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9. ABSTRACT

At the request of the Board for International Food and Agricultural Development (BIFAD), A.I.D. commissioned a planning study to identify long range research needs in fisheries and aquaculture. The study is one of three currently being carried out under A.I.D. direction. The study focuses on research activities which will directly contribute to increased food production and which will lead to better income and employment opportunities for poor and disadvantaged people in the developing nations. It is to determine research and development needs, recommend priority areas for funding, and to identify U.A. universities and similar organizations and research institutions in the developing countries that are interested in the best able to formulate and carry out specific fisheries and aquaculture research programs. The fisheries research workshop was to provide an opportunity for participants to learn more about the Title XII program and its implications. This report presents an edited version of the presentations by principle speakers and reports of the working groups along with the concluding question and answer session. The main topic is Title XII and Collaborative Research Support Program. The different perspectives represented are BIFAD, Joint Research Committee, USAID, University interests, and viewpoints of developing countries. The Fisheries Research Process is also presented. Fisheries priorities developed emphasize artisan fisheries and small boats although even research requiring a large organization, such as in the development of low cost protein, or aquaculture, can involve the small fisherman. That is important, even if it puts a much lower priced product on the local market.

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**PROCEEDINGS
OF THE
FISHERIES RESEARCH
PLANNING WORKSHOP
(THE TITLE XII PROGRAM)**

Sponsored By The
United States Agency For International Development
Contract No. AID/afr-C-1135-12

**Kenneth B. Craib And Warren R. Ketler, Editors
Resources Development Associates
Los Altos, California**

TABLE OF CONTENTS

Preface	i
Workshop Agenda	iii
Welcome and Introduction.	1
Warren R. Ketler, Resources Development Associates	
Title XII and Collaborative Research Support Program: The BIFAD Perspective	3
D. Woods Thomas, Executive Director, BIFAD Executive Staff	
Title XII and Collaborative Research Support Programs: The JRC Perspective	12
Ross S. Whaley, Vice Chairman, Joint Research Committee	
Title XII and Collaborative Research Programs: The USAID Perspective	19
Marjorie Belcher, Acting Deputy Assistant Administrator Development Support Bureau, USAID	
Title XII and Collaborative Research Support Programs: University Interests	24
Robert B. Abel, Assistant Vice President for Marine Programs, Texas A & M University	
Title XII and Collaborative Research Support Programs: Viewpoints of Developing Countries	37
William E. Ripley, Fisheries Advisor, Division for Global and Inter-Regional Projects, UNDP	
The Fisheries Research Process - What to Expect	47
Douglas M. Jones, Technical Assistance Bureau, U.S. Agency for International Development	
Report of Working Group # 1	53
John S. Glude, Chairman	
Report of Working Group # 2	58
William Royce, Chairman	
Report of Working Group # 3	65
John Peters, Chairman	

Report of Working Group # 4	69
Parzival Copes, Chairman	
Report of Working Group # 5	73
James A. Storer, Co-chairman	
Comments at the Fisheries Research Planning Workshop: The Title XII Program	79
Charles E. French, Federal Liaison Representative to the Joint Research Committee, USAID	
A Response to Specific Questions.	84
Ross S. Whaley, Vice Chairman, Joint Research Committee	
Summary Statement	89
Hugh Popenoe, Head, International Programs Office, University of Florida, and Member, Joint Research Committee	
Open Forum: A Question and Answer Session.	96
Charles E. French, Chairman	

Appendix A:
 Workshop Attendees

PREFACE

In response to a request from the Board for International Food and Agricultural Development (BIFAD), the Agency for International Development commissioned a planning study to identify long-range research needs in fisheries and aquaculture. The study is one of three currently being carried out under AID direction and is an initial step in implementing Title XII of the International Development and Food Assistance Act of 1975.

The study will focus on research activities which will directly contribute to increased food production and which will lead to better income and employment opportunities for poor and disadvantaged people in the developing nations of the world. The purpose of the study is to determine research and development needs, recommend priority areas for funding, and to identify United States universities and similar organizations and research institutions in the developing countries that are interested in and best able to formulate and carry out specific fisheries and aquaculture research programs.

The planning study is being carried out by Resources Development Associates (RDA), Los Altos, California. RDA was particularly concerned that the wide range of United States university views and interests be adequately represented early in this program. At the suggestion of AID, a conference involving all interested parties was scheduled for late 1977, to allow an opportunity for comment and input from the U.S. academic community. As the planning study began to unfold, however, it was discovered that there was substantial confusion in many sectors concerning the purpose of Title XII legislation, the real meaning of "collaborative research support programs," and other areas that might directly affect the study itself. As a result, the conference grew to a "Fisheries Research Planning Workshop," at which participants would have an opportunity to learn more about the Title XII program and its implications.

The workshop, held in Denver, Colorado, on December 14-15, 1977, was attended by 110 scientists and professionals, representing 47 universities and institutes, the BIFAD, the Joint Research Committee (JRC), NOAA, the Food and Agricultural Organization of the United Nations (FAO), and USAID. The workshop's stated purpose was twofold: first, to provide an opportunity for interested university representatives to interact with the BIFAD staff, members of the JRC and AID concerning the scope and intent of Title XII legislation and collaborative research support programs, and second, to provide for an exchange of views on fisheries and aquaculture research needs and priorities in the developing countries.

The presentations by the principle speakers were recorded, as were the reports of the several "working groups" and the concluding question-and-answer session. Although the transcriptions presented here have been edited, an attempt has been made to retain the spontaneity and conversational tone of the meeting. Readers are cautioned that in most cases speakers in the "open forum" question-and-answer session have not had an opportunity to review their comments prior to publication here, and that statements by representatives of the government and other organizations may reflect personal judgements and professional opinion rather than an official government position. Errors of omission or misinterpretation must remain the responsibility of the editor.

Funding for the workshop was provided by the U. S. Agency for International Development, under contract number AID/afr-C-1135-12.

Kenneth B. Craib
Warren R. Ketler

**TENTATIVE AGENDA
FISHERIES RESEARCH PLANNING WORKSHOP**

**DENVER, COLORADO
DECEMBER 14-15, 1977**

WEDNESDAY, DECEMBER 14

MORNING SESSION: Chairman - Warren Ketler, Director, Resources Development Associates

8:45 - 9:00 Welcome and Introduction: Warren Ketler
The Title XII Program: Viewpoints of -

9:00 - 9:30 BIFAD - D. Woods Thomas, Executive Director,
BIFAD Executive Staff

9:30 - 10:00 JRC - Ross Whaley, Vice Chairman, JRC, and
Dean, College of Food and Natural Resources,
University of Massachusetts, Amherst

10:00 - 10:30 USAID - Marjorie Belcher, Acting Deputy Assistant
Administrator, Development Support Bureau, USAID

10:30 - 10:45 Coffee Break

10:45 - 11:15 University Interests - Robert Abel, Assistant Vice
President for Marine Programs
and Director, Center for Marine
Resources, Texas A & M University,
College Station

11:15 - 12:00 Developing Nations - William Ripley, Fisheries Advisor,
Division for Global and Inter-
Regional Projects, United Nations
Development Program, New York

12:00 - 1:30 Lunch Break

AFTERNOON SESSION Chairman - Phil Roedel, Senior Fisheries Advisor to USAID,
NOAA, Department of Commerce

1:30 - 1:45 Fisheries Research Planning Process - What To Expect:
Douglas Jones, Technical Assistance Bureau, USAID,
Washington, D.C.

1:45 - 2:15 The Research Advisory Panel

2:15 - 3:15 Working Group Concurrent Sessions

3:15 - 3:30 Coffee Break

3:30 - 6:00 Working Group Concurrent Sessions

6:00 - 8:00 Dinner Break

8:00 - 10:00 Working Group Concurrent Sessions

TENTATIVE AGENDA
FISHERIES RESEARCH PLANNING WORKSHOP
DENVER, COLORADO
DECEMBER 14-15, 1977

THURSDAY, DECEMBER 15

MORNING SESSION

Chairman - Warren Ketler

9:00 - 10:20

Working Group Reports

10:20 - 10:40

Coffee Break

10:40 - 12:00

Working Group Reports

12:00 - 1:30

Lunch Break

AFTERNOON SESSION

Chairman - Charles French, Federal Liaison Representative
to the Joint Research Committee.

Summary Statement - Hugh Popenoe, Director, Sea Grant
College; Head, International Programs Office, University
of Florida, Gainesville; and Member, Joint Research
Committee.

3:00

Meeting Ends

TENTATIVE WORKSHOP DISCUSSION AREAS

Problem Areas

Functional Sectors

Aquaculture:

Fisheries:

Processing and Marketing:

Species and Stocks:

Assessment
Yield
Reproduction
Genetics
Nutrition
Disease and Mortality
Behavior

Habitat:

Site Selection
Environment
Ecology

Technology:

Seed Supply
Feeds and Feeding
Grow-Out System
Harvesting
Logistics

Socio-Economics:

Supply
Demand
Price and Cost
Social Impact

International Aspects:

Law of the Sea
Trans-Boundary Stocks
200 Mile Limit

Workshop
#1
John Glude
Pat Powell

Workshop
#2
William Royce
Dick Croker

Workshop
#3
John Peters
Keith Cox

Workshop
#4
Parzival Copes
Jack Meyers

Workshop
#5
Phil Roedel
Jim Storer

WELCOME AND INTRODUCTION

Warren R. Ketler, Chairman*

Good morning and welcome to the Fisheries Research Planning Workshop. Before we have our guests tell us about why we are here and what we hope to accomplish in the next two days, I would like to make a few remarks. By way of introduction, I am not Ken Craib as listed on the agenda; I'm Warren Ketler and will be substituting for him.

Resources Development Associates is the name of our company; we are working with USAID to complete the planning for the small scale fisheries and aquaculture collaborative research program under Title XII and that is why we are here. We are a private company with no affiliation with any institution or organization that might benefit in any way from Title XII funding.

Resources Development is tasked with developing initial plans for the collaborative research program. In this role we are sort of middle-men so to speak. We are getting our direction and guidance from USAID, BIFAD and the JRC. We are trying to obtain factual information from you, the universities that will be involved in conducting the necessary research work. Representatives of various concerned organizations will be speaking to you this morning. The purpose of this particular get-together is to condition you and prepare you for what comes later, and what we hope is the real meat of this gathering, the working group sessions that we will get into this afternoon.

The main purpose of this meeting, other than the working group sessions, which you are to be a part of, is to get you people involved in this planning process. Although we are ultimately responsible for the report that comes out, and the conclusions and commendations therein, we wanted to use everyone

* Senior Partner, Resources Development Associates

available as a source of information. This meeting provides the opportunity for us to get input from the people who will be doing the eventual research work--the universities and other institutions that would be involved in the collaborative research program. That is why you are here. I think that we will all be in a little better position to act intelligently after this morning's session is finished. Then, the early part of the afternoon we will break up into smaller groups and hopefully develop some ideas on what the problems in fisheries are and how you, the university community, are going to go about solving those problems. That will be part of the input to our final report.

Our report is due out the end of July 1978 so we do not have an awful lot of time. I know you are all anxious to get some definitive word on what Title XII and the collaborative research program is all about so you can provide input to the planning process.

I did want to say one more thing before we begin introducing the speakers. I have tried to describe to you just very briefly the philosophy and approach to the planning process by getting everybody involved. We are confident that our policy will pay off in the long run, or possibly later.

Since we are running about 15 minutes behind already, I want, with no further ado, to introduce Woods Thomas, Executive Director of the BIFAD Executive Committee, Executive Staff, who will explain to you in his terms what BIFAD is all about and some of the reasons why we are here.

**TITLE XII AND COLLABORATIVE RESEARCH SUPPORT PROGRAMS:
THE BIFAD PERSPECTIVE**

D. Woods Thomas*

Thank you very much Mr. Ketler. Miss Belcher, Dean Whaley, ladies and gentlemen.

I am pleased to be here to visit with you about Title XII, the Board for International Food and Agricultural Development and, of course, collaborative research possibilities in the fisheries problem areas.

First of all, on behalf of the Board for International Food and Agricultural Development, I want to welcome each of you to this workshop and to thank you in advance, if I may, for your participation in an exercise which the Board considers to be of greatest significance and importance. Originally, Dr. Clifton R. Wharton, Chairman of the BIFAD planned to address you this morning. Time and events intervened. In the interim, Dr. Wharton decided to leave the Presidency of Michigan State University to become the Chancellor of the State University of the New York system. The necessity of completing his work at MSU and assuming his new responsibilities at SUNY made it impossible for him to be here today. When I talked with him last night, he did ask me to extend his best wishes for a productive and pleasant conference.

To open the conference and provide a bit of background and perspective for the more specific presentations and deliberations to follow, it seems to me that it might be useful for me to speak to some four points.

First, I will identify some of the fundamental forces and concerns which gave impetus to the creation of the Title XII Amendment to the Foreign Assistance Act and the programs being developed under the authorizations of the Act.

* Executive Director, Board for International Food and Agricultural Development Executive Staff

Second, I will attempt to indicate those things which the Title XII Amendment suggests, generically, about the manner in which the bi-lateral foreign agricultural assistance program of the United States will be conducted.

Third, I will describe briefly the several categories of activities which will constitute the component parts of Title XII keeping in mind collaborative research in fisheries as a subset of a far more comprehensive program.

Finally, as an introduction to the things which Miss Belcher and Ross Whaley will say, I will try to lay out in the simplest possible terms the basic concept of collaborative research as envisioned under Title XII.

Before proceeding, let me introduce an important caveat to all that which follows. This caveat applies to the definition of food, nutrition and agricultural development as used herein. These terms should be interpreted in quite comprehensive fashion to include relevant aspects of fisheries and aquaculture as well as those of farming, per se. Out of habit, I shall probably fail to make this point from time to time, so please forgive me in advance.

In terms of the history of the Title XII Amendment and the programs being developed under its aegis, it seems fair to say that it was not the "brainchild," if you like, of any individual or for that matter, any small group of individuals. Rather, it was really the product of deep-seated, common concerns in a number of different quarters. These concerns were relevant to the future course of a broad array of world events. They were concerns about the part that the United States could and should play in the shaping of this set of events.

Let me indicate the nature of a few. In the late 1960's and in the early 1970's, there arose wide-spread concern over the sharply increased and quite irreversible global interdependencies - interdependencies, for example, in the political realm; interdependencies among nations in terms of domestic public policies

and the way that such interact, one with the other; the set of interdependencies associated with the world energy problem, inflation, and economic growth; and, obviously, the interdependencies among nations relative to food supply, on the one hand, and demand, on the other. It was against this background of increased and basically irreversible interdependencies that the U.S. posture toward foreign policy in general, and developmental assistance in particular, were and continue to be reexamined.

The appropriate posture vis-a-vis assistance to foreign agricultural development was a part of this scene. Of course, the specific thing which surfaced the Title XII Amendment was the most recent food crisis of the early 1970's and the associated world food conference of 1974.

