test the feasibility of the vessel introduction, and if suitable, attempt to introduce the boat design to local fishermen. The feasibility study and project implementation,

including test fishing, had its own errors and if managed differently may have led to successful introductions of catamarans. For instance, no additional funds were budgeted for modifications or corrections of the original vessel design. Also, the fishermen were never asked to accept the technology since the local extension agency had no evidence that it would benefit the fishermen in any way. The Volunteer stressed the success of the project in terms of the process of attempting to introduce a new technology that the agency had followed, particularly in contrast to the previously unsuccessful introduction of the fiberglass boats. Although there was no positive impact on the fishermen or their communities, there was no negative impact either, and based on initial objectives, it had a beneficial impact on the host country agency personnel involved in the project in learning a process of technology introduction.

CASE STUDY #3: APPLIED RESEARCH/CORAL REEFS In the late seventies, the Peace Corps ran a cooperative program with the Smithsonian Institution which placed Volunteers into research positions within host countries. In the Philippines, Volunteers were placed in the research division of BFAR as well as with the University of the Philippines. Many of these Volunteers had Master's degrees in marine biology or oceanography. One Volunteer started a coral reef research project within the research division of BFAR. Staff were loaned from other sections and others hired as temporary contractual workers. This project along with similar research of Volunteers at UP, working in collaboration with in-country scientists, brought attention to the extensive destruction occurring to coral reefs of the Philippines due to dynamite fishing and siltation caused by deforestation; as well as highlighted the importance of coral reefs to the fisheries production of the country. Along with pioneering research on coral reef fisheries, information programs were developed and presented in the rural villages, where much of the field research was conducted, to raise the awareness and understanding of the local coastal villagers and fishermen to these major issues.

In the early eighties, the coral reef research project was still continuing applied research on coral reefs and had expanded activities into research on sea turtles, artificial reefs and the aquarium fish trade. A noticeable difference today is that Volunteers are no longer assigned to this project and the Filipino staff of the coral reef project are now being utilized as resource trainers at the technical training programs of Volunteers. The project has recently been institutionalized as the Coral Reef Research Section within the Research Division of the National BFAR office and

is currently staffed with full time permanent research personnel.

The cooperative program with The Smithsonian Institution has been discontinued and Volunteers no longer serve with research agencies within the Philippines, even though this was generally considered to be a highly successful program. The reasons for the discontinuance of the program are not fully clear, but it is assumed that the program was too distant to the goals of Peace Corps described in the Peace Corps Act. These Volunteers were not necessarily working with the poorest of the poor, and their activities, although relevant, were not directly impacting on the nations' development efforts, nor the development efforts of rural communities.

CASE STUDY #4: SHELLFISH DEPURATION Oysters and other bivalve mollusks are abundant in Philippine estuarine waters. There is extensive mariculture production of two major species of oysters, Crassostrea iredalei, and Crassostrea malabonensis, in several estuaries, including the Agno River estuary in the vicinity of Dagupan City, Pangasinan and in the Manila Bay in the region of Cavite City. Because the seawater surface temperature in the Philippine archipelago rarely dips below 27°C, and is usually in excess of 30°C, it is possible to grow oysters to market size in 9 to 18 months. In Japan and Korea there is also extensive mariculture of Crassostrea, but because of lower water temperatures, it takes twice the time to grow the oysters to a comparable size. Because of the high production rate of oysters in Philippine waters, and the high price of oyster meats in most developed countries, oysters are an attractive export commodity. A significant problem with Philippine bivalve mollusks as an export item is that most of the primary grow out areas are in close proximity to large population centers. Much of the shellfish is grossly contaminated with fecal coliform bacteria and microbial pathogens.

In 1981 in Dagupan City, Pangasinan, there was a small-scale trading company which developed marketing contacts in Singapore. The trading company was successfully shipping shucked oyster meats from the Agno River estuary oyster farms until the Singaporean public health officials halted all oyster shipments from the Philippines due to high bacteria counts in random samples of the incoming shellfish. The owner decided that what was needed was a shellfish depuration facility. In order to save his export business, the owner of the trading company sought technical assistance from the BFAR provincial fishery office. Since the Volunteer assigned to the Pangasinan fishery office at that time had experience with circulating seawater systems, he worked with the marketer setting up the depuration tanks, designing the filtration and

ultraviolet water irradiation systems. After the depuration facility went into operation, Singaporean officials allowed resumption of oyster shipments. Three months later, random testing again found high bacterial levels in spite of 48 hour depuration, and the ban was reinstated. This action permanently ended the exports of oysters from Pangasinan.

Several factors led to the failure of this project and are outlined elsewhere (Rice & Poquiz, 1983). Although this project was a failure, publicity during the initial operation of the facility (Rosario et al., 1982) caught the attention of the Philippine fishery research community and depuration facilities were implemented experimentally in other parts of the country (Gacutan et al., 1986; Palpal-Latoc, et al., 1986). This case study illustrates that project impacts can go well beyond the local community, and even if the project is a failure, documentation of the reasons for failure may aid future research and project efforts.

CASE STUDY #5: APPLIED RESEARCH/STOCK ASSESSMENT

Seriously needed in the Philippines are objective assessments of fisheries stocks to guide decisions as to directions appropriate for fishery development and management. This need was demonstrated in Case Study #1. One of the key reasons for the failure of the Biyayang Dagat Program was a lack of information about the abundance and sustainability of coastal fisheries stocks in the Philippines. A number of stock assessments have been made in various regions of the Philippines. The most comprehensive of these studies was carried out by the International Center for Living Aquatic Resources Management in the San Miguel Bay area of the Camarines provinces in the Bicol Region (Pauly and Mines, 1982). The main conclusion of the San Miguel Bay study was that most of the fishery species in the bay were being overexploited. Reduction of fishing effort in the bay was recommended. At the time of the completion of the San Miguel Bay study, two Volunteers (a married couple) were assigned to the island of Catanduanes in the Bicol Region to assist BFAR in the Biyayang Dagat Program. One of the Volunteers had a Master's degree in aquatic ecology and was familiar with fisheries sampling techniques and statistical methods. The Volunteers recognized that considering the San Miguel Bay study, the success of the Biyayang Dagat Program rested upon adequate fishery stocks. The Volunteers set out to collect catch composition and length-frequency data according to the methods of the San Miguel Bay study. After the two-year service of the Volunteers, enough data was collected to calculate maximum length for three pelagic fish species using ELEFAN, a microcomputer program for fishery stock analysis (Pauly and David, 1981). The Volunteers found that the

fisheries stocks were largely underexploited, as a result of a short (approximately six-month) fishing season. The data were reported to ICLARM who had been compiling fishery stock information from around the Philippine Archipelago. At the time, the Catanduanes stock study was one of the first to be carried out on the less populated eastern coast, on the Pacific Ocean. The results suggested that commercial fishery development on the eastern coast may be feasible from a biological point of view.

Depending on the background of the Volunteer, applied fishery research similar to that performed in this case study may be appropriate for Volunteer involvement. The quality of fishery stock data relies heavily on the Volunteer developing a rapport with the local fishermen. In this respect, the cross cultural aspect of the Peace Corps training is essential. In addition, applied research of this type can help to build institutional linkages between Peace Corps and other agencies.

CASE STUDY #6: GREEN MUSSEL TRANSPLANT FEASIBILITY A popular project that involved many Volunteers in the late seventies and early eighties was taking breeder stocks of green mussels (Perna viridis) from current producing areas and attempting to introduce them to new areas in the country where they were not found naturally. A Volunteer in northern Luzon was requested by the regional BFAR office to work with an oyster farm manager to attempt introducing mussels into a local bay. The Volunteer and his co-worker developed a project design which would transfer mussels from a naturally producing mussel ground near Manila in Cavite, where simple biophysical parameters were being measured by the mussel farm manager, to the local bay more than 500 kilometers north of Manila.

The project design called for monitoring the same parameters as were being monitored at the Cavite farm. In addition, the project would attempt to monitor any spat fall from the breeder stocks in and around the bay where the transferred mussels were placed, based on the recommendations of the staff at a successful mussel transplant project south of Manila. An optimal site for the breeder farm was selected which would be easily accessible and well protected from possible damage from typhoons, in a bay surrounded by mangroves with freshwater input from streams. Mussels were transplanted from Manila and the following parameters were measured for a period of one year; (1) mussel growth rates and mortalities, (2) sex ratios and gonadal development, (3) water temperature, (4) water turbidity, (5) salinity, and (6) presence of spat fall.

Growth rates at the transplant site although approximately

half the Manila growth rate, were deemed adequate to support commercial production if other factors proved successful. Mortality rates were negligible. Water temperature was similar to that in Cavite except during the monsoon season when it dropped approximately two degrees centigrade cooler than Cavite. Salinity was much higher at the transplant site and stayed at almost regular seawater levels year round. Turbidity at the transplant site was much less than in Cavite and was considered a leading factor in the slower growth rates.

Gonadal inspections demonstrated that both female and male gonads were developing and releasing sperm and eggs into the surrounding waters. Unfortunately, spat collectors placed out periodically at various locations in the bay never showed any green mussel spat fall. A number of hypothesis were put forward. Either the larvae could not survive in the high salinity waters and lower temperatures, or the strong currents swept the larvae out of the bay and never returned at the proper time of spat fall. Another possible influence was that there was not a large enough critical mass of breeder stock transplanted to ensure successful spat falls, although even with a small stock at least a few spat could reasonably be expected to be found. Whatever the reasons, the data strongly suggested that a successful transplant into this bay was not feasible. Some researchers now suspect that the green mussel cannot survive north of Manila's latitude since no transplants north of Manila have ever been successful. Many of these were Volunteer initiated projects in the following localities: Masinloc, Zambales; Anda, Pangasinan and San Vicente, Cagayan.

The Volunteer in Cagayan recommended in his final report before leaving his site that the project be discontinued, as successful transplant did not seem likely based on the available data. Six months after the Volunteer left, the Regional BFAR office discontinued the project.

As a footnote to this story, five years later, another Volunteer was planning to conduct a mussel transplant feasibility study on Catanduanes which faces on the Pacific Ocean. The Volunteer who conducted the transplant project in northern Luzon happened to be back in the country and received a letter asking advice. Although records of the project undoubtedly existed in the records of the Provincial and Regional BFAR office, the new Volunteer did not seem to have any access to records of the project at her own BFAR office or from Peace Corps. The returned Volunteer provided an outline of his project's feasibility research design and indicated that chances of success for the project were probably very slim based on the geographic location of the proposed transplant site. It was only by chance that historical information and lessons of a previous Volunteer project of similar nature became available to this new Volunteer.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In summary, Peace Corps Programming efforts in the areas of marine fisheries and mariculture should be guided by the various strengths and weaknesses of the Peace Corps organization. A key element of Volunteer success is host agency participation in the selection of appropriate project areas for Volunteer involvement. Negative reactions of Volunteers towards the host country agency can often be traced to conflicting views of what the Volunteer's role should be. This points to a need for closer cooperation with the host country agency which ensures input in all phases of the program cycle; from programming, site development, and Volunteer placement to program and project evaluation. Project areas should be guided by the ability of Peace Corps to adequately recruit and train Volunteers. The majority of the projects will be general in nature or highly focussed in scope because of the background of the majority of Peace Corps recruits. Strong consideration should be given to narrowing the scope of potential marine fisheries Volunteer roles in the Philippines into the areas of mariculture, stock assessment, artificial reefs and conservation education, and move away from Volunteer assignment in areas related to loan subsidy programs, cooperatives and capture fishing technology. Special effort should be taken to find adequate projects for the occasional Volunteer recruits who have specialized knowledge and/or skills. Project cycles must take into account the limited amount of time that Volunteers and Peace Corps Staff are present in-country before they are replaced.