Another factor closely associated with the genesis of the Title XII Amendment was a basic reconsideration or reassessment, if you like, in several quarters of the U. S. bilateral development assistance strategy, particularly insofar as agricultural development was concerned. There existed a good deal of worry that the response to the Congressional mandate to work with the "poorest of the poor" might lead us down a path of over-concern with equity issues to the exclusion of the equally important productivity issues. This in my judgement at least, was one of the underlying concerns among those who shaped the Title XII legislation.

A third relevant factor was a general reassessment during this period of the "enough is already known" syndrome. Most of you have been involved in one way or another through the years, in the development process. Many of you would join me in the concern that many have had over the rejection of the notion that investment in research is a necessary part of the development process and, therefore, of effective developmental assistance programs. For many years this simply was not the kind of thing which development agencies held to a high payoff, priority investment - "enough was already known."

In the 1960's there was genuine recognition, based on experience, of the necessity of research of the right kind in order to build the knowledge and technology based upon which agriculture, broadly defined, could really develop. The need to harness the scientific capabilities of the developed world's research systems to treat the problems of developing agricultural sectors around the world was a major force behind the Title XII legislation.

A fourth factor which undergirded the evolution of the Title XII Amendment dealt with the notion that the institution-building or the institution-development job in the poorer nations was done and we needed to turn to other things. The "false premise" nature of this notion became increasingly clear in the period preceeding the passage of Title XII. Most of the developing nations simply do not have adequate national systems of research, of education, and for the delivery of technology and information to end users. Similar conditions exist in the areas of policy formation, the planning processes and other institutional services fundamental to the development and sustained growth of equitable food and fiber sectors in these economics.

Still another element of the genesis of Title XII was general recognition that much of the professional expertise, both individual and institutional, required to enable the United States to make high payoff lasting contributions to growth with equity in the agriculturally developing nations rested in the diffuse, heterogeneous, complex, independent, sometimes difficult agglomeration of institutions constituting the American system of higher education and research. It is here where that which is needed most resides!

Finally, it became apparent that this great national resource simply had to be mobilized to participate fully in the world's struggle against proverty, hunger, and malnutrition. It became equally clear that mobilizing this expertise and talent over the relevant time frame would necessitate far more rational means than had existed in the past.

It was from this set of rather widely held perceptions that Title XII evolved. It is an attempt to respond in a positive and productive way to a significant set of national priorities on the international front.

Against this background, let me comment briefly on those things which, in my judgement, the Title XII Amendment is designed to do. I'm sure that each of you has read the legislation; some have done so several times. Like most bills, I'm sure you will agree, it is complex in its simplicity. Neither the letter nor the intent of the law is completely clear in its rendition. The important messages, however, come through loud and clear. Here is what I think they are.

First, the legislation provides rather explicit Congressional guidance relative to that body's perception of what the substance of our U. S. bilateral developmental assistance program in food, nutrition, and agricultural development ought to be. It suggests the kinds of developmental assistance inputs in which this nation has a comparative advantage and which will make a major difference through time in terms of resolving the world's food, nutrition, poverty, and development problems.

Second, the Title XII Amendment provides quite explicit guidance relative to what group of people and what set of institutions ought to be more deeply involved in our nation's agricultural development work abroad. Explicitly, as I have already indicated, this turns out to be the agricultural and related complexes of the American higher education, research and extension community, including as appropriate, the private sector as it factors into the development process.

Third, the Amendment provides a direct Congressional mandate to our public education and research institutions to participate in agricultural developmental activities abroad. While it is true that many such institutions have been involved in this process for many years, there has always been some question relative to the legitimacy of such activities. This question has varied from institution to institution, from one time period to another and

from one type of involvement to another. In view of the fact that most such institutions are state entities, have specific local and regional responsibilities and a long tradition of serving the needs of this clientele, this question is understandable. On the other hand, there exist significant complementarities between domestic and international educational and research endeavors. Equally, these institutions represent a major national resource which constitutes the bulk of the talent required to discharge effectively our national commitments to agricultural development in the poor nations. With the Title XII Amendment, the people of the United States, through the Congress, have said to this segment of the university community and to the people who make it run that concern with the problems of agricultural development in the poorer nations should be among their priority missions. This is, I am convinced, of great importance to all of us.

Fourth, the Amendment creates the basic "machinery;" i.e., the BIFAD, the Joint Research Committee, the Joint Committee on Agricultural Development, needed to weld together the Federal agency responsible for our developmental assistance work abroad with the talents and expertise of our educational and scientific community into a true partnership which will mount a first class developmental assistance program that the world needs and which, in our own self-interest, we need.

For background purposes, let me turn at this point to a brief elaboration of the major programmatic components falling within the scope of Title XII authorization. It is important to note that Title XII is quite comprehensive in terms of the kinds of activities which it envisions. This particular group is concerned with the collaborative research component of Title XII. This is understood and this research approach to the problems of the developing countries is indeed important. But in a broader sense, Title XII encompasses much more; it encompasses a major portion of the total U. S. bilateral food, nutrition and agricultural development assistance programs with the developing

nations. The overall concern of Title XII is one of making maximum contributions, given budgetary and other constraints, to the development, sustained growth and progress of the rural sectors of the poorer nations.

In this context, U. S. universities and related institutions may become involved in a wide array of cooperative activities with and in the developing countries. Included may be participation in agricultural sector analyses and assessments; special studies of agricultural education, research and extension capacities; cooperation in the expansion of indigenous institutional capacity in agricultural education, research, extension and other essential institutional services; provision of technical assistance for agricultural development projects; formal and informal educational activities for LDC personnel in the United States and in host countries and cooperative research on specific problems in the LDC's. Additionally, Title XII encompasses the traditional AID contract research on specific problems as well as mutually desirable university interaction with the international agricultural research centers. Also of significance is the fact that Title XII will provide opportunity for universities to evolve special university-based activities which will support in general the principal thrusts of Title XII.

In short, Title XII provides opportunity for universities to participate in innovative ways in all major aspects of the U. S. foreign assistance program in food and nutrition wherein they have particular interests, competencies and resources.

I would like to close these opening remarks by outlining quite briefly, the fundamental concepts of the new Title XII collaborative research program with which you will be working in the next couple of days. The collaborative research activity is a specific authorization under Title XII. At least in the international field, it is a new programmatic concept. I believe that it has tremendous potential if we are but wise enough to put it together effectively. To do so will require constant attention to the basic tenets of the concept. These run as follows.

First, the concept holds that a continuing stream of new knowledge and useful technology is essential to two things:

1. The development of the rural sectors of the poor countries of the world
2. The continued well-being of U. S. agriculture, fisheries, aquaculture and the like.

Second, it is known that there exists a number of physical, biological, economic, and social problems which are of common concern and of mutual interest to the agriculture of the United States and to that of the developing nations. Collaborative research is concerned with the mutuality of concern about these common problems.

Third, it is fact that the U. S. scientific community, under one rubric or another, is already investing quite heavily in research in many problem areas of concern to the developing countries.

Fourth, it is clear that there is growing scientific capacity and increased research investment in some of these problem areas in the developing countries, the international agricultural research centers, the AID "graduate" countries and the middle-income countries.

Fifth, the collaborative research concept argues that the utility of some U. S. agricultural and related research programs has been constrained and will continue to be constrained by lack of access to the laboratories, the data, the phenomena and the scientists in other countries working on similar problems.

Sixth, and of particular importance to the Title XII program, that the usefulness of research being conducted in the developing countries is seriously constrained by barriers to effective cooperation with and easy access to scientists in the United States, our research institutions, the international centers, other developing countries, and in other developed countries as well.

Seventh, that innovative, imaginative cooperation and collaboration among scientists, working on common priority problems around the world, would result in two things:

1. Sharply increased usefulness of the products of research to U. S. agriculture, fisheries and aquaculture interests
2. Increased utility of the research investments being made by the developing countries.

This then is the fundamental concept of the collaborative research support program. And it is what this conference is all about! How, in the problem areas of your individual concerns as scientists and the concerns of the institutions which you represent, may we identify priority fishery and aquaculture problems which fit this basic concept? How might we be able to put together, over the long run, collaborative, cooperative associations among our scientists and the scientists of the developing countries to attain the objectives that this program envisions? If we are wise enough, I'm convinced that we will be able to do so in a manner such that the end product will be far greater than the sum of the individual parts.

Thank you very much for your most kind attention. I shall look forward with considerable interest to working with you during the next few days on this challenging, important and intriguing endeavor.

**TITLE XII AND COLLABORATIVE RESEARCH SUPPORT PROGRAMS:
THE JRC PERSPECTIVE**

Ross S. Whaley*

Like Woods Thomas, it is a pleasure for me to be here this morning. As was mentioned, our chairman, Fred Hutchinson, is not in the country right now. I'm sorry he can't be here. The advantage of his being here is his enthusiasm for the Title XII program. I think it is quite a contagious thing and I wish he were here so that some of that contagion could run off on you. I guess one of the jobs that I see for myself this morning is to develop some of that enthusiasm.

Being with a university, as I take the pulse of my university colleagues around the country, I get the sense that the attitudes about the Title XII program went from great excitement, to a dwindling excitement, to some scepticism, and in some instances, even anger. I hope you find that after the exercise to today and tomorrow, we have changed that attitude around: that you in the fisheries community have gotten excited about the potential of collaborative research in making a contribution to the developing world. I will be a bit mechanical in my presentation talking about the role of the Joint Research Committee, talking about how that fits in to the research picture of AID, talking a little bit about how we got to where we are today, and where we hope to be in the next six months.

It's been attributed to several people, I guess mostly Mr. Findley, that Title XII would be in the international arena what the Hatch Act and the Smith-Lever Act were to the domestic arena. The idea was that U. S. universities had played a very significant role in making the market basket in this country a smaller share of disposable income of a family than any other country in the

* Vice Chairman, Joint Research Committee

world. If we could develop a way in which the research and extension capability of U. S. universities could be expanded from just domestic interests to international interests, we would make a major inroad on hunger problems internationally.

In looking at the research efforts within AID, I think it's extremely important to remember that AID is not a research agency; AID is a development agency. There was some concern over the fact that once Title XII was passed by Congress, that we not borrow procedures from the National Science Foundation and become operational the next week. Although AID is a development and technical assistance agency, there is certainly recognition on the part of Congress and on the part of the agency that undergirding development is research.

Within AID there are two major thrusts, two major avenues if you will, which involve research. One is known as CENTRALLY FUNDED RESEARCH: and the other is known as the COLLABORATIVE RESEARCH SUPPORT PROGRAM. I want to mention the two of them, because there has been a lot of misunderstanding that somehow AID was going to get out of the Centrally Funded Research or that these two were going to be merged. The Centrally Funded Research Program is intact. That particular program is the kind of contract research in which AID and the host country perceive a problem whose solution is hopefully short-run in nature, and for which the amount of money needed to solve that problem is "relatively small."

Now let me tell you about some of the characteristics, as I see them, of the Collaborative Research Support Program. First of all, these programs are aimed at research in broad programmatic areas. For example, this particular conference is focusing on fisheries, a tremendously broad programmatic area. It had its inception there as opposed to dealing with a particular fishery-aquaculture-mariculture problem. In these programmatic areas, it seems to me that there are a couple of things that we are attempting to accomplish: one is certainly the delivery of research results; and another increasing the capability of U. S.

institutions in a continuing way as a support base for fisheries expertise dealing with international development and food supplies in the lesser developed countries. The Collaborative Research Program thus has two goals: one is the delivery of research results; the other is improving the on-going research capacity of U. S. universities and research institutions.

That brings me to a second characteristic of the Collaborative Research Support Program and that is that the institutions that will be involved are those institutions that are willing on their own behalf to make a commitment to increasing the capability of their institution, in this case in fishery research, as applied to the problems of the lesser developed world. What I mean by that is that we will be looking for people to be involved who have expertise in this area, whose institutions are committed to continuing that expertise, to institutions that are willing to build in that area, and are willing to make some shifts from programs that may be totally domestically oriented to programs that have international implications. One of the things that will come up over and over again is the degree of commitment of the U. S. institutions.

Let me mention one misunderstanding that crops up continuously. I have heard many people express concern that the Collaborative Research Support Program is a matching grant program. It is not a matching grant program. The funds will not be given to institutions on a dollar-for-dollar basis. But having said that, I don't want to minimize the idea of commitment on the part of the U. S. institutions. Another way to look at it is that we want the university and the AID involvement to be complementary. We want the AID funding in these institutions to be additive. It boils down to dealing with a fixed budget and trying to get the greatest bang for the buck. It is as simple as that. And it seems like the way to do that is take AID funds on the one hand, and other funds that are available to the institutions in their existing fisheries research programs, combine them in a way that improves the capability of the institution to supply research results

applicable abroad, and at the same time build a continuing expertise in this country.

Another characteristic of the Collaborative Research Support Program is that normally it will involve more than one institution. Again that differs from centrally funded research, which is usually a contractual arrangement between AID and a single institution. In the Collaborative Research Support Program the contract will usually be with a group of institutions composed of U. S. universities, perhaps foreign universities, perhaps international research centers and perhaps other U. S. agencies. I add the perhaps because what we want is the most flexible arrangement here to find all of those people with the capability, the interest, the commitment to this program to join forces to make the most significant impact on fisheries problems.

A last area in which I see the Collaborative Research Support Program differing from Centrally Funded Research is that the amounts of money we're talking about are larger, and the commitments are over longer periods of time. Behind the idea of the collaborative research program is not a two or three-year research contract but contracts which may be three to five years in length and rolling forward. And it may be not unusual that in some of the collaborative research efforts that these contract will go on eight years or ten years. We have a longer time commitment, larger amounts of money and rolling contracts.

Now let me talk a little bit about mechanics of the Joint Research Committee and how we got to where we are today. Given the expected size of the individual Collaborative Research Support Programs, it is obvious that the number of programmatic areas that can be funded will be relatively low. I don't know what that low number is, but it is not going to be one hundred, probably won't be fifty, it's unlikely to be twenty, and it's more likely to be ten. It will not be an investment in a pot-pourri of research, but in selected high priority programmatic areas. And if you are going to do that within a restricted budget, then the question of establishing priorities for the areas in which you are going to

invest these monies becomes a significant job. A significant part of the activity of the Joint Research Committee over the past nine months has been devoted to an attempt to establish these research priorities.

The kinds of elements that will enter into the establishment of research priorities include the social demand in the lesser developed countries. One has to be extremely careful that one does not use a U. S. perspective of research needs abroad, and uses a perspective that comes from the countries that are to be assisted.

A second element is the question of technical feasibility. Simply are we at a point in time where the contributions of research are likely to be significant? Do the U. S. institutions have the capability to make contributions in this area?

There is a question of economics that enters into priority setting. In my crass way of putting it, it's how do you get the most bang for the buck. If you are going to invest a million dollars, two million dollars, in a research program, will this area deliver more in terms of food supplies, than will another area?