Monitoring and evaluation of Volunteer projects should be an integral part of the project cycle. Time, manpower, and financial constraints are often cited as reasons why better data collection and analysis cannot be incorporated for improved project monitoring and evaluation. Volunteers are the manpower, have the time, and require little finances to collect and analyze data to monitor and evaluate project success at their sites if they are properly trained. Peace Corps with host agency must stress this as an integral part of Volunteer job roles. Adequate project monitoring and evaluation requires collection of baseline and control data, as well as simple methods of analysis, all of which can be accomplished by the Volunteer in the field. This information can then be used to measure how well project objectives and program goals have been met.

Improved maintenance of project and Volunteer placement records can also improve project evaluations. Baseline data for most projects can be collected during the initial site checking process. The Volunteer's end of service reports can serve as part of the evaluation data. As new projects are later developed in a town or village, old site reports and

project records could be used to provide helpful information about the community, and data included within can serve as a baseline for the new projects. In the Philippines, the Filipino Peace Corps staff tend to remain with the organization for much longer periods than the American Volunteers or staff. Increased emphasis upon the evaluation of Volunteer projects should be facilitated by the long-term presence of the Filipino staff. In conclusion, it is argued that attention should be given by Peace Corps to the entire project cycle, which includes elements of monitoring and evaluation. The goal of Peace Corps to "provide trained manpower" implies that efforts should be taken to assure that the trained manpower be utilized to optimum benefit to the host country through measurable outputs.

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FOOTNOTE

1. Public Law 87-293-Sept. 22, 1961, Title I - The Peace Corps Act, Section 2. The Congress of the United States declares that it is the policy of the United States and the purpose of this act to promote world peace and friendship through a Peace Corps, which shall make available to interested countries and areas men and women of the United States qualified for service abroad and willing to serve, under conditions of hardship if necessary, to help the peoples of such countries and areas in meeting their needs for trained manpower, and to help promote a better understanding of the American people on the part of the peoples served and a better understanding of other peoples on the part of the American people.

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7

MONITORING AND EVALUATION OF SMALL-SCALE FISHERIES PROJECTS AS SMALL BUSINESSES

C. Ross Croulet

INTRODUCTION

The approach to monitoring and evaluating small-scale fisheries projects depends on whether the projects are for academic research purposes or are business activities benefiting people and communities. This paper focuses on the latter type of project. A small-scale fisheries project is similar to any other enterprise such as a bakery, trade store or large corporation. It has to generate, use, and reinvest resources such that it achieves project goals of providing an adequate means of livelihood, endures profitably, and positively impacts the quality of life (cf. Otero 1987; SEEP 1987; Croulet and Sio 1986; Allsopp 1985; Kilby 1971).

Monitoring and evaluation, referred to here as a "system", are essential to determine whether project goals are achieved. A monitoring and evaluation system is integral to other elements necessary for successful projects, including promotion, planning, start-up, and implementation. Monitoring checks progress towards achieving project goals. Evaluation determines whether a project has achieved its goals.

Reference is made in this paper to an assessment of small-scale fishery activities in the Pacific Coast Colombian community of Tumaco. The assessment demonstrates how an effective monitoring and evaluation system improves project profitability. The assessment analyzed differences between fishermen who belonged to a cooperative (Sociedad Colectiva de Pescadores Artisanales, or SCPA) and fishermen who did not. A matrix summarizing assessment interviews of five fishermen, two fish market women, and, for comparative purposes, two women involved with tailoring appears as Table 1 below.

OBJECTIVES

Two specific objectives of monitoring and evaluating a

fisheries project as a business include: 1) cost effectiveness measurement and 2) management information.

In Tumaco, cost effectiveness was measured in terms of project profitability and capitalization. Comparisons were made between those who were members of the SCPA cooperative versus those who were not. Management information is provided to those interested in the success of the project. The Tumaco business people listed in Table 1 have the highest interest in getting feedback on how profitable their business activities are. Other interested parties include bankers, PVO and NGO agency officials, donors, and host governments.

AUDIENCES

There are many audiences who have a need for the information a monitoring and evaluation system provides. These include: 1) owner(s) of the project, 2) lending and donor institutions, 3) agencies providing technical assistance, 4) host country government, 5) researchers and evaluators.

Project owners need to know whether their projects have progressed towards and achieved profitability. In Tumaco, for example, the monitoring and evaluation system demonstrates that the physical risk of working on the high seas is compensated by potentially higher profits. Fishing is also proven to be more profitable than fish marketing and tailoring.

Lending institutions such as banks need to know whether they will get their money back. A bank in Tumaco would be more likely to lend money to a fisherman if the bank knows that the fisherman runs a profitable business. Donor agencies such as USAID or the United Nations which support development efforts would like to know that their funds improve project performance.

Agencies providing inputs such as training, consultancy, marketing, and technical assistance need to know whether these inputs help projects earn more income. Foster Parents Plan (PLAN) in Tumaco, for example, needs to know whether its considerable investment in the SCPA, fishermen training, advisory and technical assistance help projects earn more income. Differences between planned and actual performance show the need to reexamine the premise on which the project was designed and implemented.

Host country governments, especially in the Third World, need information on how to tailor policy and programs to facilitate economic development. In Tumaco, the national and regional governments have a keen interest in the development of fisheries. A monitoring and evaluation system which gets project data to concerned governments provides a basis for more accurate decision making.

Academic researchers and evaluators often need to analyze and evaluate the overall developmental effectiveness of projects in an area. A monitoring and evaluation system supplies a quantitative data base on which research can be done. Table 1, for example, supplies project data on which impact on the quality of life, history, culture and politics can be analyzed.

BASIC NEEDS AND METHODOLOGIES FOR AN EFFECTIVE SYSTEM

There are several requirements for a monitoring and evaluation system to be effective. These requirements include having an initial baseline data base; use of criteria that measure project performance, sustainability and impact; record keeping by project owners; the staff of an agency or agencies assisting projects to have minimum professional business, economics and fishing qualifications; use of simple formats to capture key project data; and, for an agency or agencies, frequent and regular visits to projects for monitoring purposes.

BASELINE DATA BASE A standard baseline data base should include a social, cultural, and economic profile of project owners and their businesses. In Tumaco, for example, relevant personal baseline data would include age, health, education, and years in business. Relevant business data would include amount and rate of profitability, capitalization, and whether the businesses kept books and had bank accounts.

Means of obtaining baseline data include: 1) sample survey; 2) business plans, feasibility studies, and loan application; 3) publicly available macro economic information; and 4) key informant interviews.

Standard units of measure, or criteria, are needed to effectively monitor and evaluate small-scale fisheries projects as businesses. Criteria fall under the three categories of 1) performance, 2) sustainability and 3) impact.

The most important performance criterion is profitability. Other performance criteria include return on investment, and rate of repayment on debt. Table 1 indicates the amount and rate of profitability of nine different projects surveyed in Tumaco.

Project sustainability is measured through total capitalization and the ratio of equity to debt. Columns three and four in Table 1 show sustainability data for projects in Tumaco.

The criteria used for measuring impact are many and varied. Impact criteria such as education, health, mortality, employment creation, and economic linkages are

TABLE 1
KEY RESULTS OF FISHERIES PROJECT SURVEY, TUMACO

COLUMN ONE	TWO	THREE	FOUR	FIVE	SIX	SEVEN	EIGHT	NINE	TEN
KIND OF BUSINESS; ASSOC. W/SCPA; NUMBER OF MEMBERS; AVERAGE AGE OF MEMBERS	YEARS EDUCATION	% OF O.E.* & TOTAL AMT USED TO START	TOTAL CAPITALIZATION; DEBT TO TAS**	BANK ACCOUNT?	BOOK KEEPING?	PROBLEM INDEX	AMOUNT OF PLAN INVESTMENT	YEARS IN BUSINESS	PROFITABILITY PER ANNUM & RATE
1. Fisherman; (not with SCPA); 1 member, 53 years old	2 yrs	100% $400	$3,300 10%	No	No	5.0	$180	22 years	$3,100 33%
2. Fisherman; (not with SCPA) 1 member; 32 years old	2 yrs	100% $600	$2,350 0%	Yes, savgs acct. $110	No	4.5	$110	8 years	$1,250; 27%
3. Fishermen; (not with SCPA); 9 members; 40 years ave. age	7 yrs average	5% (proposed) $15,500	N/A	Yes; savgs acct $370	No; have not started	N/A	Proposed $14,800	Not yet started	Projected $22,200; 24%
4. Fishermen; (with/ SCPA); 9 members; 45 years average age	3 yrs average	0% $7,000	7% $22,437	Yes; savgs acct $370	Yes; (not available for viewing)	6.0	$7,000	10 years	$12,000 or $1,340 per member; 25%
5. Fishermen; (with/ SCPA); 1 member 50 years average	3 yrs	100% $450	78% $226	Yes; savgs $37	Yes; (not available for viewing)	3.0	$450	6 months	$142; 27%
6. Fish market woman (also trades goods in Tumaco); 34 yrs. old	6 yrs	67% $55	100% $600	No; bank too far	Yes; (not available for viewing)	6.5	$280	1.5 years	$440; 11%
7. Fish market woman (only trades fish); 33 yrs. old	6 yrs	100% $57	100% $344	No	No	2.0	$400	5 years	$1,800; 15%
8. Tailor (Mem. of Creaziones Negritas) (C.N.) 48 yrs. old	5 yrs	N/A	N/A	Yes; $20	No	6.5	$600	8 years with CN	$27/mo salary (manages coop shop)
9. Tailor (Member of Creaziones Negritas)	5 yrs	N/A	N/A	Yes	No	5.0	$480	8 years with CN	$75/mo avg. net sales rev.

* OWNERS' EQUITY
** TOTAL ASSETS

often used. Column two in Table 1 lists the number of years of education for each of the nine groups of project owners surveyed in Tumaco. A longitudinal examination may reveal that those owners of more profitable projects, such as Fishermen's Group #3, may have better educated children than the children of Fisherman #1.

RECORD KEEPING BY PROJECTS An effective monitoring and evaluation system as well as effective project management require good bookkeeping. Column Six in Table 1 indicates which of the nine business projects surveyed in Tumaco kept books. Lack of adequately maintained books for the businesses surveyed meant it took more time to obtain information on performance and sustainability. It also meant that the financial information may be less accurate and reliable.

BASIC STAFF REQUIREMENTS Staff qualifications in economics and business administration are needed to make a monitoring and evaluation system work. Technical qualifications are needed for the staff person to analyze financial information based on the technical parameters of a project. Training skills are needed for staff to transfer business and technical skills to project owners.

In Tumaco, the PLAN Field Office has a cadre of central office staff who are expert in the fields of fishing, agriculture, evaluation, and business administration. This cadre is supported by Community Development Workers or social workers (CDWs). Together, they work with project owners to make a system effective and improve project performance. At the same time, staff transfer skills to project owners so that they can manage their own projects more profitably without PLAN assistance.

FORMATS Two formats help make a system very effective. Table 2 is a format useful for monitoring project performance. Table 3 is a format useful for monitoring project sustainability. These formats provide accurate points of reference from which problems can be identified through trends or comparisons with baseline data. Accurate feedback to project owners and field staff is possible. The formats also provide essential baseline data for evaluation and research projects.

FREQUENCY AND DURATION OF MONITORING FISHERY PROJECTS Frequency and regularity of monitoring are critical features of a system. Variations on these features depend on project maturity, complexity, owner characteristics, and magnitude of impact on the community.

In Tumaco, for example, 90 small-scale fishermen were members of the SCPA cooperative. If these 90 fishermen had

TABLE 2
SAMPLE FORMAT FOR MONITORING THE PERFORMANCE OF SMALL-SCALE FISHERIES PROJECT

	JANUARY		FEBRUARY		MARCH	
	Projected	Actual	Projected	Actual	Projected	Actual
SALES - Fish - Misc.						
TOTAL SALES						
EXPENSES - Labor - Fuel - Maintenance - Bait - Maintenance - License Fees						
TOTAL EXPENSES						
NET PROFIT						

Description of variations of 10 percent or more between actual and projected figures.

TABLE 3
SAMPLE FORMAT FOR MONITORING THE PERFORMANCE OF SMALL-SCALE FISHERIES PROJECT

	1ST QUARTER		2ND QUARTER		3RD QUARTER	
	Projected	Actual	Projected	Actual	Projected	Actual
ASSETS - Cash - Fish stocks - Nets - Boats - Engines						
TOTAL ASSETS						
LIABILITIES AND OWNERS' EQUITY - Payable - Loans - Owners Original Inv. - Retained Earnings						
TOTAL LIAB. & O.E.						
NET PROFIT						

Description of variations of 10 percent or more between actual and projected figures.

been frequently and regularly visited by staff, it is possible that some of the problems of the SCPA could have been identified and solved sooner.

Citing the examples of projects in Table 1, PLAN could outline a strategy whereby Fish Market Woman #6 is to be visited more frequently than Fish Market Woman #7. Project #6 experiences both a lower amount and rate of profitability than Project #7. In order to boost the rate and amount of profitability in Project #6 to equivalency with Project #7, more frequent monitoring visits by CDWs and the fisheries expert in Tumaco would be in order for Project #6. At the time Project #6 achieves a level and rate of profitability comparable to Project #7, frequency of monitoring visits could be reduced from once a month to once every two or three months. This would free up valuable staff time to devote to other less profitable, more problem-prone projects.

CONCLUSION

Project profitability improves the quality of life and standard of living of all concerned with a project. The cumulative effect is the improvement of the social and economic status of a community, region and nation. This paper demonstrates, with the citation of an example in Tumaco, Colombia, how a system to monitor and evaluate small-scale fisheries projects as business ventures is an effective tool to help projects earn profits and achieve sustainability.

A monitoring and evaluation system helps determine project cost effectiveness. Such a system also provides management information to those most in need of the information. These include project owners, agencies assisting projects with funds and technical assistance, host governments, and researchers. Fundamental requirements for an effective monitoring and evaluation system include a good baseline data base, use of standard economic criteria, project record keeping, well designed formats, qualified support staff, and projects visited frequently and regularly. Absence of an effective system will result in projects unable to fulfill goals of performance, sustainability and impact. This paper demonstrated through an example in Tumaco, Colombia how an effective monitoring and evaluation system can help fishermen achieve their social and economic goals.

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8

ARTISANAL FISHERIES DEVELOPMENT IN GUINEA BISSAU

T.R. Brainerd

INTRODUCTION

The fisheries of Guinea Bissau consist of the industrial and the artisanal sectors. The industrial fishery consists of foreign vessels fishing under various bilateral agreements. The bulk of the catch from these vessels is not landed in Guinea Bissau. The artisanal fishery consists of a number of small scale fishing units comprising local fishermen and fishermen from neighboring countries fishing along the coastline, rivers, estuaries and lagoons. Most of the fish caught by the artisanal fishermen is consumed locally.

The Government of Guinea Bissau (GOGB), as well as various international agencies and donors have embarked on various small-scale fishery development projects to facilitate the development of the artisanal fishery. This is the result of their recognition of the importance of this fishery in providing fish for domestic consumption and employment opportunities in Guinea Bissau, as well as the various constraints that are preventing its development.

One such project is the Cacheu Fishery Development Project (a pilot project) located at the village of Cacheu, along the Cacheu River. The project was financed by the United States Agency for International Development (USAID). The planned duration of the project was 30 months, six months for procuring equipment and store inventory, and 24 months for full implementation of the project. The project actually operated for 13 months under USAID funding, June 1981 to July 1982. The European Economic Community (EEC) took over funding of the project's activities from July 1982.

This paper describes and evaluates the Cacheu Fishery Development Project from June 1981 to July 1982. After a brief description of the nature of the project, the financial analysis of the retail store and the fishing activities of the Cacheu fishermen are presented. Next, a sensitivity analysis

is presented on the fishing activities followed by a socio-economic evaluation of the project's objectives, the activities of the retail store and fishing operations. Finally, some thoughts are provided on how the design of similar projects could be improved in the future based on the experience gained from evaluating the Cacheu Project and on how to build in some measure of flexibility in such projects.

DESCRIPTION OF THE PROJECT

Two major objectives were identified for the project:

a. Increasing the amount and quality of fish consumed locally and expanding the distribution network for fresh fish.
b. Establishing a fisheries management unit within the Fisheries Secretariat of the GOGB.

The identified beneficiaries were: fishermen in the Cacheu region, fish consumers in Cacheu and five nearby areas, those employed by the project and the Fisheries Secretariat.

The planned project inputs included:

a. A retail store in Cacheu for selling outboard engines, spare parts, fishing gear, other inputs and fuel. The store started operating in June 1981 with a total inventory of 400,000 pesos, and in October 1981 supplies to the value of 2.4 million pesos were purchased.
b. A revolving credit fund that provided funds to fishermen for capital investment. As of April 1982, a total of 1.2 million pesos had been distributed.
c. An outboard engine repair shop to provide repair and maintenance facilities and to advise on the proper use and handling of outboard engines. The engine repair store was not operational during the life of the project.
d. A cold room and insulated truck for distributing fresh fish. The cold room was not installed and fresh fish was not distributed beyond Cacheu during the life of the project.
e. A fishery management unit for the artisanal fishery within the Fisheries Secretariat. A data collection system was established.
f. Training of local personnel and monitoring and periodic evaluation of the project's activities.

The planned project outputs included:

a. Increased fish production in the Cacheu region.
b. Improved fresh fish distribution system.
c. Additional income to fishermen and those involved with small-scale fishing activities in the Cacheu region.
d. Establishment of a management/planning unit for the artisanal fishery within the Fisheries Secretariat of the GOGB.

Funds were provided by:

(i). The USAID, approximately U.S. $500,000.
(ii). The GOGB, approximately U.S. $187,000 in kind.

FINANCIAL ANALYSIS

Two sets of financial analysis are provided. The first deals with the retail store operation and the second with the fishing operations.

RETAIL STORE OPERATION The assumptions made for this analysis are as follows: (a) The cost for the insulated truck, the small pick-up vehicle, the ice machine, the cooling unit for the cold room, the tools for the engine repair shop, and the salary for the expatriate manager are not included in the analysis. Their exclusion does not essentially affect the analysis. The engine repair shop was not operational and fresh fish was not distributed with the insulated truck. Thus, those two activities do not form part of the analysis. Salary for a local manager is included under operating costs and that for the expatriate manager excluded since the latter is not likely to be involved in the long term management of the store; and (b) Rents and utilities for the project's building were not available for inclusion in the analysis. For the ease of analysis, the period the store operated is divided into two sub-periods; June 1981 to December 1981, and January 1982 to March 1982. This is because the project's report presents the financial accounts for these periods (Vincent, 1982).

Tables 1 and 2 present the costs, sales and earnings of the retail store for both periods. Tables 3 and 4 present the capital statement and balance sheet for both periods. Substantial losses were incurred with fishing gear and fuel. Low sales were observed during the second period due mainly to insufficient inventory.

The efficiency and income ratios are calculated to assess the efficiency and profitability of the retail store operations (Tables 5 and 6). In general, it is not possible to give ranges within which financial ratios should fall. Gittinger (1982) suggests that the analyst should form a

Table 1

Financial Activity Of Retail Store From June 1981 To December 1981 (Pesos)
Small-Scale Fishery Pilot Project, Cacheu

MERCHANDISE	TOTAL COST	TOTAL SALES	TOTAL INVENTORY	LOSSES	GROSS EARNINGS
Fishing Gear	1,340,134.00	1,649,384.00	325,013.50	1,800.00	307,450.00
Engines & Spares	604,912.00	673,470.00	77,155.00	-	68,558.00
Fuel & Lubricants	412,117.00	420,315.00	123,109.00	2,688.00	5,510.00
TOTAL	2,357,163.00	2,743,169.00	525,277.00	4,488.00	381,518.00

NET EARNINGS		
Gross Earnings		381,518.00
Less: Operating Expenses		
Salaries	71,550.00	
Supplies	4,271.00	
Fuel	43,071.00	
Insurance	12,582.00	
Travel	4,175.00	
Miscellaneous	903.00	
Total Operating Expenses		136,552.00
Net Earnings		244,966.00

Source: Project Report Unpublished.

Table 2

Financial Activity of Retail Store From January 1982 to March 1982 (Pesos)
Small-Scale Fishery Pilot Project, Cacheu

MERCHANDISE	TOTAL COST	TOTAL SALES	TOTAL INVENTORY	LOSSES	GROSS EARNINGS
Fishing Gear	395,174.50	515,923.50	371,640.00	6,412.00	114,337.50
Engines & Spares	6,813.00	6,880.00	70,342.00	-	67.00
Fuel & Lubricants	303,543.00	360,720.00	36,622.50	7,281.00	49,967.50
TOTAL	705,530.50	883,595.50	478,604.50	13,693.00	164,372.00

INTEREST EARNED: 10,082.00

PROJECT GROSS EARNINGS = 164,372.00 + 10,082.00 = 174,454.00

NET EARNINGS		
Gross Earnings		174,454.00
Less: Operating Expenses		
Salaries	87,500.00	
Supplies	1,075.00	
Fuel	51,270.00	
Insurance	10,133.00	
Travel	13,356.50	
Miscellaneous	4,045.50	
Total Operating Expenses		167,379.00
Net Earnings		7,075.00

Source: Project Report Unpublished.