The last criterion for establishing priorities is institutional preparedness. That is, are there U. S. institutions with the capacity to make significant contributions in this area? Are there foreign institutions who can come along with us and grow in terms of their own research productivity? And thirdly, is there institutional preparedness in terms of the delivery system within a country? One can do a lot of research, perhaps coming up with feasible solutions to the hunger problems, but if there are not institutions in the LDC's to deliver these solutions, then it is a bad area to invest your research money. So we spent a lot of time in trying to develop priorities for the investment in Collaborative Research Support Programs. There are four of these on-going now. One is in sorghum and millet; one of them is in fisheries; one of them is small ruminant animals; another is in nutrition. These got on board early in that they were ones that

intuitively met those tests of social demands, economic payoff, technical feasibility and institutional preparedness.

Now having established priorities, a second step is how do you plan the research to be done and who is to be involved. Let us call that the planning process, and that's the thing that you are in the middle of today. And again this presents an interesting dilemma. One alternative would have been, I suppose, for the Joint Research Committee, with the support of the technical capabilities of AID, to design the research program; that is, for JRC to establish that the research areas in fisheries, aquaculture and mariculture, should be this, this, and this. This approach is unacceptable because it does not involve adequately the scientific community that will be working in the area. A second possibility, at the alternative extreme, would have been to just send out a notice to ship in your proposals. That didn't seem like a very logical alternative either. So what we did was institute a planning phase. We awarded a contract to Resources Development Associates who has the job to develop a paper on the state of the arts, to identify the institutional capabilities in the United States and abroad and then to come up with a listing within the broad fisheries/aquaculture arena of research areas. The end product of this process will result in the actual design of the program itself, in which many of you will hopefully be involved.

Let me just make two last comments. One is about funding. Let me squelch some misunderstanding. I hear two things, two kinds of feedback that I get from the educational institutions that I deal with. One was immediately after the Minnesota meeting which described Title XII, in which some number in excess of 100 million dollars was discussed. I know the people from our institution came back saying ..."a 100 million dollars--there are 50 states--that's two million dollars per state, and the odds are pretty good that we are going to get some money out of this." That's an illusion. It is an illusion because included under Title XII are all the food and nutrition efforts of AID. That

means that within that figure are some on-going programs that have already been funded. And so there wasn't, as perceived by some people, a 100 million dollars in new money that came on line with fiscal '78. On the other hand, there is the optimistic side. There are some new monies for the Collaborative Research Support Program. In addition, there are programs terminating continuously within the food and nutrition area and we will hopefully be re-directing those funds to new in-country programs as well as to research programs.

Lastly, the success of the Collaborative Research Support Program is tied to the U. S. universities and their willingness for involvement in the solution of world food problems.

My comments have been very general. Hugh Popenoe from the Joint Research Committee is also here with us; we will be roaming around over the next two days of this workshop. If there are any specific questions, we will be more than pleased to deal with them. Thank you.

**TITLE XII AND COLLABORATIVE RESEARCH SUPPORT PROGRAMS:
THE USAID PERSPECTIVE**

Marjorie Belcher*

I think it safe to say that I'm not only glad to be here this morning, but as of this moment I'm considerably relieved. There's always a certain degree of uncertainty in being the third speaker in a group of three covering roughly the same topics from different angles. And although I will repeat some points which the two previous speakers have made, the repetition with a slightly different twist may be helpful. The previous speakers have made my job much easier by going into detail in a number of areas which, given the time available, I will pass over somewhat lightly.

One of the compensations for being an old-line AID bureaucrat is the fact that you're always learning something new about a different area, or a different approach. The whole Title XII activity has been very much of a learning process for the entire Agency for the past year or so. The Agency is not only learning more about the capabilities of the U. S. university community, with whom we have always worked as you know, but also about the possibilities for collaboration, and for close cooperation; and the potentials for different relationships.

I want to assure you that the Agency from the Administrator down is determined to make Title XII work, determined to work with you, to work hard, and to take full advantage of the opportunity. I say from the Administrator down because one of the surprises to some in the Agency has been the number of offices and bureaus involved. All the geographic bureaus are involved; all the technical bureaus' people are involved; the policy planning people are involved. The General Counsel's office is up to its ears. In short, all of the Agency is finding that something which they

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thought of casually, when it was passed, as an additional piece of legislation which one of the central bureaus will deal with, isn't the case at all. With the BIFAD and its committees, we are really exploring new ways of bringing the whole potential of the U. S. university community to bear on the food and nutrition problems of developing countries.

Woods Thomas has covered the range of activities involved. I want to speak a little bit in general about the research area. Here I know I'm duplicating but I think I say the same thing slightly differently and it doesn't do any harm to say it twice. In the research area, one of the things we are all looking for is complementarity, those opportunities where a little additional effort can make work which is already going on in the U. S. domestic context on fish, on soil and water, on grains, on nutritional problems applicable to problems in developing countries. One of the things that we have learned over the last ten to twenty years is that the direct transfer of new technology is all too often not feasible. You need that extra fillip which may be additional research, which may be the testing and adaptation, which makes it applicable to circumstances, which are different physically, or which are different culturally. The old Point IV idea of direct transfer has gone. We must focus on collaborative efforts, collaborative between AID and U. S. institutions and also collaborative with developing countries so that by their participation in a collaborative research activity, they gain strength and the capacity to carry on more effectively on their own in dealing with problems of their own country and of other developing countries as well.

This meeting is very much a part of a pioneering process. I don't think any of us really know exactly how the whole planning process and then the collaborative research support grants/process is going to work. There's been an awful lot of thinking on it; some guidelines have been written. This meeting is part of the experiment as we work to find out how the process will work.

AID's program in fish and aquaculture is relatively new. Although there are some scattered efforts in the late fifties and early sixties, it really was only with the grants to Auburn and Rhode Island at the beginning of this decade that there was a concentrated effort to do research, to provide training for people from developing countries, and to provide advisory services to AID missions and to developing countries who were interested in fisheries problems. In large part it is the result of those small and pioneering efforts that the program has increased, although it is still small. There are programs in one or another aspect of fisheries and aquaculture in Southeast Asia, in several Latin American countries, and an increasing number in Africa. But this is still a very small effort. We're talking about something in the neighborhood of two to two and one-half million dollars a year from AID in addition to what the developing countries are putting in from their own resources.

It's important to remember that AID's interest in fisheries has a focus which is consistent with AID's general overall focus and direction. Our prime concern in fisheries, as in other activities, is with the poor. That leads to a concern for the small farmer and the rural under- or unemployed. With respect to aquaculture and fisheries, our principal concerns are with the possibilities for fish to provide better nutrition for the rural poor, at prices they can afford, and with fisheries and aquaculture as a source of employment and income for people who are unemployed or underemployed and whose income is so low that they can't afford to buy the things that they need for improving their way of life. This focus has a series of implications, which I don't want to spell out in any detail. It explains, for example, why we are much less interested in large scale commercial deep-sea fisheries, and much more interested in fish farming, in the possibilities for coastal fishing, and brackish water fisheries.

This group represents a very wide range of interests and activities under the broad umbrella of "fisheries." The purpose of this meeting is to narrow down these broad interests, and to

identify those priority research areas, and within those areas the specific problems that are of priority importance, that are researchable, and on which attention should be focussed in a collaborative way over the next years. And we need to narrow it down for a number of reasons.

First of all, the funds which will be available from AID to support what U. S. universities are already doing in the whole research area will be limited over the next few years. The range of possible collaborative research programs getting started over the next couple of years is in the twenty to twenty-five million dollar category, not hundreds of millions of dollars. And since collaborative research support grants will be initially funded for three years that limits the amount that will be available on an annual basis.

Secondly, there are competing demands. There's a need to establish priorities among the areas on which collaborative research activities might be undertaken. I don't need to repeat what Ross Whaley has already said but it is true that although the general area of fisheries and aquaculture is important, ranking somewhere between the first eight or twelve important areas, its exact priority ranking has not yet been decided. We've acted on a hunch that some additional research in fisheries and aquaculture is so important that it is worth going ahead to plan it. But only when we see the results of the planning activity and see what a potential collaborative research program might look like will a decision be made as to whether to go ahead with a collaborative research program in this area. In this connection, it is important to consider what others are doing. What activities the UNDP is supporting through FAO or through other organizations in the general area of fisheries; the possible role, actual or potential, of international organizations such as the relatively new International Center for Living Aquatic Resource Management (ICLARM). We need to identify what research is going on and how much of it is, or might be applicable to developing countries. What added elements are needed? What are the institutions in developing

countries which are or could be working together in this area? How can they be helped to gain strength through a collaborative effort? In the end, the focus must be on a very few high priority areas in the general fisheries field, where additional effort will make sense, and be of high priority in terms of the needs of the poor people in developing countries, if not today, then tomorrow. You all have a lot of work to do over the next day and a half. I hope I can help, but for me it's a learning session and I look forward very much to learning with you.

**TITLE XII AND COLLABORATIVE RESEARCH SUPPORT PROGRAMS:
UNIVERSITY INTERESTS**

Robert B. Abel*

If you'll bear with me, the majority of this paper must be read, because, as you could perhaps tell from the title, it is supposed to be emblematic of collaborative views rather a conglomerate expression, if you will, of the universities' attitudes toward the Title XII program. I've tried, therefore, to collect and then filter all their suggestions, recommendations, and ribald comments.

There is, however, a prologue that fairly screams for utterance here. It relates to a possible misunderstanding. In order to obtain representative flavor of the universities' viewpoints, I circulate this paper well in advance to my colleagues in academia. The responses harmonized in one sector particularly; that is, that the paper apparently had over-emphasized research at the expense of education. It was strongly recommended that I imply clearly that a university's primary obligation in all things is, after all, to provide the best possible education to the students who are its principal clients.

Now, the response I received from those concerned with the administrative aspects of the program was, interestingly, almost the opposite in that they felt I should have emphasized research vis-a-vis the other components.

This is not an illogical diversity of viewpoints, as I'm sure you'll agree. This diversity was expressed, I might remark, during one of the earlier talks this morning when it was mentioned that "well, you're here for research; this is probably your main interest." The diversity was also reflected in a letter from President Wharton of Michigan State, in his capacity as the BIFAD Chairman, to Mr. Gilligan, in his capacity as the AID

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Administrator, to the effect that he was somewhat concerned that the view of "outsiders" involved with the program was that the universities were, in fact, concerned only with research: he wanted to disabuse the AID administration of that viewpoint.

So, if you will accept the fact that there is a diversity of viewpoints which really ought to be reconciled and accomodated at some point downstream, then I'd like to offer you the distillation I have here of the university viewpoint.

The most fundamental role of management relates to the balance between authority and responsibility. This rule has special significance respecting Title XII of the Foreign Assistance Act, because the universities, as I understand the proposed doctrine, are being asked to contribute their own resources in pursuance of the Program's objectives. This is what is meant by the expression, "collaborative research " at least in my perspective. It also seems to me to imply a relatively active role by the developing countries, but more of that later. Two important issues, therefore, ought to be encompassed in this half hour: First--the universities' authorities, i.e., what's in it for the university; and second, the universities' responsibilities, i.e., guidelines for their conduct of the Program.

Universities generally consider their goals to lie in seven general areas:

- a) service to the students;
- b) service to the state(particularly in the case of the public university);
- c) intellectual enhancement of the faculty;
- d) service to the nation;
- e) material enrichment or viability;
- f) technical and cultural achievements for their own sakes, and
- g) prestige.

None of these is separate and distinct from the others; to the contrary, most of them at various times act as objectives serving

the other goals (e.g., prestige is desirable as a means of viability.) My university colleagues, however, seek to identify service to the students, i.e., education, as the number one priority; they are less concerned with the rank order of the rest.

In seeking the answer to the question--why should universities go to the trouble of involving themselves in foreign affairs, I consulted colleagues in several universities with demonstrable experience in such programs. Viewed superficially, benefits to the university would appear outweighed by the drawbacks:

- a. Loss of valued faculty members for varying, but considerable periods of time. This is not insignificant; only first rate persons should be entrusted with these types of assignments because they require rare blends of technical and social skills. These are the people who can least be spared.
- b. Adjustments of teaching schedules and techniques to accommodate foreign nations who may require "catch-up" assistance.
- c. Attention to special cultural problems such as language and religious barriers.
- d. Siphoning of resources to teach foreigners, which many believe ought better to be used to teach American youth.
- e. Risks of becoming inadvertantly involved in expensive and counter-productive activities in the Developing Countries (D.C.'s).

These are significant problems individually; in the aggregate they appear formidable indeed, and have in fact caused the managers of some universities to steer clear of such programs as matters of policy. On the other hand, these problems have been met and solved long since, inasmuch as American universities have a long tradition of training foreign students.

The reasons why the great majority of educational institutions not only accept such projects, but, as in the present instance, seek them avidly, often parallel the causes of American involvement in so many affairs that in the pragmatic sense might be termed "none of our business." They include, but are not limited to, the following because I'm quite sure that

continuance of the survey would have unearthed a number of additional purposes--limited only by the time one wished to spend in the quest:

- a. Professional advancement, which may be gained from studies of previously unplumbed regions, biological, geological, or whatever, particularly as such studies may lead to new and publishable discoveries.
- b. Intellectual curiosity, which drives social and natural scientists alike, and the social aspects of which are clearly evident in the purposefulness characteristics of the "hard scientist." For instance, the most dedicated geologist may be motivated as much by a human desire to see how humans in other parts of the world live as by his desire to augment his store of knowledge of the terrain.

In a closely related sense, many faculty members, almost by definition, have intensely cosmopolitan interests. One of the ways in which universities hold the attention (and, therefore, the services) of such professors is to participate in foreign aid programs.

- c. The opportunity to apply experience gained in other countries to one's own technological, cultural, and economic problems.
- d. Prestige! This word is as important as it is hard to define, in context. About all that can be done by way of elucidation is to observe that in modern society, aiding developing countries is considered to be socially desirable. Some universities have legitimately capitalized on this, but more to materially enhance their posture in the communities and in the nation.
- e. Service to the country is not nearly as antiquated a doctrine as some cynics would have us believe. There are both aesthetic and material aspects of the philosophy. In the first instance, altruism is not dead in the United States. Most people when they are willing to think in such terms, really want to assist their country towards achievement of its goals. In this connection, it is clearly in the national interest to educate and train foreign nationals, to help guide their scientific programs, to assist them in facing problems and opportunities, and to provide material and philosophical encouragement to them in developing their domestic public services.

Participation in such efforts is a long standing tradition among American universities, and members of the marine community can point with particular pride to their recently born, but already healthy tradition of strong and effective partnership with universities in developing countries.

There is a pragmatic but perfectly respectable corollary to the previous statement. When a university effectively helps to further a particular Federal agency's interests in one or another region overseas, the agency would be less than realistic were it to ignore said university when various benefits must be awarded. After all, it's no crime to gain, legitimately, and foreign aid can indeed be big business. I can cite aid missions, tuition payments, endowed chairs, and exciting jobs for our graduates and my colleagues can undoubtedly suggest many times more.

Generally speaking, universities often, and with complete validity view themselves and their traveling faculty members as especially valuable instrumentalities of U.S. diplomacy. They can advise both foreign governments and our own without grinding axes, and can examine problems and opportunities in a dispassionate perspective.