Table 3

Capital Statement and Balance Sheet of Retail Store at December 31, 1981 (Pesos)
Small-Scale Fishery Pilot Project, Cacheu

CAPITAL STATEMENT 1981		
CAPITAL AT JANUARY 1, 1981		
ADD: Investment Pescarte	751,694.00	
Investment USAID	1,457,888.00	
Net Project Earnings	244,966.00	
		2,454,548.00
Capital at December 31, 1981		2,454,548.00

BALANCE SHEET - DECEMBER 31, 1981			
ASSETS		LIABILITIES AND CAPITAL	
Cash in Hand	802,453.50	Accounts Payable	-0-
Credit to Fishermen	803,527.00	Capital: Cacheu Project	244,966.00
Advances	150,500.00	Capital: Pescarte	751,694.00
Fishing Gear	325,013.50	Capital: USAID	1,457,888.00
Engines & Spares	77,155.00	TOTAL LIABILITIES & CAPITAL	2,454,548.00
Fuel & Lubricants	123,109.00		
Supplies	17,000.00		
Equipments	128,790.00		
TOTAL ASSETS	2,454,548.00		

Source: Project Report Unpublished.

Table 4

Capital Statement and Balance Sheet of Retail Store at March 12, 1982 (Pesos)
Small-Scale Fishery Pilot Project, Cacheu

CAPITAL STATEMENT 1982		
ADD: Investment Pescarte	1,084,830.50	
Investment USAID	1,527,758.00	
Net Project Earnings	252,041.00	
		2,864,629.50
Capital at March 12, 1982		2,864,629.50

BALANCE SHEET - MARCH 12, 1982			
ASSETS		LIABILITIES AND CAPITAL	
Cash in Hand	1,182,369.00	Accounts Payable	-0-
Credit to Fishermen	922,559.00	Capital: Cacheu Project	252,041.00
Advances	129,845.00	Capital: Pescarte	1,084,830.50
Fishing Gear	371,640.00	Capital: USAID	1,527,758.00
Engines & Spares	70,342.00	TOTAL LIABILITIES & CAPITAL	2,864,629.50
Fuel & Lubricants	36,622.50		
Supplies	21,000.00		
Equipments	130,252.00		
TOTAL ASSETS	2,864,629.50		

Source: Project Report Unpublished.

Table 5

Efficiency Ratios Small-Scale Fishery Pilot Project, Cacheu

Ratio	Merchandise	PROJECT PERIOD June 1981 - December 1981	January 1982 - March 12, 1982	June 1981 - March 12, 1982
Inventory Turnover = Cost of Goods Sold / Inventory	Fishing Gear	4.12	1.06	4.67
	Engines & Spares	7.84	0.10	8.70
	Fuel & Lubricants	3.35	8.29	19.54
	Total (All 3 Combined)	4.49	1.48	6.40
Av. Length of Time Inventory was Kept = Days in the Year / Inventory Turnover Ratio	Fishing Gear	45	67	55
	Engines & Spares	24	710	29
	Fuel & Lubricants	55	9	13
	Total (All 3 Combined)	41	48	40
Operating Ration (%) Operating Expenses / Revenue	All Items	35.8	95.9	54.7

1

NOTE

1. The first period is calculated on 184 days.
2. The second period is calculated on 71 days.
3. The third period is calculated on 255 days.

Table 6

Income Ratios Small-Scale Fishery Pilot Project, Cacheu

	June 1981 - Dec. 1981	Jan. 1982 - Mar. 12, 1982	June 1981 - Mar. 12, 1982
Return on Sales (%) = NET INCOME / REVENUE	64.2	4.1	45.3
Return on Assets (%) = OPERATING INCOME / ASSETS	10.0	0.25	8.8

judgment on whether the ratios indicate an acceptable situation for the kind of project when compared to similar activities. For this type of activity which is seasonal, the analysis should be done to reflect seasonality. However, this is not possible with the available data.

The inventory turnover ratios indicate higher turnover for the first period, except for fuel which shows a higher turnover for the second period. The "average length of time inventory was kept" ratios indicate just the opposite. It is likely that most of the inventory during the second period were items carried over from the first period and were not in much demand by the fishermen.

The operating ratio gives an indication of the project's performance by period, or annually. If it is increasing, it may indicate that costs are increasing, or sales are declining, and management has not trimmed down expenses to reflect the situation. The increase in the second period reflects the higher operating costs and lower sales compared to the first period.

The income ratios give an indication of the project's return on its investment. For a project to become self-sustaining in the long-run, it should generate a satisfactory return on its investment. Two ratios are computed for this purpose. The return on sales ratio shows how large an operating margin the project has on its sales. The figures for the first period indicate that the sales provided adequate returns on investment. The second period's figures indicate low sales level.

The return on assets ratio comes closest to the rate of return on all resources engaged in the project. At normal operating level, this ratio should exceed the cost of capital as measured by the bank lending rate to industries, provided there is no interest subsidy. Given that the level of inflation in Guinea Bissau was fairly high during the project's lifetime, the values in Table 5 are likely below the bank lending rate.

In summary, the financial analysis shows that sales were high during the first period. Sales dropped during the second period because of the inability to replace inventory. Operating costs were high during the second period compared to the reduced level of activity.

FISHING OPERATION The assumptions made for the fishing operation analysis are as follows: (a) Prices for fresh fish are set by the government; (b) The estimated fresh weight and value of fish landed by fishermen in Cacheu is computed based on the assumption that 30% of the fish landed is sold at the market (Vincent 1982); (c) The analysis is done for the dry (October-May) and the rainy (June-September) seasons; (d) The landings consisted of 34% first class, 14% second class, 11%

third class and 41% fourth class fish. The average price per kg. of all four classes of fish landed over that period was 22.2 pesos; (e) All three boat types fish in the same areas, utilize the same types of gear, but of different sizes; (f) Fishing operations are carried out on a 6-7 day cycle, with a maximum of 15 days in a month (Vincent 1982); (g) Fishing operations are reduced by 50% during the rainy season; (h) The average catch per trip is estimated based on information in three reports: Hochet (1979), Vincent (1982) and Epler (1983); (i) Straight line depreciation is used on all equipment; and (j) Labor costs are computed for three different situations using the share system, the average between the share system and zero opportunity cost, and zero opportunity cost. Monthly estimates of production costs are computed for the three boat types operating in Cacheu to determine their economic viability. The following analysis computes the average costs, return on boat, engine and fishing gear, and sensitivity analysis for the three boat types. If fishermen are covering their average variable costs (AVC), they can operate in the short-run. They must cover their average total costs (ATC) to be able to operate in the long-run.

The AVCs are highest for all three boat types under the share system (Tables 7-15). There is little difference between the ATCs and AVCs for the three boat types. All boat types are covering their costs and making pure profits. The Niominka boat type has the highest ATC and the non-motorized boat the lowest ATC in all three scenarios.

The return on equipment is calculated based on the share earning system, since that system was in operation during the lifetime of the project (Tables 16-18). Both seasons are considered in the calculations. It is important to know whether returns during the rainy season are adequate to meet repayment obligations, otherwise there could be difficulties in fulfilling such obligations. Table 19 gives the "pay-off" period, the time required to repay their loans (excluding interest) given their operating costs and earnings.

The sensitivity analysis provides insight into the economic viability of fishing operations under different conditions (for example, if the average catch per trip falls, or the number of trips per month falls). Since the prices of fish are set by the government, price variation is not relevant in this analysis. The available data does not lend itself to conventional statistical methods, thus a more simplistic approach is used.

Given the present mode of operation, the number of fishing trips per month cannot be increased. Also, without any knowledge of the levels of the fish stocks it is safer to assume that an increase in fishing activity is likely to cause a decrease in catch rate. The number of fishing trips per

Table 7

Monthly Estimates Of Production Costs For Niominka Boat Using Share Earnings For Labor Cost (Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	10	10	7	7
Av. Catch/Trip	300	200	300	200	300	200	300	200
Fixed Costs	2850	2850	2850	2850	2850	2850	2850	2850
. Boat	240							
Gear	840							
Engine	1670							
Accessories	100							
Variable Costs	73580	52480	53280	35880	53280	35880	38100	25920
. Fuel & Lubricant	28200	28200	18800	18800	18800	18800	13160	13160
. Labor	47700	21600	31800	14400	31800	14400	22260	10080
. Engine Repairs	2000	2000	2000	2000	2000	2000	2000	2000
. Boat Repairs	590	590	590	590	590	590	590	590
. Net Repairs	90	90	90	90	90	90	90	90
TOTAL COSTS	81430	55330	56130	38730	56130	38730	40950	28770
TOTAL CATCH (KG.)	4500	3000	3000	2000	3000	2000	2100	1400
AV. TOTAL COST (Pesos/KG.)	18	19	19	19	19	19	20	21
AV VARIABLE COST (Pesos/KG.)	18	18	18	18	18	18	18	17

Source. Project Report Unpublished

Table 8

Monthly Estimates of Production Costs For Felupe Boat Using Share Earnings For Labor Cost (Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	10	10	7	7
Av. Catch/Trip	200	150	200	150	200	150	200	150
Fixed Costs	1700	1700	1700	1700	1700	1700	1700	1700
. Boat	180							
Gear	600							
Engine	940							
. Accessories	80							
Variable Costs	41910	33510	28460	22860	28460	22860	20390	16470
Fuel & Lubricant	13350	13350	8900	8900	8900	8900	6230	6230
. Labor	27000	18600	18000	12400	18000	12400	12600	8680
. Engine Repairs	1200	1200	1200	1200	1200	1200	1200	1200
. Boat Repairs	300	300	300	300	300	300	300	300
. Net Repairs	60	60	60	60	60	60	60	60
TOTAL COSTS	43610	35210	30160	24560	30160	24560	22090	18170
TOTAL CATCH (KG.)	3000	2250	2000	1500	2000	1500	1400	1050
AV. TOTAL COST (Pesos/KG.)	15	16	15	16	15	16	16	17
AV. VARIABLE COST (Pesos/KG.)	14	15	14	15	14	15	15	16

Source: Project Report Unpublished

Table 9

Monthly Estimates Of Production Costs For Non-Motorized Boat Using Share Earnings For Labor Cost (Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	8	8	4	4
Av. Catch/Trip	100	50	100	50	100	50	100	50
Fixed Costs	365	365	365	365	365	365	365	365
. Boat	75							
. Gear	250							
. Engine	-							
. Accessories	40							
Variable Costs	15330	7680	10230	5130	8190	4110	4110	2070
Fuel & Lubricant	-	-	-	-	-	-	-	-
. Labor	15300	7650	10200	5100	8160	4080	4080	2040
. Engine Repairs	-	-	-	-	-	-	-	-
. Boat Repairs	-	-	-	-	-	-	-	-
. Net Repairs	30	30	30	30	30	30	30	30
TOTAL COSTS	15695	8045	10595	5495	8555	4475	4475	2435
TOTAL CATCH (KG.)	1500	750	1000	500	800	400	400	200
AV. TOTAL COST (Pesos/KG.)	11	11	11	11	11	11	11	12
AV. VARIABLE COST (Pesos/KG.)	10	10	10	10	10	10	10	10

Source: Project Report Unpublished

Table 10

Monthly Estimates Of Production Costs For Niominka Boat: Average Between Share Earnings And Zero Opportunity Cost As Labor Cost (Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	10	10	7	7
Av. Catch/Trip	300	200	300	200	300	200	300	200
Fixed Costs	2850	2850	2850	2850	2850	2850	2850	2850
. Boat	240							
. Gear	840							
. Engine	1670							
. Accessories	100							
Variable Costs	54730	41680	37380	28680	37380	28680	26970	20980
. Fuel & Lubricant	28200	28200	18800	18800	18800	18800	13160	13160
. Labor	23850	10800	15900	7200	15900	7200	11130	5040
. Engine Repairs	2000	2000	2000	2000	2000	2000	2000	2000
. Boat Repairs	590	590	590	590	590	590	590	590
. Net Repairs	90	90	90	90	90	90	90	90
TOTAL COSTS	57580	44530	40230	31530	40230	31530	29820	23730
TOTAL CATCH (KG.)	4500	3000	3000	2000	3000	2000	2100	1400
AV TOTAL COST (Pesos/KG.)	13	15	13	16	13	16	14	17
AV. VARIABLE COST (Pesos/KG)	12	14	12	14	12	14	13	15

Source: Project Report Unpublished.