Taken individually, none of these reasons is sufficiently compelling to induce any given university to place international program participation high among its priorities. On the other hand, viewed in the aggregate they clearly account for the high degree of interest which is, for instance, displayed here today.

Now, having presented the rationale for participation, I would like to review some principles which might be applied to the universities' planning process; these might be said to represent the universities' view of their balancing responsibilities:

- a. Foreign students who are invited to the university should be treated without special privileges, but with consideration.
 1. Problems assigned to them should be relevant to their local needs;
 2. If possible, they should be assigned to work with, or under, someone who has personally experienced (lived through) their problems and needs;

3. Effort should be exerted to avoid giving them "bad cultural habits" i.e., perspectives of needs and opportunities colored by conditions in the U.S.A. rather than in their own country.
 4. On the other hand, once their education is completed, the hospitality should be turned off like a light. After all, they must go home!
 5. "Over training" should be avoided. A person who is thoroughly indoctrinated toward solving problems by depending heavily on sophisticated computers may be relatively helpless upon returning to an environment lacking such apparatus. On the other hand, of course, it may prove helpful to him or her to know how to gain access to such equipment in another country.
- b. Preliminary discussions between the principals should be planned thoughtfully so as to arrive mutually at the optimal rank order of priorities. Neither the American university's aspirations nor the developing country's desires ought to totally dominate the planning process.
 - c. It is the experience of some American participating universities that students enrolled in a conventional academic degree program are sometimes temporarily derailed by their own governments, i.e., reassigned to a project or problem when it is felt that the expertise they have already acquired is relevant to, and needed in, the given situation. This elongation of his academic career may or may not be personally pleasant for the student, but overall, such process should be viewed as beneficial, reflecting the developing country's confidence in the program and recognition of the worth of the student, and thus gratifying to the university involved.
 - d. Nothing in the program militates against three or four way partnerships, i.e., private foundations and industries may be legitimately invited to participate. In such cases, however, care should be taken to avoid "planning from the top down," i.e., reflecting more of the personal interests of top executives in the plan than suitable to the project's purpose. Further, the lead agency responsibility must not be abrogated by the university.
 - e. The university, even though an AID (or other Federal agency) contractor, should aim for a position of direct dealing with the developing country or its delegated institution.
 - f. In working with developing countries' participants, the most important objective is to build capacity for problem solving vis-a-vis solving the problems directly, for the developing country. This should be underscored; many believe this to be the most important of all the guiding principles for implementing the Program.

- g. A resource that is distressingly ignored in the United States is its cadre of senior, often retired, personnel who are often lively, extremely well informed and expert in many fields, and willing to participate in such programs. Use of such personnel also results in least impact to a university's own faculty schedule.
- h. Regardless of the particular type of project at hand, care should be exercised to avoid overlooking universities' social science departments. These faculty members are often exceptionally useful in the various transfer aspects of even highly technological programs. In fact, the most successful projects ought to be products of social and natural science blends.
- i. In considering fisheries directly, it must be kept in mind that the emphasis is normally on "artisan fisheries," i.e., projected to the small individual fisherman with his poor boat, rather than to large-ship or factory style establishments. This consideration should underlie all phases of proposal and program development.
- j. In the same connection, a basic tenet of the Program is that its principal targets are the lowest income levels in the poorest countries. In this regard, it may prove useful to invite participation by a third nation, which for any reason may be better able to adapt to the educational demand than the American university. A recent situation is offered as example where personnel from an African nation desiring to create a coffee industry were training in a South American nation at U.S. expense.
- k. A common failing of many assistance programs relates to their failure to recognize infrastructures and secondary and tertiary reactions to activities. For instance, significant fishing harbor improvement may result in vastly increased usage--of course, this is the goal. This expansion, however, may place excessive demands on local lumber industries, require new or improved roads, occasion service industry expansion (e.g. stores, repair shops, etc.) and perhaps even require new schools, if considerable population growth results. These possibilities must be explored carefully in the planning process; ignoring them could cause more harm than if the project had not been started in the first place.
- l. International centers of technology in the poor countries are excellent targets for project planning. They already possess facilities for education and training and can reach large numbers of people in their respective countries with relative efficiency. They are also experienced in identifying problem areas, and able to offer the American university people the most effective platforms from which to work.

- m. Generic problems should be viewed as promising possibilities to be explored. These are problems, the solutions to which can be adapted to many countries.
- n. Techniques which may, on superficial examination, appear to have been sufficiently developed to merit no further examination, are sometimes worth re-evaluating. Fish protein concentrate and solar drying of fish are offered as examples.
- o. Viewing the Program responsibly, a university must strive for the "additionality" factor, i.e., the types of projects that are in the university's own best interests. These may include inter alia, research areas in which the university's investigators are already interested, or geographic regions regarding which certain additional geological, biological, or anthropological information may be desired.
- p. The Advisory or Extension Service procedure is relatively underdeveloped in most developing countries. Particularly the American Land and Sea Grant colleges have had decades of experience in formulating optimum procedures. The developing countries' governments who have already established such services are extremely enthusiastic and give them their highest priorities. The American university, therefore, should constantly seek to create and expand such programs, wherever possible. In this connection, however, it is not necessary to assign large teams for the purpose; one or two experts should suffice.
- q. As part of the current Law-of-the-Seas mess, freedom of scientific research has become a matter of intense concern to American ocean-minded universities. Reacting completely many of these universities have already begun the necessary efforts to help developing countries to better utilize the results of research in their waters. These efforts may be expected to escalate, and AID will undoubtedly be asked to pay some of the bills.

I'd like now to offer some views of opportunities for United States universities to assist their colleagues in developing countries in enhancing their high seas fisheries which were contributed by Dr. Frank Williams, of the University of Miami.

The most obvious need is for individuals trained to evaluate the types of resources available within the jurisdiction of their respective (developing) countries, and within those countries' own perspectives.

Without professional scientists, responsible officials have to search outside their countries for such individuals. Advice from foreign scientists, however, will always be suspect unless close personal links are forged.

Fisheries should be high-priced if export is intended or low-priced if local consumption is the goal. In the latter case the species should be selected with great care.

Some questions which immediately arise, include:

- a. If the species is intended for local consumption, which products ought to be sought?
- b. Is employment a goal?
- c. What are the public and private sectors' roles?
- d. What can international organizations do to help (e.g., with education and training)?

Design of low-cost fishing harbors ought to have high priority.

American universities often tend to forget that developing countries are in tropical and subtropical climates.

Respecting the important considerations of vessels, the degree of specialization varies with the endurance which is required. United States universities do have some specialists who can assist developing countries available in the students' home countries. He should ascertain whether, in fact, the students in their own organizations would be restricted to desk calculators.

The instructor must be well versed in physical oceanography.

In this country we do not make enough use of the special short courses.

We need more training programs of natural resource scientists into fisheries scientists; this can take place within either the United States or the respective developing countries.

We need much more information on stocks and migrations. Many high seas stocks pass in and out of the range of fisheries economic zones with great frequency.

The fisheries scientist needs to produce advisory information for his own (developing country) fleet. He must educate fishermen,

politicians, and bureaucrats regarding policies in his own country.

Most training should be done in situ, rather than in the United States.

Joint cooperative efforts are needed. Joint ventures are best conducted between the developing country's staff and the United States university staff. The foreign countries, however, obviously want more say in planning and developing the courses.

The importance of furthering statistics must be emphasized

In summary, the United States contribution could include but should not be limited to:

- a. Better education of fisheries scientists from the developing countries in the United States.
- b. Short courses in situ in administration and technical training.
- c. Statistics, gear, and vessel training for the larger developing countries.
- d. Emphasis on the need for relevance with respect to problems in the developing countries.
- e. The need to use our own people more effectively in the developing countries.
- f. More efficient employment of the best expertise in the United States, and reduction of the bad expertise.
- g. Encouragement of people at the institutional level to tie all these things together.
- h. The understanding that our view of utilization versus conservation may be different from the view of the developing countries.
- i. The projection to socially appropriate technologies.

With respect to the conference subtitle, a catalog of the research needs of developing nations in small-scale fisheries and aquaculture is clearly beyond the scope of this paper particularly since we're not even sure yet what countries we're talking about. In what I firmly believe to be the most effective manner in which the United States can operate an AID or similarly intended program, individually university professors, for a myriad of reasons, have formed personal bonds with correspondents in developing countries'

universities. What we're really after, I submit is the sum of all their perceptions; and this objective ought to comprise a serious component of AID's plan.

It is not a coincidence that this personal interaction has been particularly encouraged in the Sea Grant Colleges; the technique's potential has been recognized in Congress' creation of the Sea Grant International Program. In the universities' view, coordination between AID and Sea Grant (and the various NSF offices, for that matter) is desirable.

Listed generically, and without priority, the following categories of activities are viewed by my colleagues as historically useful and/or potentially beneficial, in terms of both local nutrition and economic improvement (i.e., export).

- a. Pond culture of finfish
- b. Cage culture of finfish
- c. Pond culture of crustacea and shellfish
- d. Polyculture, i.e., treating two or more species in a single habitat
- e. Plant culture (for both nutritional and biomedical purposes)
- f. Preservation techniques
- g. Improvement of fishing gear and boats

The problem areas are adequately treated in the workshop schedule. What I've been reciting are mostly the guiding principles which a number of interviewed veterans of such programs have felt ought to apply to a university's planning process, if it expects to perform usefully in the Title XII Program. A few general observations about the Program's charter might now be in order.

First, concerning Ms. Belcher's remarks about priorities, the universities are understandably cautious about dealing with an agency in which fisheries and aquaculture have not enjoyed high priority. If the program is to have maximum utility, a rather broad interpretation of "Fisheries and Aquaculture" should be applied. Certainly, improvement of fishing gear, fishing boats,

and aquaculture facilities ought to be allowable. Representatives in some developing countries ask for assistance in fishing boat construction. Others want help at the other end of the marine technology spectrum in controlling erosion and the impacts of storm damage. This list grows proportionate to the nations contacted. Judgement will have to be exercised in determining the types of projects to be included in, or excluded from the program during its rational phases.

The universities are alarmed over what they perceive to be a doctrine of excluding education from the program. In our view an attempt to divorce education for research would be extremely short-sighted.

It is necessary that the university keep in mind that this is a "Collaborative Research" Program. Under existing doctrine the university, executing the project or projects, is expected to contribute its own resources, over and above what it is being remunerated for by the government. It is all the more desirable, therefore, for the university to propose projects in which its faculty members are personally interested and which will result in benefits of some form or other to themselves. These have been discussed previously. The universities must view the Program in terms of regional priorities and these priorities are assigned as inverse functions of per capita income. Thus, Africa, Southeast Asia, and the South Pacific have the priorities. Again, referring to the "Collaborative Research" phraseology, the universities perceive the opportunities in this program for a partnership process, and they would like to have a hand in the decision process, attendant upon the Program's evolution. Having said this, it must be confessed that the universities don't really understand the difference between the requirement for provision of their own resources as conventionally and historically defined.

Finally, the universities must realize that the expressions, "poor" and "developing" countries can hardly describe the totality of technological progress. There will inevitably be discovered sectors of highly qualified expertise in even the poorest nations,

in some cases rivalling or even surpassing our own. This is especially true of fisheries and aquaculture where skills acquired by generations of experience have not been entirely overtaken by high technology.

The university professors, many of whom have some experience in developing countries and who have formed close personal friendships therein, recognize this fact and are anything but likely to play "Ugly American" by adopting "Lords-of-the-Manor" and "Santa-and-his-Helpers" attitudes. In fact, if a single potential benefit of this Program might be highlighted, it would have to relate to the opportunities we see to make new friends, to tighten already existing bonds, and to assist in taking a few micro-steps to "one world."

In closing, I would like to acknowledge the assistance I've received from Sea Grant Directors, Hugh Popenoe, Bill Wick, Niels Rorholm, Jack Davidson, and Don Walsh, in a typically Sea Grant collaborative approach.

**TITLE XII AND COLLABORATIVE RESEARCH SUPPORT PROGRAMS:
VIEWPOINTS OF DEVELOPING COUNTRIES**

William Ellis Ripley*

I am highly honored at being selected to suggest development needs for the developing countries. Since there is much to compress in the next few minutes, I'll cover the subject in two parts. First, general research needs of developing nations in small-scale fisheries and aquaculture, and second, a brief survey of the facilities and services available to home in on the needs in particular countries and regions. Since each country and each culture is an entity unto itself, the design of a program for a specific country must be based on local needs. I won't attempt to advise on a country program but will list the basics as seen by the countries themselves in their preparation for development.

Under the first section of general needs, the first piece of information is that technical cooperation among developing nations is becoming a major source of technical transfer in the developing world. I have here a copy of the information on a conference to be held on this subject next year in Buenos Aires, Argentina. I won't say more about this except to mention that if fisheries development is to become a select area for U. S. participation, representation by fisheries technicians should be at the meeting.

The second general piece of information is that the United Nations is sponsoring an International Conference on Science and Technology for Development in 1979. It would behoove the designers of foreign assistance programs to have representation at this conference also since definite plans for the future of the developing countries will be formed at this conference.

In preparing for this conference the developing nations have stated their concerns for dealing with the scientific and technical

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dimensions of the new economic order they hope to generate.

These approaches should:

1. Substitute independent, isolated and sometimes discordant actions by a unified integrated and systematic application of science and technology to the process of development. In other words, a coordinated program for the country.
2. Consider the role of science and technology in development as a part of the whole system of structural changes, national, international and global.
3. Fit the development stimulus to the economic, political, social and cultural needs of each country.
4. Create indigeneous technologies that fit the local experience and capability.
5. Develop international cooperation for the research and development of the world's resources.

This is a big order for the application of science and technology for development. It will require:

1. Choice of the specific technology to be transferred (keep in mind item 3 above)
2. Adoption of knowledge and methods for the need of the developing country
3. Integrating science and technology into the economic and social framework
4. Designing new R&D approaches to overcome the obstacles of development

A framework is required to the application of research and development:

1. The institutional systems to handle this are lacking in many developing countries. They have to be strengthened or created.
2. Links need to be established between the R&D in developed countries to meet problems in the less developed.
3. Mechanisms are needed for exchange of R&D information significant to development.

4. Strengthen the international cooperation among all countries.
5. Promote cooperation among developing countries and enhance the role of developed countries in such cooperation.

Finally, there is the need to improve the use of the existing U. N. system and other international organizations in the whole process of science and technology for the developing nations.