Table 11

Monthly Estimates Of Production Costs For Felupe Boat Using Average Between Share Earnings And Zero Opportunity Cost As Labor Cost (Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	10	10	7	7
Av. Catch/Trip	200	150	200	150	200	150	200	150
Fixed Costs	1700	1700	1700	1700	1700	1700	1700	1700
. Boat	180							
. Gear	600							
. Engine	840							
. Accessories	80							
Variable Costs	28410	24210	19460	16660	19460	16660	14090	12130
. Fuel & Lubricant	13350	13350	8900	8900	8900	8900	6230	6230
. Labor	13500	9300	9000	6200	9000	6200	6300	4340
. Engine Repairs	1200	1200	1200	1200	1200	1200	1200	1200
. Boat Repairs	300	300	300	300	300	300	300	300
. Net Repairs	60	60	60	60	60	60	60	60
TOTAL COSTS	30110	25910	21160	18360	21160	18360	15790	13830
TOTAL CATCH (KG.)	3000	2250	2000	1500	2000	1500	1400	1050
AV. TOTAL COST (Pesos/KG.)	10	12	11	12	11	12	11	13
AV. VARIABLE COST (Pesos/KG.)	10	11	10	11	10	11	10	12

Source: Project Report Unpublished.

Table 12

Monthly Estimates Of Production Costs For Non-Motorized Boat Using Average Share Earnings And Zero Opportunity Cost As Labor Cost (Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	8	8	4	4
Av. Catch/Trip	100	50	100	50	100	50	100	50
Fixed Costs	365	365	365	365	365	365	365	365
. Boat	75							
. Gear	250							
. Engine	-							
. Accessories	40							
Variable Costs	7680	3855	5130	2580	4110	2070	2070	1050
. Fuel & Lubricant	-	-	-	-	-	-	-	-
. Labor	7650	3825	5100	2550	4080	2040	2040	1020
. Engine Repairs	-	-	-	-	-	-	-	-
. Boat Repairs	-	-	-	-	-	-	-	-
. Net Repairs	30	30	30	30	30	30	30	30
TOTAL COSTS	8045	4220	5495	2945	4475	2435	2435	1415
TOTAL CATCH (KG.)	1500	750	100	500	800	400	400	200
AV. TOTAL COST (Pesos/KG.)	5	6	6	6	6	6	6	7
AV. VARIABLE COST (Pesos/KG)	5	5	5	5	5	5	5	5

Source: Project Report Unpublished.

Table 13

Monthly Estimates Of Production Costs For Niominka Boat Using Zero Opportunity Cost As Labor Cost (Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	10	10	7	7
Av. Catch/Trip	300	200	300	200	300	200	300	200
Fixed Costs	2850	2850	2850	2850	2850	2850	2850	2850
. Boat	240							
. Gear	840							
. Engine	1670							
. Accessories	100							
Variable Costs	30880	30880	21480	21480	21480	21480	15840	15840
. Fuel & Lubricant	28200	28200	18800	18800	18800	18800	13160	13160
. Labor	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
. Engine Repairs	2000	2000	2000	2000	2000	2000	2000	2000
. Boat Repairs	590	590	590	590	590	590	590	590
. Net Repairs	90	90	90	90	90	90	90	90
TOTAL COSTS	33730	33730	24330	24330	24330	24330	18690	18690
TOTAL CATCH (KG.)	4500	3000	3000	2000	3000	2000	2100	1400
AV. TOTAL COST (Pesos/KG.)	8	11	8	12	8	12	9	13
AV. VARIABLE COST (Pesos/KG.)	7	10	7	11	7	11	8	11

Source: Project Report Unpublished.

Table 14

Monthly Estimates Of Production Costs For Felupe Boat Using Zero Opportunity Cost As Labor Cost (Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	10	10	7	7
Av. Catch/Trip	200	150	200	150	200	150	200	150
Fixed Costs	1700	1700	1700	1700	1700	1700	1700	1700
. Boat	180							
. Gear	600							
. Engine	840							
. Accessories	80							
Variable Costs	14910	14910	10460	10460	10460	10460	7790	7790
. Fuel & Lubricant	13350	13350	8900	8900	8900	8900	6230	6230
. Labor	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
. Engine Repairs	1200	1200	1200	1200	1200	1200	1200	1200
. Boat Repairs	300	300	300	300	300	300	300	300
. Net Repairs	60	60	60	60	60	60	60	60
TOTAL COSTS	16610	16610	12160	12160	12160	12160	9490	9490
TOTAL CATCH (KG.)	3000	2250	2000	1500	2000	1500	1400	1050
AV. TOTAL COST (Pesos/KG.)	6	7	6	8	6	8	7	9
AV. VARIABLE COST (Pesos/KG.)	5	7	5	7	5	7	6	7

Source: Project Report Unpublished.

Table 15

Monthly Estimates Of Production Costs For Non-Motorized Boat Using Zero Opportunity Cost As Labor Cost (Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	8	8	4	4
Av. Catch/Trip	100	50	100	50	100	50	100	50
Fixed Costs	365	365	365	365	365	365	365	365
. Boat	75							
. Gear	250							
. Engine	-							
. Accessories	40							
Variable Costs	30	30	30	30	30	30	30	30
. Fuel & Lubricant	-	-	-	-	-	-	-	-
. Labor	-	-	-	-	-	-	-	-
. Engine Repairs	-	-	-	-	-	-	-	-
. Boat Repairs	-	-	-	-	-	-	-	-
. Net Repairs	30	30	30	30	30	30	30	30
TOTAL COSTS	395	395	395	395	395	395	395	395
TOTAL CATCH (KG.)	1500	750	1000	500	800	400	400	200
AV. TOTAL COST (Pesos/KG.)	0.26	0.53	0.40	0.80	0.50	1.00	1.00	2.00
AV. VARIABLE COST (Pesos/KG)	0.02	0.04	0.03	0.06	0.04	0.08	0.08	0.15

Source: Project Report Unpublished.

Table 16

Estimates Of Returns On Engine, Gear & Boat For Nhominka Boat (Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	10	10	7	7
Av. Catch/Trip	300	200	300	200	300	200	300	200
Engine:								
Gross Share/Month	7950	3600	5300	2400	5300	2400	3710	1680
Less Repairs	2000	2000	2000	2000	2000	2000	2000	2000
Net Engine Share/Month	5950	1600	3300	400	3300	400	1710	< 320>
Net Engine Share/Season	47600	12800	26400	3200	13200	1600	6840	<1280>
Gear:								
Gross Share/Month	7950	3600	5300	2400	5300	2400	3710	1680
Less Repairs	90	90	90	90	90	90	90	90
Net Gear Share/Month	7860	3510	5210	2310	5210	2310	3620	1590
Net Gear Share/Season	62880	28080	41680	18480	20840	9240	14480	6360
Boat:								
Gross Share/Month	7950	3600	5300	2400	5300	2400	3710	1680
Less Repairs	590	590	590	590	590	590	590	590
Net Boat Share/Month	7360	3010	4710	1810	4710	1810	3120	1090
Net Boat Share/Season	58880	24080	37680	14480	18840	7240	12480	4360

Table 17

Estimates Of Returns On Engine, Gear & Boat For Felupe Boat
(Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	10	10	7	7
Av. Catch/Trip	200	150	200	150	200	150	200	150
Engine:								
Gross Share/Month	6750	4650	4500	3100	4500	3100	3150	2170
Less Repairs	1200	1200	1200	1200	1200	1200	1200	1200
Net Engine Share/Month	5550	3450	3300	1900	3300	1900	1950	970
Net Engine Share/Season	44400	27600	26400	15200	13200	7600	7800	3880
Gear:								
Gross Share/Month	6750	4650	4500	3100	4500	3100	3150	2170
Less Repairs	60	60	60	60	60	60	60	60
Net Gear Share/Month	6690	4590	4440	3040	4440	3040	3090	2110
Net Gear Share/Season	53520	36720	35520	24320	17760	12160	12360	8440
Boat:								
Gross Share/Month	6750	4650	4500	3100	4500	3100	3150	2170
Less Repairs	300	300	300	300	300	300	300	300
Net Boat Share/Month	6450	4350	4200	2800	4200	2800	2850	1870
Net Boat Share/Season	51600	34800	33600	22400	16800	11200	11400	7480

Table 18

Estimates Of Returns On Engine, Gear & Boat For Non-Motorized Boat
(Pesos) Small-Scale Fishery Pilot Project, Cacheu

	DRY SEASON				RAINY SEASON			
No. of trips/Month	15	15	10	10	8	8	4	4
Av. Catch/Trip	100	50	100	50	100	50	100	50
Engine:								
Gross Share/Month								
Less Repairs								
Net Engine Share/Month								
Net Engine Share/Season								
Gear:								
Gross Share/Month	7650	3825	5100	2550	4080	2040	2040	1020
Less Repairs	30	30	30	30	30	30	30	30
Net Gear Share/Month	7620	3795	5070	2520	4050	2010	2010	990
Net Gear Share/Season	60960	30360	40560	20160	16200	8040	8040	3960
Boat:								
Gross Share/Month	7650	3825	5100	2550	4080	2040	2040	1020
Less Repairs	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Net Boat Share/Month	7650	3825	5100	2550	4080	2040	2040	1020
Net Boat Share/Season	61200	30600	40800	20400	16320	8160	8160	4080

Table 19

Pay-Off Period (Months)

Small-Scale Fishery Pilot Project, Cacheu

	1:1	1:2	1:3	1:4	2:1	2:2	2:3	2:4	3:1	3:2	3:3	3:4	4:1	4:2	4:3	4:4
NIOMINKA																
Engine	10	12	11	13	23	42	31	52	15	21	18	24	37	125	60	313
Gear	4	5	5	5	7	10	9	11	6	7	7	8	9	13	11	15
Boat	6	7	7	8	11	15	13	17	9	11	10	12	14	22	18	26
FELUPE																
Engine	5	6	6	6	7	9	9	10	8	9	9	10	11	13	13	16
Gear	4	4	4	4	5	5	5	6	5	6	5	6	6	7	7	8
Boat	3	3	3	3	4	4	4	4	4	4	4	4	5	5	5	6
NON-MOTORIZED																
Gear	2	2	2	2	2	3	3	3	2	2	2	3	3	4	4	5
Boat	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3

month, and the average catch per trip are decreased by 50%. There are slight increases in some of the average costs when both factors are decreased by 50%, but there is no significant difference from the average costs figures computed under the original assumptions. In all situations the boats covered their ATCs and AVCs given the average price of fish per kilogram.