I know that these are all generalized and do not identify the specific needs of a particular country. I will, however, share with you an annotated shopping list of operational objectives as specified by a number of nations, mostly developing:

1. Zaire: Support the poorest sectors of the country (in accordance with their abilities to accept the support)
2. Cuba: Improve the opportunity of the local population to achieve fulfillment as humans
3. Mongolia: Strengthen the independence of the individual country, and end the one-sidedness of their economy
4. Bulgaria: Reduce the overhead cost and get more resources to the operational level
5. Indonesia: Meet the needs of the 500 million children living in poverty and deprivation
6. Surinam: Develop the skills of the developing nationals in negotiating trade and transactions
7. Tunisia: Enhance economic and social development projects, strengthen technical cooperation among developing countries
8. Finland: Focus on the poorest countries and the poorest sectors of their societies
9. Czechoslovakia: Develop technical cooperation among the developing countries for self-reliance
10. Australia: Build the capacity of the poor to meet their own basic needs
11. Cyprus: Create regional and interregional use of the technical skills in the developing countries
12. Ukraine: Emphasize economic and social development and speed up implementation of projects

13. Nepal: Foreign experts while on assignment in a developing country belong to the development corps and not to the diplomatic corps. They should work like missionaries and set an example of modest living.
14. Kuwait: Coordination is needed for technical development among the sources of assistance in order to avoid duplication and to increase the efficiency of aid.
15. Economic Commission for Africa: Four major obstacles are involved in the transfer of technology: (1) developing countries lack capability to shop from technological super-markets; (2) they have limited capacity for articulating their technological needs; (3) they are generally handicapped in the selection of technologies best suited to their needs; (4) they are not familiar with negotiations that ensured the acquisition of technologies on the most favorable terms.

Let's examine the needs of one country - India. I'll quote from the Government's program. From this, I think you will see why it is necessary to relate the needs of the program to the state of fisheries development in that country. This development level is outlined in the country programme and in the projects under execution in the country.

The overall policy of the Government on Fisheries is one of promoting growth with stability. The formulation of policies and priorities is closely related to the broad objectives of the country's fisheries development programmes. The objectives of the fisheries development programmes during the Fifth Five Year Plan period are:

- to increase availability of protein rich food thereby contributing towards bridging the protein gap in the Indian diet;
- to improve the socio-economic conditions of fishermen who are among the economically weaker sections of the population through measures designed to provide more effective and remunerative methods of production and distribution; and
- to tap on an increasing scale the vast potential for foreign exchange earnings through export of selected priced varieties.

In the marine fisheries sector, the strategy is for the development of traditional, coastal mechanized and deep-sea fisheries. The development of traditional fishery is envisaged through improvement of designs, material and operational aspects of fishing units, fish handling, distribution and marketing and economic betterment of the fishermen community. The coastal mechanized fishery is to be further developed by introducing additional mechanized boats, by increasing their operational efficiency and reducing the operational costs. The development of deep-sea fishing is envisaged by introducing deep-sea vessels either imported or indigeneously constructed and establishment of infrastructural facilities such as fishing harbours, processing plants, cold storages, etc. Diversification of fishing, development of diverse fish products and joint ventures in selected fields between Indian industry and suitable foreign industry are encouraged. Besides, marine fisheries research, extension and training activities are intensified.

In the inland fisheries sector, main emphasis is to achieve higher fish production through adoption of improved fish culture practices; augmenting spawn collection, fish seed supplies and creation of additional nursery areas. Fish culture operation under the Fish Farmers Development Agency is intensified.

Planned development of fisheries commenced from the First Five Year Plan which started in 1951-52. The Programmes and schemes drawn up for the Fifth Five Year Plan (1973-74 to 1978-79) are the continuation of the developmental activities in the various fields with special emphasis on such sectors in which attention has not so far been adequately given. Various plan schemes are formulated after a critical review of the progress of programmes achieved during the previous years and the difficulties/bottlenecks encountered in the implementation. Each of the plan schemes includes objectives, physical programmes, targets and other objectives as may be relevant to the subject with due regard to the national objectives which are self-reliance, export promotion, more equitable distribution of income and wealth, generation of more employment and improvement in the economic as well as social conditions of the weaker sections of the Society.

Based on the functional pattern and administrative nature, the various fisheries plans are classified under 3 categories, viz., (i) Central Sector Schemes, (ii) Centrally Sponsored Schemes and (iii) State Sector Schemes. The Central sector schemes cover activities which are either the direct responsibility of the Centre or in which the Centre has direct promotional interest. The centrally sponsored schemes are

those sanctioned by the Central Government to assist the States in key areas where Central assistance becomes necessary. These schemes are administered by State Governments. The state sector schemes are formulated, financed and administered by States themselves.

A list of the central and centrally sponsored schemes along with the outlays in the Fifth Plan is given in Appendix 18.1.

The important schemes envisaged in the state sector for marine fisheries are:

- 1) assistance to non-mechanized types of traditional fishing;
- 2) assistance to small boat mechanization programme;
- 3) assistance to deep-sea fishing;
- 4) marine fisheries research and pilot projects;
- 5) fish processing, storage and marketing;
- 6) training and education;
- 7) extension: and
- 8) provision of housing colonies for fishermen designed on a functional basis.

On inland fisheries, the schemes under the state sector are:

- 1) river fishery management and spawn production;
- 2) setting up of district level fish seed farms and block level nurseries;
- 3) development of fisheries in silted up water systems;
- 4) assistant to fish culturists;
- 5) development of reservoir fisheries;
- 6) brackish water fish farming;
- 7) cage fisheries: and
- 8) high altitude fisheries

The next step in our discussion is to focus on some research activities that need to be carried out in the small-scale fisheries subsector. I have listed the major studies in sequence basic to any small-scale fisheries assistance program. I emphasize that they are not action programs since action programs require an organizational structure to carry them out. Implementation is the work of the country bolstered by technical assistance and aid organizations.

Research Activities Needed in Small Scale-Fisheries

1. Socio-cultural background studies of regional areas areas to determine if a common pattern exists (to make pilot study applicable in several areas).
2. Econo-political assessment of the national fisheries structure, its legal position and government policy in the country.
3. Socio-economic background studies of individual fisheries communities where assistance is contemplated.
4. Analysis of the artisanal socio-economic structure including relationships of buyers, market exchange, transportation, low capital cost for fisherment, etc.
5. Technological study of the fisheries operations in a selected community. This is to assess the capacity of the community for improvement in its production if any, and the impediments thereto.
6. Specific design of the technological change necessary for the community and the preparation of the infrastructure to support it; i.e., gear change - supply, finances and credit, management arts, purchasing, bookkeeping, etc., construction care and maintenance, demonstration, training. In general, the design must provide for the organization of a continuing mechanism for the support of the technological change in the community.

Now, for a brief survey of the facilities and services available from the United Nations system.

The UNDP/FAO Fisheries Sector

1. UNDP has offices in every developing country in the world.
2. Each country has developed its country program, listing its economic background, its constraints on development and its priorities in development and a shopping list of projects to carry out its development plan. Some are funded by UNDP/FAO and some from bilateral sources. UNDP programs equal \pm \$500 M/year.
3. Each country has projects in several sectors. Example: India - UNDP plus Government counter-part contribution

- a. Agriculture, forestry and fisheries (35) \$27M
- b. Education (8) \$8M
- c. General economic and social planning (14) \$2.2M
- d. Health (14) \$4.8M
- e. Industry (37) \$40.8M
- f. Science and technology (26) \$27.7M
- g. Social security and other social services (6) \$2.7M
- h. Transport and communications (20) \$7.7M

Total \$155M for 160 projects

- 4. Fisheries projects:
 - a. List with marked small-scale and aquaculture projects
 - b. Regional and interregional project network
- 5. As an example of information and publications available on the subject, the subsector of small-scale fisheries and aquaculture, the South China Sea project probably has done more than any other project. This list contains approximately 95 titles.
- 6. What I have tried to show is that there is a lot of work that has been done all over the world in developing aquaculture and the small-scale fisheries, and it doesn't have to be repeated.
- 7. I would suggest that wherever a program is planned for assistance in the small-scale fisheries in any country, it cannot be done by osmosis or by remote imagination. It has to be done on a local basis and that requires knowledge. And mainly, it has to involve those that understand the culture, the technology and what has gone on before. Here is a list of suggestions.
 - a. Review the country program with the resident representative and the senior agricultural adviser or his team, if any. Use the U. S. Embassy's resources. Learn what the basic constraints to development are in that particular area. You cannot absorb it on a two-week visit to the country.

- b. Review with the appropriate government officials the interests of governments and their priorities for development in the sector.
- c. Use the UNDP and U. S. Embassy offices to determine the parallel interests of other bilateral contributors in the country. Don't run head on into the same project being conducted by others.
- d. Talk to the local academic and other institutions involved in development. But be sure that they are in contact with the real development needs of the country.
- e. Do contact a regional or country program manager if there is one in the country or in a regional program.
- f. Use whatever background papers are available on the country. The U.S. and FAO have lots of them on every country in the world.
- g. Lastly, be sure that the objectives of your program are designed to develop employment for the fishermen, not the contractor.

Perhaps to summarize I might start by quoting from the statements made at the last FAO conference in November 1977.

"Food is a political right that underpins all other human rights...Every country in the world is fighting and losing the battle of bureaucracy...Hunger is primarily a problem of the poor and powerless. The rich somehow manage to get enough to eat... Poverty is a complex of deprivations, only one of which is hunger." (Andrew Young, Ambassador to the U.N.)

I think that these problems are basic to those that we are discussing here today.

There is still another reality: even with massive external help, many developing countries today lack the resources required to meet the basic needs of the great mass of their poorest people, whose consumption potential even for the "basics" in life is well beyond the means of the most compassionate government.

A major effort must be expended to encourage greater technical cooperation among developing countries themselves. The exchange of appropriate technologies and experience by the developing countries with each other can have considerable impact in the satisfaction of basic human needs. For, if you reflect on it, there is relatively little that developed countries can teach developing countries about dealing with the kind of poverty found in remote villages in Chad or in Indonesia.

In my experience, it is this unhappy reality which constitutes the greatest source of despair among developing countries today. They are far more aware of the plight of their poor than most of us are. And relieving that plight confronts them, not only with the need for vastly expanded resources but also with complex political issues, no matter what the form or base of popular support of any particular government. These are difficult decisions.

And this brings me to one final reality none of us can escape. Because sensitive political decisions are at the heart of any genuine anti-poverty strategy, there is very little that aid agencies or donor governments can do to impose any approach upon countries which are either unready or unwilling, for whatever reasons, to accept it.

THE FISHERIES RESEARCH PLANNING PROCESS – WHAT TO EXPECT

Douglas M. Jones*

I would like to discuss very briefly just what it is that we--and by we, I mean those of us in AID, the Joint Research Committee, the BIFAD--expect from this Title XII planning effort.

First of all, as has been pointed out here this morning, we are concerned primarily with research. Obviously this concern cannot be so exclusive or limiting as to preclude consideration of other related areas such as teaching, training, and manpower development; such as extension and the outreach functions relating to technology transfer; such as public policy formulation and implementation in the developing countries. All of these, like research, contribute to the process of change which we call development. While I'm sure that many of our discussions throughout the remainder of today and tomorrow will lead us into the tangential areas, I would hope that we do not go too far astray from the central concern for research. I hope that those who will be leading the working group discussions will exercise a strong hand in guiding the discussion along this more narrow trace so that our stated objective relating to research planning can be achieved.

With respect to the research planning process, we are concerned, at this point I think, with some first approximations--with a sorting out process which will provide a rational basis for making judgements as to what are the major research problem areas which should be addressed, what resources should be mobilized to address those problems, and how should our collective capabilities be organized to meet research needs.

As has already been noted this morning, the broad area of fisheries and aquaculture, as it relates to our development

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concerns, encompasses a wide range of activities, decision processes, and problems, which are either endogenous to or which impinge on the fisheries and aquaculture sectors. Endogenous factors include, but are not necessarily limited to:

1. Production and harvest technologies
2. Methodologies for management and protection of resources or the related environment, so that production and harvest can be sustained over a long period
3. Handling processing and distribution systems, all of which are integral parts of the overall systems which result in increased food availabilities or better utilization of biomass for human nutritional purposes. Also we need to be concerned about factors which are exogenous to these systems. We need to be particularly concerned about:
 - a. Social and political systems
 - b. The public policy milieu which impinges on food production and its ultimate utilization.

With this in mind we (AID) have asked Resources Development Associates to undertake a seven-step process.

First, we want to begin by identifying various programmatic research areas that are reasonably compact, reasonably homogeneous, susceptible to concentrated research efforts, and which logically could become the basis for specific collaborative research support programs.

As an illustration, the following might be considered as a framework for delineating programmatic research areas:

1. Freshwater aquaculture production technology
2. Mariculture production technology
3. Capture fishery technology
4. Management of fish populations in open ecosystems
5. Environmental considerations related to various types of fisheries

6. Social science aspects concerning fisheries and aquaculture development including government policies and socio-cultural institutions which inhibit or enhance growth and well being within the fisheries and aquaculture sector
7. Marketing, handling, processing, and distribution systems relating to fishery products including food technology and nutrition implications.

The foregoing is illustrative and is neither exhaustive nor exclusive nor is it meant to foreclose possibilities of addressing research problems along other lines. Alternatively we might want to think in terms of organizing research around a single commodity or fish type such as tilapia, milkfish, or carp and then addressing various constraints within a vertically integrated system from production through final utilization. What we are looking for ultimately are problem areas which can be developed into cohesive research programs. We wish to avoid the smorgasboard approach of financing research on a project-by-project basis.

Second, once the programmatic areas are identified and defined we need to describe in further detail the major research problems which need to be addressed. The following need to be considered:

1. The current state of technology
2. Factors which pose significant constraints to development objectives
3. The unusual opportunities for technological change which would enhance LDC well being
4. Potential benefits to specific target groups in the LDC's, or other considerations which are deemed appropriate.

This step involves a "fleshing out" of the programmatic areas which were identified and defined in the earlier step.

Third, following the identification and definition of the broad programmatic areas and description of the research problems and opportunities within each, it will be necessary to make some judgements about which are most important in terms of overall development objectives and AID's capacity to respond. In ordering priorities we will be keeping in mind the four points which Ross Whaley mentioned this morning: the relevance of research to the LDC problems; the technical feasibility of finding a research solution; the probable impact on LDC development once research solutions have been found; and the preparedness of the U. S. university community to lead and participate in research programs.

Fourth, we will also be looking for options with respect to funding strategy. Does it make sense to single out one major programmatic area and try to develop a single large collaborative research support grant or might it be better to think in terms of two or more smaller grants. Timing and phasing need to be considered. While we are thinking in terms of a planning horizon which extends through the 1980's, funding will be provided for shorter periods--perhaps for three to five year programs. The planning exercise will need to analyze these management aspects within the context of current expectations about funding availabilities as well as taking into consideration the priorities arrived at in step three.

Fifth, we will be looking for Resources Development Associates to prepare an inventory of U. S. university capabilities to undertake research work consistent with priority needs. We expect this capability inventory will take into consideration the depth and breadth of scientific talent in various institutions as well as the commitment of institutions to the collaborative research concept.

Sixth, we also need to make some early assessments about which LDC institutions have scientific resources to participate with counterpart U. S. universities in collaborative research. This phase will involve identification and inventory of LDC

talent, interests, and institutional capacity. Obviously it will not be possible to involve all qualified LDC institutions in collaborative research programs but we hope to be in a position to make some recommendations as to which of these are the ones which should be considered for participation in AID financed research activities.