Tables 16-18 show that the financial returns to fishing equipment are expected to fall under the original assumptions. One figure of particular significance is the net engine share per month for the Niominka boat with an average catch per trip of 200 kg. and seven trips per month. The repair cost on the engine is higher than the gross share per month, thus resulting in a negative value for the "net engine share per month". This result indicates that the share system will have to be adjusted so that the earnings cover the replacement cost of the engine.

The various combinations of the number of trips per month, and the average catch per trip are used to compute the pay-off periods. The figures for the dry and rainy seasons are added, then divided by 12 to obtain the average net share per month.

The cost of equipment is then divided by this value to obtain the pay-off period in months. For example, 1:1 indicates that the figures used for the computation are from column one under dry and rainy seasons respectively. The results show that under the assumptions, the pay-off periods are within the lives of the equipment, except in the case of the engine for the Niominka boat (Table 19).

Clearly, for certain combinations, (2:2, 2:3, 2:4, 4:1, 4:2, 4:3, 4:4), the pay-off periods exceed the life of the engine which is assumed to be 30 months. Under these assumptions the engines cannot be replaced with the earnings from their operations. However, unless there are operational problems, e.g. frequent damage to boat, engine, or gear, some of these combinations are not likely to occur.

SOCIO-ECONOMIC EVALUATION

The socio-economic evaluation consists of an evaluation of the project's objectives to determine whether the project succeeded in fulfilling them, or if not, what reasons are responsible for any failure, as well as an evaluation of the fishing and retail store operations.

EVALUATION OF THE PROJECT'S OBJECTIVES The first objective involves increasing fish production and the quality of fresh fish distributed. Since there are no figures for fish landings at Cacheu prior to the start of the project, the estimated increase in production is computed based on the assumption that the 19 motorized boats (4 Niominka and 15 Felupe) would not be fishing without the provision of the outboard engines. Table 20 gives the estimated increase in production due to motorization.

Given the number of Niominka and Felupe boats that were motorized, annual production increased by an estimated 383,000 kg. This translates to a per capita increase of 2.8 kg. of fish consumed in Cacheu if the total landings were consumed there. However, the project failed to expand the fresh fish distribution network because the GOGB did not provide a building to house the cold room within reasonable time for the project to undertake this activity.

The project only succeeded in establishing a data collection system within the Fisheries Secretariat. There was no indication of how the management unit should be structured or the list of functions it was supposed to undertake. Also, the time frame was too short for one person to establish such a unit given the low level of expertise in the Fisheries Secretariat at that time. The establishment of such a unit requires long-term planning outlining training and other logistic needs. Although four types of training needs were mentioned in the project document, it did not outline how

Table 20

Estimated Increase In Boat Income And Production Due To Motorization
Small-Scale Fishery Pilot Project, Cacheu

	Boat Type		
	Niominka	Felupe	Non-Motorized
No. of Trips/Year	160	160	152
Av. Catch/Trip (KG.)	300	200	100
Av. Annual Catch (KG.)	48,000	32,000	15,200
Av. Price/KG. Pesos)	22.2	22.2	22.2
Gross Annual Income/Boat (Pesos)	1,065,600	710,400	337,440
Annual Operating Costs/Boat (Pesos)	841,760	449,120	155,400
Net Annual Income/Boat (Pesos)	223,840	261,280	182,040
Annual Increase In Net Income/Boat Due to Motorization (Pesos)	41,800	79,240	-
Annual Increase in Production/Boat Due to Motorization (KG.)	32,800	16,800	-

these needs should be fulfilled.

The project document calls for a periodic monitoring of the project's activities to assess its socio-cultural impact and to provide information for revising the strategies or activities if necessary. One noticeable aspect is that the retail store engaged in rice selling in order to encourage fishermen to go out to sea often. According to Vincent (personal communication), even when fishermen in Cacheu are provided with all their fishing equipment they would not go out to fish unless they have rice to feed their families. If they cannot obtain sufficient rice at the markets, they have to grow rice themselves losing a considerable number of fishing days. The flexibility in the store's operation made rice selling possible.

Table 21, gives the average annual income per fisherman for the three boat types under the share system. Fishermen are earning far above the wage for unskilled labor (30,000 pesos) obtained in the capital city. Thus, this system does not reflect the opportunity cost of fishermen. This situation cannot be sustained in the long-run because competitive market mechanisms would operate to make the labor cost of fishermen

Table 21

Estimated Increase In Fishermen's Income Due To Motorization
Small-Scale Fishery Pilot Project, Cacheu (Pesos)

	Boat Type		
	Niominka	Felupe	Non-Motorized
No. of Trips/Year	160	160	152
Av. Income Per Fisherman/Trip	530	450	380
Av. Annual Income Per Fisherman	84,800	72,000	57,760
Av. Increase In Annual Income Per Fisherman Due to Motorization	27,040	14,240	-
Av. No. of Fishermen/Boat	6	4	2
Av. Increase In Fishermen's Annual Income Per Boat Due to Motorization	162,240	56,960	-

reflect its true opportunity cost, and the share system would likely adjust through this mechanism.

The availability of outboard engines in Cacheu made it possible for fishermen to fish with bigger boats, employing more fishermen, increasing their catch and number of days fished in the month. Also, more people were involved in handling and marketing the increased catch. It is difficult to determine the number of jobs created by the supply of outboard motors and other fishing inputs, because some fishermen operate on a rotational basis, and others are involved in farming. However, the supply of outboard engines did extend the fishermen's monthly work hours.

RETAIL STORE AND FISHING OPERATIONS The main problem encountered with the retail store was the inability to replace its inventory because of the lack of hard currency. Supplies for the store could only be bought in U.S. dollars or CFA francs. It is important to note that the long term operation of the store depended on the availability of hard currency. The 19 engines sold by the store increased boat income by an estimated 1,356,000 pesos and the estimated net increase in annual income (given the cost of the engines) was 780,000 pesos. This increased contribution to national income is significant enough to justify the provision of foreign exchange for the purchase of outboard engines.

The credit system enabled fishermen to purchase the engines, fishing gear and other accessories. There was no report of repossession, and some fishermen repaid their loans ahead of schedule. This is an indication that fishermen were able to make adequate returns on their investments. The repair and maintenance costs of engines were high. This was due mainly to poor handling and inadequate repair and maintenance facilities. The project could have made a significant contribution in this area if the engine repair shop had operated.

Two other factors are relevant to this evaluation: the gestation period for the project and the procurement procedures for obtaining supplies for the store. The assumption that the project would be fully operational and self-sustaining in 24 months was too optimistic considering the slow pace at which such activities move in developing countries. The procurement procedures were flexible enough to allow the project management to make certain adjustments for purchasing supplies for the retail store. It was much easier and quicker to obtain the supplies from Senegal than to go through overseas suppliers.

DISCUSSION

A number of factors prevailing in developing countries should be taken into consideration in designing and implementing small scale fisheries development projects. This probably holds true for most other development projects. In general, the macro-economic situation in a country and the level of priority given to any economic sector determine to a large extent how much of the country's resources are devoted to that sector. However, often times resources are devoted to some sectors because of political expediency and not because such sectors are efficient and productive. Small scale fisheries development projects do not usually receive the same level of commitment from governments as agricultural projects. Thus, the design of fisheries projects should be such that governments can fulfill their obligations within reasonable limits. One example with the Cacheu Project was the GOGB failure to provide space to house the cold room and the repair and maintenance facilities.

External factors are also critical to the successful implementation of fisheries projects. Developing countries have no control over the price of oil or the prices they expect to pay for engines and other fishing inputs. With most projects, there have been cost overruns or scaling down, mainly due to external factors. Even when project planners can identify such factors in advance it is difficult to predict the extent to which they could affect a project. However, the worst likely scenario could be accounted for in

an ex-ante evaluation and contingency plans formulated to address such situations. Other external factors that could affect projects include delays in procuring equipment and supplies due to strikes, acquiring unsuitable equipment, etc.

Most development projects require the training of people to improve their skills and performances, and in some cases to perform new functions. It is important that training needs be carefully identified in the project document and the methods for fulfilling those needs clearly outlined. Schultz (1964) claims that investment in human capital is a principal source of agricultural growth. While there are always some needs that arise unexpectedly and call for quick, short programs, the basic requirements of low income countries consist of skills and knowledge that can best be provided by well conceived, enduring programs.

In most developing countries public sector institutions are ill equipped and sometimes do not have the structure to enable them to operate efficiently. When development projects demand human and physical resources from an institution that is barely functional, that project is bound to encounter problems. Instead of making demands on these fragile institutions, projects should identify the deficiencies and, to the extent possible, correct such deficiencies. This would also strengthen the coordination of activities between institutions.

One big problem that may not go away for a long time as far as developing countries are concerned is the lack of foreign exchange. A few countries have adopted various policies to deal with this situation, but still find the value of their imports rising faster than the value of their exports, thus creating a balance of payment problem. Development planners should be aware of this crucial factor, and projects should not be designed to be dependent on imported materials if local materials can be satisfactorily substituted. Where this dependence is unavoidable, much thought should be given to the availability of foreign exchange, and contingency plans made.

It is not apparent that there was any involvement of the target groups during the design of the Cacheu Project. One factor that contributed to a fairly successful implementation of the project was the project's flexibility to adjust to local situations. During the project preparation stage, some input from the target group could enable project planners to identify some of the potential problems, particularly with extension activities and to look for possible solutions.

Finally, it is important that project planners allow enough time for new innovations and improved technology to be accepted and assimilated by the target groups. This usually requires a fair amount of time, especially for the target groups to accept the advocates of the changes.