Seventh, we need to examine what are some of the options with respect to organizing and developing relationships between universities, and LDC institutions which will facilitate carrying forward a collaborative research program. Experience to date does not give us very much guidance on what can or should be done in this respect. While we may not be able to come up with firm recommendations we believe that we can identify options which will be useful to the JRC and BIFAD in formulating the rules and procedures which will govern collaborative research.

So that we are all clear, I'd like to indicate very quickly what we do not expect out of this exercise. We do not expect a detailed research agenda, or research program design which tells us, the individual universities, or the researchers what it is in detail that they ought to be doing or which asks them to undertake a specific research assignment. We are trying to sort out some first approximations of what are believed to be the major problem areas, and to identify the institutions which might be involved. These institutions subsequently can and should have a hand in formulating the specific research design and negotiating the details of their own particular program.

We are concerned that this research planning process not be a unilateral one on the part of AID or its chosen contractor. We certainly hope that there will be a meaningful input from the scientific community represented in the U. S. university system. If the conclusions and findings from this planning exercise cannot represent a consensus of what the university scientific community thinks, we are hopeful, at least, that there will be a broad base of support for the views and recommendations set forth therein.

One final point: I think, as Ross Whaley and Marjorie Belcher have pointed out that we need to keep in mind that the amount of funding that we are ultimately talking about is limited. Being realistic we probably would not expect more than one collaborative research support program for fisheries to be undertaken in the initial year of the program. And I think it's fair to say that not all of the universities that are represented here today are likely to be involved, or to share in that program. This may be because the particular choice of programmatic areas for collaborative research support is not one in which some of your universities have a strong capability, or in which your university may have an interest in making the correlative inputs which are likely to be required.

The guidelines and rules which govern these collaborative research programs are just beginning to be established. As yet there has been no rich legacy of experience to look back on to see what works or how things progress. We are confident that with open discussions and free exchange of ideas we can develop a system which will be satisfactory from both the scientific and administrative points of view.

Thank you.

REPORT OF WORKING GROUP # 1

John S. Glude, Chairman*

The aquaculture workshop included lively discussions which extended well into the evening of December 14 and took two directions: one, a look at detailed research that, in the participants' experience appeared to be important for the development of aquaculture; and second, the general categories of research that include the specific research areas discussed at the workshop.

After the introduction of participants, the chairman asked for recommendations of important research areas, based on the experience of those individuals who had worked in overseas projects. The following areas, in which the development of aquaculture in lesser developed countries is limited by the lack of knowledge, were identified.

Richard Neve discussed the problem of limited productivity in coastal waters and described experiments at the University of Alaska which showed that four years growth of mussels could be achieved in twelve weeks with an artificial upwelling system.

Robert Wilson listed the need to determine nutritional requirements of species cultured in lesser developed countries and the importance of using low-cost native foods.

Evan Brown commented on the need to develop low-cost systems which would produce low-cost foods.

Harold Hagen described trout culture at high elevations in South American using local foods as a source of income and nutrition. Known methods could be applied without further research.

Donald Johnson discussed the need to determine water quality in relation to environmental requirements of the culture species with emphasis on the effect of contaminants and the physiological response of the animal.

* Member, Research Advisory Panel, Resources Develop Associates

Addison Lawrence stated that although some species of shrimp can be matured in captivity at the experimental level, it will take 2-5 years to develop commercially applicable methods. He also commented on the need to understand nutritional requirements of shrimp larvae in the protozoa and mysis states and of juveniles from 8 to 16 grams.

William Lewis, Sr., discussed the problem of aquaculture in lower rainfall areas and suggested closed system hydroponics combined with fish culture. Research on this is on-going.

Craig McPhee described the need to control unwanted species of fish as well as weeds in ponds or reservoirs and suggested the use of selective toxicants which have proven valuable in the states of Idaho, Oregon, and Washington.

Wallis Clark, with the support of Ron Linsky, Graham Gall, Fred Conte, and Paul Sandifer, suggested grouping these research needs into generic areas such as: nutrition, feeds and feeding, pathology, reproduction, and environmental requirements.

Roger Mann suggested that need to use wastewater as a resource in aquaculture.

Samuel Meyers emphasized the need to improve efficiency by integrated low-technology aquaculture-agriculture systems which are highly labor intensive. Howard Johnson described this as "control and manipulation of nutrient flow."

Serge Doroshev described the importance of participation of local countries in the selection of projects, and told of inappropriate projects in Cuba on the rearing of Chinese carp, Mangrove oysters, eels and mullets. After these projects have been completed, it was found that these species were not wanted by the Cubans. This substantiated Robert Abel's caution in the earlier session: "Don't solve their problems; teach them to solve their own."

Ernest Brannon commented on the need for basic information on nutrition and feeds, pathology and reproduction.

An attempt was made to establish priority ratings on these listed research needs following a system that was used in the

development of the NOAA species plan for Macrobrachium. This effort was aborted, however, because the participants felt that they were not well enough informed regarding this area to make evaluations in this detail.

Instead, there was a consensus that the broader, generic research areas, important to aquaculture, should be selected at this time. Detailed research projects should be planned jointly by U.S. universities, organized formally or informally into consortia with planning input by the developing countries and participating overseas universities. It was also considered important to get input from AID and UNDP missions and to learn of similar projects carried out by other organizations in those countries. As a result, most of the discussions concerned a set of topics prepared by Ron Linsky and a selection of those that are important to aquaculture development.

The first listed topic is breeding and seed production. This includes the areas of:

- . reproduction
- . reproductive physiology
- . nutrition of adults, juveniles, and larvae
- . environmental factors
- . behavioral responses.

The second, nutrition, foods, and feedings includes:

- . nutrition
- . nutritional requirements
- . availability of inexpensive feed ingredients
- . analysis of potential ingredients
- . natural food organisms in ponds.

The third, genetic selection and hybridization, includes:

- . determining genetic variabilities
- . identifying characters for selection
- . studying genetic nature of desirable characteristics.

The fourth, intensification of culture systems, includes:

- . polyculture

- . integration with agriculture
- . physio-chemical parameters
- . effects of metabolites
- . stress effects
- . utilization of ecological niches.

The fifth, aquacultural engineering, includes:

- . the study of physical, chemical, soil and site characteristics
- . the assessment of constraints in construction and operations.

The sixth, aqua-farm management includes the production problems such as:

- . disease
- . predators
- . parasites
- . pests
- . weed control
- . and physical, chemical and other causes adversely affecting aquaculture operations.

It also includes the balancing of fixed and variable costs, especially energy demands, to optimize economic returns, and the problem of the minimum size of units.

The seventh, training, is limited in this case to the training of researchers.

The eighth, added by the group, is stock enhancement, the restocking of depleted areas with selected species.

It was recognized that these general areas include nearly everything needed to develop aquaculture. Within each of these categories, there will be high priority problems in some part of the world. This list in itself does not establish priorities, but the workshop participants felt that priorities have to come later when we look at the individual needs of regions, countries, or localities. Detailed research programs with priority ratings should logically follow from the input of the people in each area, their universities and their government,

working together with U.S. universities with this very important caution: that we know what has been done before, that we take advantage of the successes and failures of earlier projects.

Finally, concern was expressed several times about the methods and criteria that will be used by the Joint Research Committee in the selection of collaborative research programs. At one point, we almost declared a recess until we could get Ross Whaley to answer some questions, but I understand we are going to have a chance to talk to him today.

Also there was confusion regarding endorsement of the consortium concept in various documents which have been distributed at this meeting, and in contrast, a statement, attributed to Dr. Wharton at the Minneapolis meeting, that consortia would be an unlikely method of organization because of their poor success records. The aquaculture working group requested a clarification of these points.

REPORT OF WORKING GROUP # 2

William Royce, Chairman*

We took our assignment to be to examine what are the researchable problems in resource assessment and habitat deterioration that apply especially to the LDC's and need solution in order to provide a basis for investment decisions, especially in small scale fishery development. This turns out to be, as I'm sure you recognize, a complex problem and I think it necessary to provide some background to emphasize the relative importance of the capture fisheries to the LDCs. The development that overshadows everything in fishery management in the world is the extension of jurisdiction under the recent Law of the Seas discussions. These discussions have proceeded to the point, as far as fisheries are concerned, that the negotiating text is accepted by most of the countries around the world as the existing law. Most countries have extended their fishery jurisdiction to 200 miles.

Next, consider the fact that the LDCs - 108 of them or however many there are - are mostly coastal countries of the tropics which are in an extraordinarily good position to use the ocean resources that come under their control via this means. Now let's look briefly at the general condition of these resources. The overall trends in world fishery production have indicated a leveling off for the past 4 or 5 years due mainly to the great decline in Peruvian anchovy production which has only been partly compensated by the continuing modest increases in the production of other species. It is clear that the great resources of the temperate waters of the northern hemisphere are close to their limits of productivity in most parts of that hemisphere and that the opportunities for further production are mostly in the tropics and in the southern hemisphere. The generally accepted level of maximum yield from the oceans of the commonly known species is about one

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hundred million metric tons (about 40 million more than are now being taken from the seas). The sea production, by the way, is roughly 85% of the world total fish production. Aquaculture, both salt and freshwater, accounts for about 10%.

Much of the tropical production has been harvested by distant-water fleets from more than 20 nations that have been fishing off the coasts of Africa and the Indian Ocean countries. A common misconception exists in that these are called "high seas" fleets. They're "high seas" in the sense that they're built to fish off the coasts of other nations. Only a few tuna vessels and whaling ships really fish on the high seas beyond 200 miles. The distant-water trawler fleets are all fishing off foreign coasts, and most of those coasts belong to the developing countries of the world.

These great fleets have been admired for their efficiency, but I think it is a general truth that it is cheaper to process fish ashore than it is on board ship. The recent economic experience of the distant-water fleets vis-a-vis the coastal fleets of the developed countries is that the coastal fleets, consisting primarily of small vessels, have been doing better economically even though the distant-water fleets have been harvesting a larger quantity of fish.

Here is a tremendous opportunity for the LDCs. There is an animal protein food resource on the order of several tens of millions of tons available to these countries either by displacement of the foreign fleets or from under-utilized resources. It is available now for the taking and can be perpetuated. The obligations of the LDCs in using these resources are to know their productivity, to control the harvest in ways which will perpetuate the resources, and to allow the resources to be used by other nations if the coastal nations are not using them.

It might be useful to give a few examples of some earlier fishery development in the 200-mile zone. You'll recall that some of the countries of the west coast of South America declared a 200-mile jurisdiction several years ago and they made it stick. It became the model for the world pattern.

The Peruvian anchovy resource developed as a consequence of certain technological improvements which began in the late 50's and it was the envy of all the neighboring countries. Chile saw what was happening and, with advice from some United States advisors, built a similar assembly of fish-meal plants and fleets. They failed to recognize that Chile's part of the anchovy resource was a minor one, and they had a serious over-investment. The development corporation, CORFO, was in debt by tens of millions of dollars and it took a long time to overcome the deficit.

Dick Croker tells me that, at about the same time, Nicaragua was considering a similar development. Fortunately they didn't make that kind of an investment. They got some advice that they did not have the resources. I happened to be asked to look at development possibilities in Northeast Brazil at about that same time. I met with a group of investors who said they wanted to invest in any natural resources in that very poor part of the world that would produce employment and economic development. They handed me a fully developed economic plan for a fishery based on the Peruvian model complete with the fishmeal plants, the port developments, fleets, and everything. I took a look at the situation and I said there is only one problem - no fish of the kind harvested by Peru.

Later in 1970, Peru found it desirable to trumpet its patrimonial sea as its greatest source of wealth. It looked beyond the anchovy fishery and wanted to know what could be developed in the way of food fish for people, especially the poorer people in the highlands. It wanted plans for increasing the production of all the food species, such as the corvina and other coastal species, many of which are choice eating fish.

They had been fortunate in starting in early 1960's a modest laboratory which collected basic statistics on these fisheries and it required only a little examination of the rather good records to show that the production of all of the choice food fishes had remained about level or had declined in the face of an approximate doubling of the fishing pressure.

Here was clear evidence that none of their well-known fish stocks could stand further fishing and were no basis for expecting investment to produce more food for people.

Another example is Lake Nasser in Egypt and the Sudan. The fish production from the lake has reached a level of about 20,000 metric tons. The government is now faced with some decisions. How big a fleet should be constructed to collect the fish on the lake, all of which are harvested by small-scale fishermen? Are there fish stocks in this lake out of reach of these fishermen that could be harvested only by relatively sophisticated mid-water trawlers, for example? How big a production will this lake produce? These are the kind of investment decisions that are constantly recurring and on which or for which resource information is absolutely essential to prevent over-investment and to identify the real opportunities. The common need of the LDCs is to know the resources and to use this knowledge as the basis for developing policy, laws, and regulations. All of the LDCs have some information of their fish resources; all of them have a system of getting some catch data, and all of them have some laws with respect to fishing.

So we can define the common problem as one of improving in a cost-effective way the assessment of the condition of the resources and then of using this information as the basis for planning fishery development. I stress a cost-effective way because in many cases only a modest increase of reliable data is needed to provide a much better basis for the investment decisions. In other cases, a fairly sophisticated investigation may be necessary, but each such need ought to be independently identified and justified.

The specific problems in approximately their priority order are as follows: first is to have the benefits of past development experience in similar projects. AID and FAO and other donors suffer from not having effective, constructive, evaluation of their on-going projects. Much of what we see in the way of project plans are political promises.

Second, every country needs a complete base of the pertinent country data, - the surveys that have been made and the research that bears on the fisheries. A suitable library can be a service facility for collecting or it can be a special preliminary to the research.

A third common problem is collecting accurate current statistics on catch and catch per unit of effort by species. Frequently, this can be combined with pertinent social and economic statistics. In most of the LDCs these statistics are supplied by some kind of bureaucratic system which produces poor statistics. There are some sampling approaches which would provide a much better base than now exists at a modest cost. These need to be designed on a regional basis because of rather similar conditions in a great many countries.

A fourth need is to identify the unit stocks, their habits, their habitat requirements, and their migrations. Here the key is to have some competence within the country to do such things as may be necessary. The stock is the manageable unit of the catch. Ideally it might consist of a single interbreeding population but in practice it is usually a mixture of species that is caught by a single fishery by the same gear so that the definition of a unit stock is frequently a compromise. Some of these studies may provide spinoffs to improve the fishing. Behavioral characteristics of the fish may lead to improvements in fishing gear for example. They may also provide essential information concerning the needs for stock enhancement if there are reasons why natural reproduction is not adequate, and here I go back to Lake Nasser. Another decision which the government of Egypt is facing is whether to build some big fish hatcheries (which has been recommended) and it's not at all clear that the fish in Lake Nasser aren't able to reproduce perfectly well themselves.

Fifth, collect basic productivity and pertinent physical data on the waters. These can frequently explain and supplement the catch data. In the case of new reservoirs they provide a first approach to the productivity that may be expected and basis for planning the fishery investments in advance of any experience

with the fisheries. There are some sophisticated concepts of minimum physical data requirements that can be obtained rather easily and used effectively to supplement the biological information.