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9

EVALUATION OF TWO SMALL-SCALE MARINE FISHERMEN'S TRAINING PROJECTS IN PALAWAN

Richard B. Pollnac, Alma Dickson, Alicia Sualog,
Natividad Razo, and RFTC Project Coordinating Staff

INTRODUCTION

The purpose of this paper is to illustrate some general points concerning fishery project impact evaluation by presenting the results of an evaluation of two marine fishery training projects carried out on Palawan, the Philippines. The generalizations made are quite obvious, yet they are rarely accounted for in the "evaluations" of fishery development projects. The generalizations are as follows:

1. An evaluation procedure must be established prior to implementation of actual development strategies (e.g., training, introduction of new equipment, etc.) in the target populations. This will facilitate establishment of a one-step procedure for both assessing target group needs and providing baseline data which can be compared with comparable post-project data for evaluation purposes.

2. The evaluation procedures must be compatible with skills, manpower, and resources of the institutions designated to carry out the evaluation. A "perfect" evaluation system is of no use if the resources needed to implement it are unavailable. It may result in no evaluation where a less sophisticated, easily implementable system, although not providing as much detailed data, would at least provide some valid indicators of project impacts.

3. Some attempt must be made to account for variables external to the actual development inputs which may impact evaluation criteria. For example, changes in natural resources, market demand, and infrastructure as well as differences in individual characteristics of

project participants (e.g., age, education, experience, etc.) may all impact variables used in evaluation. Provision should be made for use of control groups as well as measurment of potentially confounding variables so that their effects can be statistically evaluated.

4. Measurement techniques for evaluation variables should be developed in situ to increase the liklihood that they are appropriate for local conditions.

5. Post evaluation of project impacts should be carried out at least one or two years after all development inputs have ended. This allows sufficient time to determine if the changes are sustainable.

With the above generalizations in mind, the Regional Fishermen's Training Center (RFTC) Coordinating Staff of the Bureau of Fisheries and Aquatic Resources (BFAR) and the author conducted a workshop in August 1983 aimed at developing a methodology for RFTC project social impact evaluation. Participants in the workshop included staff from the seven RFTCs located in various parts of the Philippines. The staff had familiarity with the fishermen and conditions in their home regions; hence, they were able to insure the appropriateness of proposed variable measurement techniques.

In developing the evaluation instrument participants in the workshop tried to account for available resources; e.g., (1) the number of adequately skilled personnel available at each RFTC to collect data and perform preliminary analyses; (2) the skills and workload of the RFTC Project Coordinating Staff who would be responsible for final analyses and report preparation; and (3) the hardware and software available to perform analyses (e.g., calculators, computers, etc. At the time of the workshop the most sophisticated equipment available to the staff was a programmable calculator).

The social impact evaluation interview form developed was agreed upon by all participants as one which was realistic in terms of interview length and proposed analytic procedures. There were some questions, however, concerning the ability of the RFTC Project Coordinating Staff to handle the large amounts of partially analysed data that would be flowing in from the seven RFTCs, but it was anticipated that the central office would expand both in terms of staff and equipment. This expectation turned out to be correct in that a few new staff were hired and a personal computer was acquired in the following several years.

Evaluation instruments were pretested in a fishing community near the workshop site (Davao) and adjusted as necessary. Workshop participants conducted a pilot baseline study in a local community as a part of workshop training in

procedures for collecting, analysing, and writing-up evaluation data (cf., RFTC Project Coordinating Staff and Pollnac, 1983). The final result of the workshop was an RFTC Project Monitoring and Evaluation Plan (Dickson, et al., 1983). For the purposes of this paper we are going to examine the evaluation of training programs which were designed and carried out in two target communities on Palawan.

OBJECTIVES AND DESCRIPTION OF TRAINING PROGRAMS

The overall objective of the training programs conducted by the RFTCs is to provide training which will increase production and incomes of small-scale producers in the fishery sector as a means of improving their quality of life. As a first step in achieving this objective, RFTC staff design training programs which have as their immediate objective the transfer of specific skills to the small-scale producer. In accordance with the project monitoring and evaluation program instituted by the RFTC Project Coordinating Staff baseline data was collected in the target communities as a means for assessing training needs as well as providing information which could be used in assessing impacts of the training. The training programs designed for the two target communities on Palawan had similar objectives: (1) to teach trainees how to design, construct, and operate bottom set gillnets; (2) to familiarize trainees with different types of fishing gear that could be effectively used in the local fishery; and (3) to organize the fishermen into an association or cooperative.

Training was conducted in Manalo in October 1983 and in Panacan, six months later, in April 1984. Training methods were similar in the two communities. Each training program started with three days of lecture on topics directly related to the training objectives. This was followed by a practicum which lasted six days in Manalo and five days in Panacan. During the practicum, fishermen (35 in Manalo and 28 in Panacan) constructed units of bottom set gillnet. In Manalo each group (the trainees were divided into four groups) of trainees constructed two or three 50 by 2.5 meter sections of bottom set gillnet. In Panacan, each fisherman trainee was provided with complete sets of netting materials, line, floats, and sinkers. Each trainee used these materials to construct two 50 by 2.5 meter units of bottom set gillnet.

Following construction, the nets were deployed to give the fishermen actual experience in operating techniques. In Manalo, the RFTC Staff helped the fishermen form a fishermen's association (Barangay Manalo Fishermen's Association). A fishermen's association already existed in Panacan.

EVALUATION OF THE TRAINING PROGRAMS

In May, 1986 a post evaluation of the training programs in the two communities was initiated by the RFTC Project Coordinating Staff. The goal of the evaluation was to determine if the training had any influence on production, income, and quality of life of the trainees.

METHODS Three data sets are used in the evaluation. Data collected prior to training to assess training needs is also used to establish a baseline for comparisons. Data collected several years after training includes information from both trainees and non-trainees; hence there is a baseline, an experimental group (the trainees), and a control group (the non-trainees). The control group is necessary as a means of controlling for external factors such as changes in fish populations, market conditions, etc. The variables used in this paper do not exhaust the information collected as a part of the monitoring and evaluation plan. Here we simply focus on a few of the relevant variables to demonstrate the importance of obtaining information on factors external to project inputs. The analysis of the data will examine similarities and differences between the three samples in terms of the objectives of the training.

ANALYSIS As a first step in the evaluation, trainees are compared with non-trainees and the baseline sample with respect to average daily catch and income and material life style (MLS) score.[1] Results of this analysis are in Table 1.

Table 1
Comparison of baseline, trainees, and controls

	BASELINE		TRAINEES		CONTROLS	
	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
MANALO						
Catch	11.1	13.2	6.7	5.9	5.6	5.3
Income	53.1	107.9	57.2	60.6	43.5	62.9
MLS	2.1	1.1	2.2	0.9	2.0	1.2
PANACAN						
Catch	21.4	13.7	18.9	11.2	16.2	11.6
Income	103.1	97.7	183.2	108.6	103.6	56.5
MLS	1.9	1.0	2.4	1.0	1.0	1.0

Catch and income are per-fisherman daily averages in kilograms and Pesos respectively.

The analysis in Table 1 indicates that average daily catches have decreased in both communities. The differences between the samples, however, are not statistically significant in either Manalo ($F = 2.51$, d.f. = 2 76, $p > 0.05$) or Panacan ($F = 1.15$, d.f. = 2 73, $p > 0.05$).

Despite the decrease in average catches, trainees in Panacan manifested significantly higher average daily incomes than the baseline or the controls ($F = 5.06$, d.f. = 2 72, $p < 0.01$). While both the baseline and control groups averaged about 103 pesos a day, the trainees averaged 183. Differences in income in Manalo are not statistically significant ($F = 0.15$, d.f. = 2 79, $p > .05$).

The higher incomes of the trainees in Panacan is reflected in their mean MLS Scale score. The trainees MLS Scale score is higher than both the baseline and controls ($F = 9.37$, d.f. = 2 73, $p < 0.001$). The scale scores are not significantly different in Manalo ($F = 0.05$, d.f.=2 79, $p > 0.05$).

Although the analysis presented in Table 1 indicates that the Panacan trainees have a higher income than the controls, it is important to rule out other non-training related variables which may have influenced the observed differences. For example, the trainees may manifest characteristics not associated with the training program which could impact catch and income. Differences potentially attributable to training are statistically significant only in Panacan, so we will confine the analysis of possible confounding variables to that community.

A comparison of the Panacan trainees and non-trainees (controls) on several variables which may potentially impact production, income, and MLS scores can be found in Table 2.

Table 2

Comparison of Panacan trainees and controls with respect to potentially confounding variables

	TRAINEES	CONTROLS
Age (mean)	46.2	37.0
Years Education (mean)	6.8	8.0
Years Fishing (mean)	28.3	16.0
Not Own Vessel (%)	24	48
Use of Bagnet (%)	24	6
Vessel Length >8m (%)	60	29

Table 2 clearly demonstrates that there are differences between the trainees and controls which may influence the dependent variables. Trainees are older, have more fishing

experience, are more likely to own the vessel they fish from, use larger vessels, and almost one-fourth use a bagnet. Their level of formal education is slightly lower, however. As a first step in determining if any of these variables are influencing the results of the evaluation of the training program, their interrelationships with the dependent variables (income, catch, and MLS Scale score) will first be examined in the baseline data. Results of the analysis for age, education, vessel size, and years fishing experience can be found in Table 3.

Table 3
Correlations between evaluation and potentially confounding variables in Panacan baseline data

	Years Fishing	Vessel Size	Age	Education
Catch	.20	.53**	.00	.10
Income	.19	-.12	-.01	.16
MLS	.25	-.02	.10	.51*

Correlations are Pearson's product-moment.
** = $p < 0.01$; * = $p < 0.05$

The analyses presented in Table 3 indicate that only boat size and education are significantly related to any of the evaluation variables: the larger the vessel the larger the catch, and the higher the education level, the higher the MLS Scale score. Since the trainees had slightly lower education levels than the non-trainees, education is probably not a counfounding variable in the evaluation. Vessel size, however, is significantly related to catch size; hence, it may have influenced the findings of larger catches among the trainees who, overall, fish from the larger vessels.

The fact that a greater percentage of trainees than controls (24 versus 6 percent respectively) use the highly productive bagnet may have influenced the between group differences on the evaluation variables. Hence, fishermen who reported use of the bagnet were eliminated from the sample, and another analysis of variance was conducted to compare the trainees and non-trainees in Panacan. The results of this analysis are in Table 4.

Table 4 indicates that even with the bagnet users removed from the sample, the trainees still have significantly higher incomes and MLS Scale scores ($F = 7.65$, d.f. = 1 31, $p < 0.01$; and $F = 13.05$, d.f. = 1 31, $p = 0.001$ respectively). The differences in catch, however, are still not statistically

Table 4
Comparison of evaluation variables for Panacan trainees and controls who do not use bagnets

	TRAINEES		CONTROLS	
	MEAN	S.D.	MEAN	S.D.
Catch	19.5	12.3	15.4	11.2
Income	178.4	103.1	101.5	56.9
MLS	2.4	1.0	1.1	1.0

Catch and income are daily averages in kilograms and Pesos respectively.

significant ($F = 0.98$, d.f. = 1 31, $p > 0.05$).