Such data is the first step in evaluating the development opportunities and is followed by the estimates of needs for gear, vessels, infrastructures, market possibilities, and the rest of the components of a feasibility analysis. They are also the basis for policy, laws, and regulation of domestic fishing as well as foreign fishing.

It's worth noting here that fisheries pose some special institutional complexities for all countries because of the several ministries concerned. Usually the Ministry of Food or Agriculture will be involved, the Ministry of Defense and Foreign Affairs will be involved in any international issues, the Ministry of Justice may be involved with the laws, etcetera. The effective use of the fishery information commonly requires effort to streamline the institutional arrangements in the country.

Lastly, the resource data are the basis for choice of the use of some aquatic habitat where there are conflicts with, say, oil or industrialization.

Let us summarize by noting that the research we are talking about here is strictly applied to the fishery problems. It is the basis for on-going management. It is necessarily diverse, calling on a substantial number of disciplines, and it needs to be used only as it contributes to the solution of identifiable problems. The resources are public and investments are public, and subject to political pressures. Therefore, the need for sound information in order to prevent waste is even stronger than it is as far as private investments are concerned.

The researchers are continuously involved in a recurring decision process. These are renewable resources and this is not a one-time research that leads to a finding that is then generally applied and the research goes on to something else. They are applied researchers, and their measure of success is the application. These fishery activities will in most cases be

country-based but there are commonalities throughout the developing countries. In fact, neighboring countries frequently have the same problems on the same resource as it migrates across their common boundary.

REPORT OF WORKING GROUP # 3

John Peters, Chairman*

This is the report on the workshop of Processing and Marketing. We had a small but quite a vocal group. The following is a summary of the things that we considered to be important.

In attempting to focus on problem areas which would affect the most impoverished section of the population in developing countries, the group identified the artisanal or small-scale coastal fisheries and small-scale aquaculture as prime sectors.

For the small-scale fishery, problems were defined in terms of locating and catching fish (gear and vessels), preservation of the catch on board (landing facilities, handling method, drying, smoking, salting, etc.), distribution and sale (transportation conditions, market acceptability, etc.). Suggestions for particular research topics within these areas included:

- . Development of cheap simple "fish finders" suitable for adaptation by artisanal fishermen
- . Redesign of boats to improve seaworthiness and holding capacity for fish
- . Research on fishing gear design, use of native materials, etc.
- . Design of simple and economic cooling systems both at sea and ashore
- . Research on causes of and rates of spoilage of fish caught in inshore tropical waters and cheap, simple alternative preservations methods
- . Research on simple, cheap containers for fish holding and transport
- . Evaluation of novel practical energy generating systems to provide local power for cooling or processing
- . Methods for improving the effectiveness of existing simple processing procedures

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- . Improved design for simple smoking or drying operations
- . Feasibility of digestion and ensilage systems and small-scale processing systems which are simple and have low energy demand.

In some developing countries, fishermen are forced to discard part of their catch because it is unacceptable as food because of cultural or dietary restrictions. They also do not fish in many areas because the species in those areas are not of use to them for various reasons. This is a critical problem for many of these countries because the people really can't afford this waste. Many of our university scientists can help with this problem because they have the technology and can develop quite rapidly means of producing acceptable foods from under-utilized species and the so-called "trash" fish.

There was also a suggestion that much more innovative research on catching methods should be supported, leading to perhaps the eventual supersession of boat fishing by fixed installations to which fish are attracted by various means. This would require increased research on fish behavior, as well as other studies relating to selective capture and sorting methods.

In the small-scale aquaculture field, it was suggested that there is a strong role for technologists in the research areas related to production of seed (fry), nutrition and feed formulation, feed delivery systems, and the optimization of yield in terms of consumer demand (cf. broiler industry), as well as harvest and post mortem treatment of cultured fish.

Traditionally, food safety aspects have been a concern of the food scientist, and these issues were addressed in terms of the safety of cultured fish and the problems of "poisonous" fish. In the case of cultured fish, safety considerations derive from two situations:

- a. the spread of parasites and pathogens derived from man and his domestic animals where sewage or animal waste is used as a fish pond fertilizer;
- b. pesticide accumulation in cultured fish as a consequence of local farming practices, direct use of insecticides, and addition of contaminated vegetation as feed or fertilizer.

Research was felt to be needed in both areas to enable assessment of the extent and severity of the problem.

Among marine species, the hazards were identified primarily as food chain toxins such as saxitoxin (paralytic shellfish poisoning), ciguatera, and (probably) tetrodotoxin (puffer fish), with lesser concern for human parasites and pathogens (particularly viruses) in fish caught in polluted inshore waters and, the bacteria related to scombroid poisoning. The existence of these hazards greatly reduces the take of fish and shellfish in some regions of the world and poses an increasing threat as the intensity of fishing grows with a growing population. The primary needs in these areas were felt to be quick and simple methods of identifying toxic animals, processing methods to destroy the toxin, and simple accurate methods or means of predicting outbreaks.

In addition to the above, several members of the group indicated they felt strongly on items which, although not directed specifically to this workshop, were of critical importance in any programs of research involving LDCs and therefore should be mentioned. Perhaps the most critical of these, it was suggested, is in the area of communication. No purpose would be served if the advantages developed for the fishermen by collaborative or any other kind of research if the means and methods of applying the new discoveries, processes, or whatever, could not be communicated to the fishermen in the language he understands.

It was suggested that research into the best and most effective means of communication at the fisherman's level should start with the socio-economic mores and customs as related to specific fisheries communities. This should be done by qualified anthropologists and linguists directly contacting the fishermen through intermediaries (translators) using a variety of audio-visual methods, i.e. transistor radios, traveling communication units with films, etc.

There must be a legitimate incentive and or motivation

for the fisherman to make him change his ways. He must be convinced that any changes that he may be asked to make or suggested he make in his fishing technique method, food habits, etc. will be considerably more advantageous to him than what he knows and has been following all of his life. This, for example, may require anthropological studies on food habits including changes in diets, etc. Research to enable training programs to be established in the U.S. to implement those changes is needed.

This is, of course, only an incomplete summary of the discussions and may well represent primarily those interest areas and suggestions which were most attractive to the members of the group. Nevertheless, it may be helpful in putting together the material for the final report.

REPORT OF WORKING GROUP # 4

Parzival Copes, Chairman*

While our workshop was labelled "socio-economics", we found that attendance was confined to economists and a few members of the "hard" sciences who had strayed from the other workshops. Nevertheless, we did feel required, in our discussion, to cover some considerations relevant to the role of the social sciences other than economics.

May I also observe that while our group we hope, generated some light to illuminate the subject of our discussions, we unfortunately did not produce much heat in our deliberations. In view of the low temperature environment of our meeting room - uncorrected by our requests for technical intervention - we felt constrained to proceed most expeditiously with our work, terminating it before six o'clock.

Perhaps the most significant conclusion reached by our group was that the economists's potentially most important role in broad, programmatic fisheries research projects was that of a coordinative character. We felt that our greatest impact could come from cooperating in larger projects staffed mostly by individuals from other disciplines. The role of the economist would be to introduce considerations of economic feasibility through cost-benefit analyses, trade-off calculations and various considerations of economic optimization.¹ In other words, our task would be to keep the work of our enthusiastic colleagues from other disciplines within realistic bounds, so that the prospects of ultimate pay-offs for the poorest of the poor in the LDCs would relate realistically to the sums proposed

1 It was also noted that larger, multi-disciplinary research projects would often contain separable components that called for micro-economic analysis - which work would naturally be assigned to participating economists.

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for investment in research.

Our group, however, did come up with a few proposals for possible collaborative research projects, in which the economic component was likely to be sufficiently dominant to warrant organizing the projects through personnel drawn primarily from the economics discipline at U.S. universities.²

The first of these would be a project on what we might call Resource Management Regime Analysis for small-scale fisheries in LDCs. It would deal both with the theoretical underpinnings of fisheries management - for instance in bio-economic relationships - and the practical applications of management techniques. We noted an existing capacity for such work, among others, at Columbia University, the University of Rhode Island and the University of Delaware. Work already undertaken by the University of Rhode Island in Southeast Asia was also noted.

As a second research area with a dominant economic cast, it was proposed that we consider a project on Developing Basic Information Systems for Fisheries Management in small-scale fisheries in LDCs, in order to facilitate the process of fisheries development and management. We might think here in terms of collecting data that would assist in determining yield/effort relationships, cost and earnings analyses, etc. The University of Rhode Island, again, expressed an interest in this area.

As a further project of programmatic research with a particularly large economic component, we noted the area of Food Distribution, in which work is being undertaken at Oregon State University and Texas A & M. This work might fit into a larger framework of fisheries development and could include research on buyer behavior, delivery systems, market structures, etc.

² If budgeting procedures favor a smaller number of larger projects, some of the projects suggested here could be amalgamated.

As a separate project area of dominant economic interest we also identified the area of Financing Development of Small-Scale Fisheries and Aquaculture in LDCs, covering the various aspects of capital investment needs.

In the absence of representatives from other social science disciplines, the economists did feel an obligation to put forward as a possible collaborative research area, that of Fisheries Development and the Institutional Environment. Sociologists, anthropologists and political scientists, here, would have a major contribution to make.

The workshop did consider the need for education and teaching of fisheries management personnel in LDCs - which, again, was a particular concern of the University of Rhode Island. Recognizing the importance of this area, there was no consensus in the workshop on the need to cast this in the mold of a collaborative research project. There are facilities available for education and training that can be utilized outside the framework of a collaborative research project.

Our Working Group also considered it useful to offer an observation on the allocation of resources to research on capture fisheries and aquaculture, respectively.³ The judgemental consensus of the Group was that in the circumstances of LDCs, where low cost considerations are paramount, the scope for economically feasible aquaculture was limited - though certainly not absent. It was felt that too often there was a failure in research planning to anticipate the divergence between technological feasibility in aquaculture and economic viability with a result that funds were wasted on projects with inadequate pay-off prospects.

The working group did discuss further aspects of the participation of economists in broader collaborative research

3 As a matter of interest, it was also observed by members of the group that, in terms of economic analysis, the problems of aquaculture were more akin to those of agriculture than to those of capture fisheries. The dominance of common property and fugitive resource problems placed the economic management of capture fisheries in a special and unique category.

projects. We noted particularly the ambitious polycultural research work carried on at Louisiana State University with emphasis on applicability to Costa Rica and other Latin American countries. Evan Brown of the University of Georgia intrigued us with the possibility of stimulating ornamental fish production in LDCs to provide much needed foreign exchange, as well as improved income and employment opportunities among the poorer sections of the population in LDCs.

In summary, the economists saw their primary role as participants in broader multi-disciplinary collaborative research projects, where considerations of economic feasibility and viability have been too often neglected. In other words, it would be our role to keep such projects within economically realistic bounds. But we did note a few areas in which we felt there were prospects for collaborative research projects of a predominantly social science cast.

REPORT OF WORKING GROUP # 5

James A. Storer, Co-chairman*

Workshop 5, dealing with international aspects, had a core group of 15 representatives with another 5 who participated from time to time. The representation included public and private universities, research institutions, and Federal Government employees.

The Workshop first took a look at its areas of concern and tried to define them. Essentially, it decided that it was appropriate to emphasize those international aspects that arose by virtue of the special characteristics of fishery species in terms of their migratory nature and the common property aspects, together with the consequences of these characteristics in terms of research needs and policy. The particular context of the workshop consideration was the present reality of the widespread implementation of extended fisheries jurisdiction. This has also been commented on by Bill Royce in his summary of Workshop 2. We, like they, felt that extended jurisdiction created a tremendous opportunity for the coastal states to utilize their own resources and to take advantage of that potential in terms of meeting their own nutrition needs, providing employment for coastal fishermen who often had no other alternative for employment, and to improve their incomes. But again, like they, we realized that along with this new opportunity, there also came a tremendous responsibility. For, if these stocks are not exploited properly and if they are not managed wisely, the potential will not be realized for the long-term benefit of the citizens of coastal states. It was recognized that the crucial need for management by LDCs of their living marine resources had a short time fuse by virtue of the ever-increasing pressure for utilization of fisheries resources and the fact

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that fishery fleets are highly mobile. Furthermore there is now a great deal of fisheries capacity looking for likely harvesting areas, particularly on the part of some of the developed countries whose distant-water fishing operations have been seriously altered by virtue of extended jurisdiction.

The task force also recognized that because of the pattern of national boundaries and the fact that fish do not recognize these boundaries in terms of their migratory patterns, there is a necessity to find regional solutions for research and management. Furthermore, we were mindful of the interaction of fisheries management with the broader eco-system approach including alternative uses of coastal waters and the concern for pollution.

In looking at this rather broad package, the working force took note of the fact that it was to the United States' own interest to play an active role in the establishment of a worldwide pattern of effective fisheries management. There would, of course, be a feedback to the United States' of its own knowledge and in terms of its research results. It was recognized that the responsibility of the US as a world leader with respect to ocean management, and its own role in having encouraged many countries to adopt exclusive economic fishery zones through its own unilateral action, gave the United States the particular obligation to assist LDCs in meeting their present problems. Also it seems likely that the United States own eventual nutritional needs may demand more and more interest in distant-water fishery resources. There was therefore no doubt that there was a two-way street of benefits and interests on the part of the United States in addressing itself to research in fishery management of LDC coastal waters.

In terms of the increasing concern that the LDCs are displaying with respect to the development of their own management schemes, note was made of the recent FAO conference in Rome during the agenda of which a major issue was the changing regime of the seas. A whole day was devoted to discussion of this item which involved interventions from more than 45

countries, most of them LDCs expressing their need for assistance in carrying out the research and responsibilities of ocean management.

Convinced of the urgency of the problem and the appropriateness of US concern with it, the task force then went on to identify some of the specific areas of research, some of which parallel points that have been made by spokesmen for the other workshops. These include the necessity for research about stocks themselves, research on the appropriate system, and, in particular, research on the models of management that might be applicable to LDCs. It was felt that the development of such management systems for certain countries or regions would have relevance at least in a general sense, to other countries and regions facing similar problems. There is a need for research on the objectives and the benefits of management as well as on the costs of management. In this respect some of the members of the Workshop felt that the impact of management on various sectors of a society was not often clearly identified and that the distribution of costs and benefits was not carefully assessed. Other specific research projects concern the relationship of the management systems to the fisherman himself and the need for developing appropriate measures and techniques for getting effective participation by fishermen in the management system and providing incentives for their participation.

In the planning and carrying out of research projects it was recognized that a general equilibrium approach, to use the economists's term, had to be taken. That is, it had to be an integrated effort, not only in terms of the biological interrelationships of various species, but also of taking account of the interrelationships of a management system for fisheries upon the whole ecology of the system. The various possible alternative uses for fishery resources and for the ocean as a whole had to be taken into account. The Workshop recognized that you could not be concerned only with the fishery resources within the water, that we also had to be mindful of a necessity to get the fish onto a boat, from the boat to the

shore, and from the shore to the ultimate consumer. There was an awareness, therefore of the magnitude and the breadth of the spectrum involving management and development of the fishery resources. However, the Workshop was equally clear that some priority would have to be established from among all of the possible research topics and the inability to handle the totality all at once must not deter us from dealing with certain partial solutions, keeping in mind that these must be compatible with other links in the chain.