Analysis of the impact of boat ownership on the evaluation variables is conducted using the baseline data. The baseline data, rather than the post evaluation-data, is used due to the fact that the sample would become unacceptably small if either vessel owners or non-owners were removed from the post-evaluation samples. Additionally, comparing owners and non-owners in the evaluation data would confound the effects of training due to the larger percentage of boat owners among the trainees (76% among trainees versus 52% among the non-trainees). Results of the analysis comparing boat owners and non-owners using baseline data from Panacan can be found in Table 5.

Table 5
Comparison of evaluation variables for Panacan boat owners and non-owners (baseline data)

	BOAT OWNERS		NON-OWNERS	
	MEAN	S.D.	MEAN	S.D.
Catch	18.6	13.2	26.8	13.5
Income	117.7	115.1	76.2	44.5
MLS	2.0	1.1	1.7	0.8

Catch and income are daily averages in kilograms and Pesos respectively.

Table 5 indicates that none of the evaluation variables differ significantly between boat owners and non-owners in the baseline data (catch: $F = 3.27$, d.f. = 1 36 $p > 0.05$; income: $F = 1.55$, d.f. = 1 35, $p > 0.05$; MLS: $F = 0.65$, d.f. = 1 36, $p > 0.05$).[2]

As a final step in the analysis of the impact of training

on the evaluation variables, correlation and regression analyses are conducted. Table 6 includes zero order correlations between the evaluation variables, training, and other variables potentially related to the evaluation variables and training. Use of gillnet and organization membership are included in this analysis since they formed part of the training and are expected to influence income, catch, and MLS Scale scores. Use of gillnet, boat ownership, organization membership, and training are dichotomous variables ("dummy variables" either present or absent and coded as one or zero respectively).

Table 6
Correlations between predictor and evaluation variables for Panacan and Manalo

	CATCH	INCOME	MLS	TRAINING
PANACAN (N = 32)[A]				
Age	-.23	.35*	.37*	.41*
Years Fishing	-.04	.38*	.32	.50**
Use of Gillnet	-.04	.28	.30	.18
Vessel Size	.13	.16	.15	.39*
Own Vessel	-.16	.48**	.66**	.41*
Organization Member	-.07	.39*	.58**	.63**
Years of Education	-.06	.01	.05	.25
Training	.06	.46**	.59**	---
MANALO (N = 43)				
Age	-.06	-.08	.20	.32
Years Fishing	.04	.24	-.01	.47**
Vessel Size[B]	-.05	-.15	.36*	.19
Use of Gillnet	-.09	-.12	-.11	.25
Own Vessel	.17	.15	-.09	.37*
Organization Member	-.08	-.13	.20	.49**
Years of Education	.05	-.11	.13	.16
Training	-.10	-.11	-.05	---

[A]Correlations for Panacan are for cases included in the multiple regression; hence, sample size was reduced due to missing data.
[B]Sample size reduced to 24 due to missing data.

** = $p < 0.01$ * = $p < 0.05$

Table 6 confirms the general findings of the preceding analyses in that training does not seem to impact any of the evaluation variables (income, catch, and MLS Scale score) in Manalo. In contrast, the training program in Panacan seems to

have positively impacted both income and MLS Scores. In Manalo, however, training has impacted organization membership. Training is also related to organization membership in Panacan.

We will now determine the relative influence of training and the other predictor variables on the evaluation variables. The analysis will be conducted only for Panacan since none of the predictor variables are significantly related to the evaluation variables in Manalo. The type of analysis used is a best subset regression analysis.[3] This analysis was conducted for only two of the evaluation variables: income and MLS. Catch was not used as a dependent variable since it was not significantly correlated with training. The results of these analyses are in Table 7.

Table 7
Best Subset Regression analyses of predictor and evaluation variables for Panacan

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	STANDARDIZED BETA COEFFICIENTS	CONTRIBUTION TO R^2
Income	Boat owner	.35**	.10
	Training	.32*	.08
	R	.56***	
MLS	Boat Owner	.51***	.22
	Organization member	.40***	.13
	R	.75***	

*** = $p < 0.01$ ** = $p < 0.05$ * = $p < 0.10$ N = 32

The analysis presented in Table 7 indicates that training is included in the best subset of predictor variables only for income. Its contribution to the amount of variance explained is slightly less than that of boat ownership.[4] The two predictor variables together account for 32 percent of the variance in income, a modest and statistically significant amount. With respect to MLS, a regression analysis using boat owner and training as independent variables resulted in an R^2 of 0.55 which is only 0.01 less than using boat owner and organization member. A multiple regression analysis was conducted using all three of these independent variables to predict MLS, and the results are presented in Table 8.

The results in Table 8 indicate that training in

combination with boat ownership and organization membership account for 52 percent of the variance in MLS, a statistically and practically significant amount [5] The standardized beta coefficients suggest that boat ownership is the most important predictor of income, and organization membership and training are of approximately equal significance.

Table 8
Regression analysis of three predictor variables and MLS

DEPENDENT VARIABLE	INDEPENDENT VARIABLES	STANDARDIZED BETA COEFFICIENTS
MLS	Training	0.30**
	Boat owner	0.35***
	Organization member	0.30*
	R	.72****

* = p = 0.06 ** = p = 0.05 *** = p = 0.01
**** = p < 0.001 N = 38

SUMMARY

Overall, fishermen from Manalo seem to have benefitted least from the training program. In part this may have been due to the difference in training methods used. In Panacan each fisherman was provided with materials for constructing sections of net while in Manalo, groups of about 8 fishermen worked jointly to construct two or three sections. It would, however, be necessary to compare the results of a larger sample of training programs to determine if the methods influenced the results. Additionally, another variable distinguished the two communities which could have influenced the results. Most of the fishermen in Manalo obtain a significant portion of their income from sources other than fishing (for the most part farming)[6]; hence, they may not have worked as hard to apply the lessons they learned in the training sessions. The training in Manalo did, however, result in formation of a fishermen's association which may be useful in future development efforts. In contrast, the training program conducted in Panacan seems to have had a modest impact on incomes from fishing and material life style.

Catches in both communities decreased somewhat since the baseline data was collected, but this may be due to normal fluctuations in the stocks. It is important to note, however, that without a control group we might have concluded that the training had a negative influence on production.

Additionally, the information available on other variables which could potentially effect the evaluation variables allowed us to statistically control for their effects; hence, we were able to determine the independent effects of the PFTC training program. In sum, the training appears to have had limited success in Manalo except for establishment of a fishermen's cooperative. The training in Panacan seems to have achieved its objectives in terms of improving the well being of the fishermen.

FOOTNOTES

1. Most of the small-scale fishermen in the Philippines keep no records and are unable to accurately report annual or monthly income. Attempts to obtain this type of data have resulted in much missing or highly questionable data. Pretests indicated that fishermen are able and much more willing to provide estimates of average daily catch and income.

   The MLS scale was constructed using a set of household items (electricity, television, tape recorder, refrigerator, fan, sewing machine, cooking range) and house and land ownership. Each of the items was assigned a value of one and summed for a total MLS scale score. Although the assumption that the weight of each item is equal is questionable, this technique was used as a rough estimate since the staff were initially conducting analyses with hand held calculators and other scale producing techniques (e.g., factor analysis) were impractical.

2. Degrees of freedom vary from variable to variable due to missing data.

3. Best subset regression analysis calculates a regression equation for every possible subset of the independent variables (for example, every possible combination of two, three, and so on) with each dependent variable and selects the "best" subset on the basis of some criteria such as R^2, adjusted R^2 (adjusted by taking into account the number of cases and variables), or Mallow's Cp which is based on a ratio of the residual sum of squares for the selected subset to the residual mean square using all independent variables with a correction for number of variables in relation to sample size (Daniel and Wood, 1971). In this analysis, Mallow's Cp was used as the selection criteria.

4. In Table 8, contribution to R^2 is the amount by which R^2 would be reduced if the variable were removed from the

multiple regression.

5. Note that the regression in Table 8 is based on 38 cases. The sample size has increased over that reported for the best subset regression analysis due to the fact that the best subset analysis was run with 10 independent variables, some of which had missing data. All cases with missing data on any of the ten independent variables were eliminated prior to running the best subset analysis, resulting in an N of 32. The change in N in the analysis presented in Table 8 resulted in a change in the magnitude of the correlations between the independent and dependent variables; hence the lower than expected R.

6. A more complete analysis of the baseline data for each community including relevant details on infrastructure can be found in Pollnac & RFTC Project Coordinating Staff (1987).

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AUTHORS

T.R. Brainerd is a Ph.D. Candidate in Marine Resource Economics at the University of Rhode Island, Kingston, Rhode Island.

Brian R. Crawford is Training Coordinator for the Coastal Resources Center, the University of Rhode Island, Kingston, Rhode Island.

C. Ross Croulet formerly with Foster Parents Plan International is presently a Management Business Development Specialist with Opportunities Industrialization Centers International Inc., Philadelphia, Pennsylvania.

Alma C. Dickson is a senior staff member of the Training Division, Bureau of Fisheries and Aquatic Resources, Quezon City, Philippines.

Bryan L. Duncan is Director of the International Center for Aquaculture and Professor in the Department of Fisheries and Allied Aquaculture at Auburn University, Auburn, Alabama.

W. Timothy Farrell is Assistant Director, Technical Services, Impact Evaluation Systems for Foster Parents Plan International, East Greenwich, Rhode Island.

Henk Franken is Evaluation Specialist for the South American Region with Foster Parents Plan International, Quito, Ecuador.

Joseph J. Molnar is Professor of Rural Sociology in the Department of Agricultural Economics and Rural Sociology, Auburn University, Auburn, Alabama.

Michael T. Morrissey is Assistant Professor in the Department of Food Science and Nutrition and Research Associate with the International Center for Marine Resource Development, the University of Rhode Island, Kingston, Rhode Island.

Richard B. Pollnac is Professor of Anthropology in the Department of Sociology and Anthropology and Research Associate with the International Center for Marine Resource Development, the University of Rhode Island.

Robert S. Pomeroy is Extension Agricultural Economist and an Assistant Professor in the Department of Agricultural Economics and Rural Sociology, Clemson University, Clemson, South Carolina.

Natividad G. Razo is a staff member of the Training Division, Bureau of Fisheries and Aquatic Resources, Quezon City, Philippines.

RFTC Project Coordinating Staff includes **Alma C. Dickson, Alicia A. Sualog, Natividad G. Razo, Erlinda A. Aralar, Giovani T. Baoy, Wenresti G. Gallardo, and Enrico H. Mercado**, all members of the Training Division, Bureau of Fisheries and Aquatic Resources, Quezon City, Philippines.

Michael A. Rice is Assistant Professor in the Department of Fisheries, Animal, and Veterinary Sciences, the University of Rhode Island, Kingston, Rhode Island.

Alicia A. Sualog is a staff member of the Training Division, Bureau of Fisheries and Aquatic Resources, Quezon City, Philippines.

Lamarr B. Trott is Senior Fishery Advisor, Office of Agriculture, Bureau for Science and Technology, the United States Agency for International Development, Washington, D.C.