In this concern for specific research topics, the Workshop several times came to the point that we must not dictate to countries what we saw as their needs but that we must first determine what their own perception of their needs is and to build a mutually acceptable program upon this perception. It was recognized that within LDCs the perception of these needs may not be necessarily the same as between government, academic institutions, or the fishermen themselves. The Workshop noted that the advisory group is expecting to travel to several LDCs, particularly those with which institutional linkages may be the most likely. This travel was strongly endorsed by the working group since it would provide an opportunity to discuss research projects with the countries involved. The Workshop also noted Mr. Ripley's invitation to make use of all of the information that was available from his agency, UNDP. The Workshop also hoped that adequate contact and cooperation would be maintained with FAO.

As I have already noted, the Workshop was aware that in much of the research on fisheries management, a strong regional element had to be taken into consideration. In particular it was noted that many of the costs of a management system, including those of enforcement, would be too great to be undertaken by individual countries and could only be borne through some sharing of them on a regional basis. Recently, the Gulf and Caribbean Fisheries Institute held a workshop on small-scale fisheries in Cartagena, Columbia, which was in part made possible by a grant from AID. One message that came out clearly from

this meeting was that national problems, while requiring at times national solutions, must be attended to in the context of their regional relationships.

I should like to point out and emphasize that in the Workshop's discussion of research, a broad definition was consciously utilized. You may call it applied research, and there is nothing wrong with that. But by whatever name, it was recognized that the research would not be very effective if it was carried out only by the US institutions on the safe shores of the United States without getting firmly planted on the shores of an LDC. The point was emphatically made by the Workshop members that you not only had to do the research, but, if it was to be meaningful, you had to develop research capabilities within the LDC itself. Furthermore, the research capability had to be transferred into policy and programs. Otherwise, the research would tend to be sterile and would have a usefulness limited to the US participating universities.

In the context of the need to develop research capability and its transferability, there was much discussion of the appropriate linkages. On the one hand, it was clear that the participants were thinking of collaborative research among a number of universities and institutions in the United States. Though there may be a lead university on any particular project, participation of other universities was also considered to be likely, because in the fisheries there may very well be particular and special capabilities (e.g. economics or some other discipline) that should be tapped no matter. Relatively few institutions have an across-the-board capability. Furthermore, there was a linkage in dealing with universities abroad. Not only would this linkage be with the universities abroad but also with government laboratories and institutions. One interesting point was made by one of our members who has had a considerable experience in working with both academic institutions and governments in LDCs. He pointed out that American universities, in dealing with fisheries matters, had developed not only the research capability and know-how, but had also been concerned and involved in the

application of research, either through extension and education or through dealing directly with Government agencies. It was felt that American university staff have the opportunity to help the LDCs develop the bridges between the research capability within the LDC and the appropriate Government entity.

Among the university and institutional representatives in the Workshop there was a great conviction not only of the need and urgency of the research problem to be tackled in this area but also of the willingness and ability to go ahead and carry out constructive programs. One of the university spokesmen went so far in the course of the discussion as to draw up his own matrix of a program for his university to participate in research activities in fisheries management in LDCs. His matrix not only looked at some of the specific areas that might be appropriately handled by the university on an interdisciplinary basis but also at the nature of the linkages that might be established abroad. Other university representatives spelled out what they thought they would do in terms of their own particular capabilities.

The Workshop felt that the areas of research admirably fitted the views and purposes of AID, in terms of nutrition, the poor, and employment and income. Furthermore, the Workshop felt that it had addressed itself to the appropriate role that American universities and institutions could exercise and that they had the capability to deliver effective research programs to LDCs abroad. It was their hope, therefore, that this workshop would be helpful in bringing to a reality a constructive fisheries program for the benefit of LDCs under Title XII.

**COMMENTS AT THE FISHERIES RESEARCH PLANNING WORKSHOP:
THE TITLE XII PROGRAM**

Charles E. French*

My comments primarily will open up this session for Hugh. He will summarize the procedure we have been through.

First, the most important single thing in any decision-making operation is how you involve people in it. I have spent 25 years of my life in university work, mostly working with people. I am now with a Federal agency and the one thing I have noticed in both places is that people get fussed if they do not know just how they are being involved. This involvement of you is a sincere effort on the part of the contractor for this planning grant, the university representatives of JRC, and AID to have your honest-to-God, sensible input into this process.

In any decision process there can usually be one or more of four levels of involvement. One level is that the decision maker can delegate a decision to the people involved. At the other end he can make a decision himself and inform the people what that decision is to be. Most generally, people are involved in one of two ways which lie in between. People can be asked either to give some alternatives that are feasible or they can be asked for recommendations as to what should be done. We are a bit in between those two. We are looking for substantial recommendations, but we do not want to stifle the initiative of you people to give us a reasonable inventory of the important things in your field that could be amenable to this new type of evolving collaborative research effort.

I would be naive if I did not sense an undercurrent of unrest among you. That was not completely unexpected! But let me reiterate to you the fact that your involvement here is a sincere and honest effort on the part of everybody to get your best

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thinking into this process. We have appreciated the sincerity with which you have taken this on. The kind of heated intellectual dialogue here is the type upon which I grew up. I love it and I am not scared by the fact that some of you are a little miffed.

Secondly, I must say that research administrators are confused about the potential of aquatic research. In this area I can speak as somewhat of a lay person, yet I have had a recent two-year experience in a big exercise with general scientists trying to get aquatic research priorities to recommend to this government. Much the same thing happened there as happened here, and I sense it has happened elsewhere. Lay people and many research administrators think that the aquatic area has a great contribution to make to world food and nutrition problems, but when we get down to the nitty-gritty of it, it is difficult for scientists in this field to make a convincing case for their research. In the National Academy of Sciences study there was great expectation in the beginning, but that did not follow through to the final report. Much of what was put in that final report was in many ways on faith, rather than on demonstrated specificity that could compete with some of the other groups. This characteristic, I think, stems primarily from the fact that this group is a relatively new profession. That gives it many virtues, but it also makes it difficult for you to get a toe-hold on a program such as the Collaborative Research Support Program.

Also, you have a sort of "unique syndrome" in that you think your profession is unique and you should have special treatment. Believe me, my profession is agricultural economics and I spent most of my administrative experience trying to show the same thing. We wanted to be unique so that we would not get confused with general economists. I know something about your problem. That you must defend yourselves in your uniqueness is good, but if you argue that too far in this particular program some people are going to outflank you. You have too many "unique" ideas at this stage in your profession, and it is hard to boil them down to something manageable in this type of research program.

You have a shortage of resources and you are hungry. That to me is good. But a tendency exists in this kind of situation also to get a certain amount of polarization and that is bad. Often this can put a slant on what is recommended that makes it warped in terms of what is feasible. We have laid it on you that there are only certain things that are feasible. As a result, we may have constrained some of you more than you would like to be constrained. You probably are used to trying to bootleg your programs in your universities. Again, I know something about a profession that had to do that! You may need to try to get some of your good flexible colleagues to do some things for you. That is a resource you can call upon and often you can piggyback on them. Sometimes that kind of conservativeness puts you a bit at a disadvantage in coming up with a big proposal of the type that might be possible here.

You have the advantage of a bright younger contingent which is much in evidence here. I am impressed, as I know Hugh is. I am impressed with their talent, and it is paramount for us to harness some of that talent under this program.

I listened carefully to the reports as they were made. I made a fairly generous evaluation of what might qualify as possible collaborative proposals. I added the list up to about 37. That is almost precisely the number we have in total inventory from all other areas at the moment under consideration by JRC! That should tell you something about the fact that you are suboptimizing, or that you lack aggregation in your process. Many things that were proposed can be welded together with good packaging, but you are still quite a ways from coming up with the kind of definable packages we are getting from other people.

One problem we may have here is caused by a generic problem that some of you are trying to define important subject matter areas without too much concern for this new method of getting it done. Some of you are starting with our discussions about collaborative research as a new way of getting it done, and you are trying to figure out what you could do without enough thought about the

importance of the problem itself. We are going to have to work with that as our contractor puts all this together. We probably laid some of these conditions on you. We told you to give us your best shots in terms of what you can do in your field. We told you to have a new vehicle. We told you that we want your input into it. It is natural that we would split your thinking, and that has been confusing to some of you.

We have a problem, in part, because you are arguing that everything is linked to everything else. I am sympathetic with that as a social scientist, but it may put you at a disadvantage. We probably have given you some fuzzy barriers at least on training, what our baseline studies in some of these countries may contribute, and what we want in terms of interdisciplinary collaboration. However, you are going to have to make some arbitrary decisions in some of these programs to get them into manageable proportions. There are some boundary problems. One thing that would bear though is the fact that you recognize the importance for country-specific research of an adaptive type, yet we are asking you for fairly generic things that would be important to several institutions. If you have a problem that has some generic implications, you may be able to set up country-specific studies in a series with a well planned comparative analysis contributing to general knowledge. This would be compatible with collaborative research concepts.

One question that I have not heard discussed is the ICLARM issue, and where that fits in your total scheme of thinking. Some critical decisions must be forthcoming in that area. If you have things to feed into JRC about the place of that international center, those would be extremely helpful to us.

Before Hugh speaks, I will ask Ross Whaley to speak on the two questions that were asked specifically. We were asked to clarify the criteria that we are considering to choose among programs. Ross chaired the committee which evolved those criteria for JRC. No one is better qualified to discuss that than he. The other question involved the point of where does the consortium notion fit into this thing. What is the difference between a

consortium and some of those other collaborative arrangements?
So I will ask him to answer these.

Before I summarize, let me explain that I still have a lot of university bias and I come out quite direct. I do not know you people well; if you were social scientists, I would not hesitate to say what I have just said. In the present case, I probably should explain that what I have said is out of respect. This was an attempt to crystalize a process with which we have here experimented.

I thought it in your best interests to tell you frankly that going in with 37 proposals could well wind up with your getting none.

I wanted to emphasize that this is a serious and important effort by the Federal Government combined with some of the best thinking in our universities to involve your subject matter in a viable program.

I hope I have convinced you that part of this process, whether you like it or not, is the discipline of coming up with something which will compete with some other disciplines who have been at this a long time, have their problems rather well defined, make a convincing case, and come up with specificity that is appealing to decision makers.

Unfortunately, or fortunately, that is the kind of ball game you are in. I hope you can give us your best shots, and that you score.

Thank you.

A RESPONSE TO SPECIFIC QUESTIONS

Ross Whaley*

I was asked last night and this morning before this session to talk a little bit about criteria. I guess I wasn't even quite sure what the question was. Do you really want to know about criteria or is the question how does my university get into this apparently large purse? Let me try to talk about criteria and process both, and if I'm a bit fuzzy on the process area, I do that without apology; we are learning too. That is, we are in the middle of the first one of these planning processes. I think I can give you a sense of where we are going. But in talking about criteria, I'd like to talk about it in three separate ways. The question is, with your packages of the 37 areas combined into some kind of manageable units, which of these are likely to emerge as being funded, and which of these are likely to be rejected?

A first consideration is the law. For Title XII funding, we are talking about food and nutrition research. As you develop your proposals and the justification for particular areas, the end product has to somehow be the enhancement of food and nutrition supply. A second item in the law is the "new directions" of AID, and that directs us toward dealing with the "poorest of the poor." So for starters, that is one set of criteria that we will look at as we evaluate individual project areas within the broad program of fisheries.

A second set of criteria are those which I mentioned yesterday, which are the ones that we are using to decide on the broad programmatic areas. How did fisheries emerge but something else get rejected? Well, these are the same criteria we will use as we look at the project areas within fisheries that should be funded. There are social demands. That's a terrible term; I'm not sure I know

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what it means--but basically its dealing with the problems as perceived by the less developed world: the probability that the research output will be implemented because of the felt need on their part. The second area is technical feasibility, and that simply relates to what is the probability of payoff. Is the state of the arts such that there is a reasonable probability of payoff from research in that area? A third criterion is economic payoff. Here what we are looking for, as I mentioned yesterday in rather crass terms, is the greatest bang for the research dollar. Ideally when one gets through with funding all of the things which come to the fore under collaborative research, the marginal payoff of the last dollar invested is equal for all projects. The last criterion is institutional preparedness. As I mentioned yesterday, there are three levels of institutional preparedness. We must have institutions in this country prepared to carry out the work, either now or with some reasonable investment. Second, there should be institutional preparedness in the LDCs. Is there a research arm there that can grow? And then institutional preparedness in terms of the management arm in LDCs. Not only is there research preparedness, is there an institutional preparedness in order to apply the results of the research? Those four items compose a second level set of criteria.

And then the third one, which we did not mention at all yesterday and which I won't go into detail now, is the evaluation of projects on the basis of scientific merit. We have a separate document which considers scientific merit. I think that you will find in that document the same kinds of questions that would be asked by the National Science Foundation or other research granting agencies. That is the third level of criteria.

Let me just reiterate what has already been said by Charlie French. At this juncture, there is no stacked deck. I was a little disappointed last night, as I went from table to table and talked with various groups, that there is still the perception that somehow this conference was legitimizing some decisions that already had been made. Warren Ketler will reaffirm the fact that his firm was very solid when taking on the contract,

that if in fact there was a hidden agenda they would refuse to take it. The Joint Research Committee is made up of people from universities such as yourself, some of us from universities without large international involvements who are interested in getting in this process. I am from the University of Massachusetts and I don't want to see any process developed over the next several years which excludes the University of Massachusetts because of a limited involvement in the past in international affairs. I think I can guarantee that the process is an objective one.

Let me move on to another question and that is what is a consortium? My answer to that is going to be a conceptual answer. I want to separate that from a legal answer, because the terms I'm going to use are not those that would be used by the AID Legal people. I tend to be a little sloppy when I use the words "grant" vis-a-vis "contract", and "administrative unit" vis-a-vis "management entity", and attorneys are not sloppy about that. Please don't hold me to any legal interpretations of what I say, but take it as a layman trying to describe what we are trying to accomplish.

The management entity will be determined principally by the research groups involved with some guidance from AID and the Joint Research Committee. In other words, we are not going to tell you that you've got to organize in a certain way. We will certainly help you in terms of various legal problems. There is going to be an array of possibilities--one of which might be a group of institutions getting together and deciding that you'll select one of them as a lead university, who would then be the contacting entity with AID. The others would participate, but the formal relationship between AID and the collaborative research program would be with a lead university. Others might decide to get together and form a non-profit corporation. We avoid using the work consortium. Rather, we talk about a management entity which suggests that there's an array of possibilities in the collaborative research process. We don't exclude the possibility that there may be (I can't imagine one of these) a single institution eligible for a

collaborative research support program grant in which the collaborative end of that is the linkage between that institution and an international research center and two or three institutions abroad. That would be a collaborative research program in which there was a single US institution involved. As I say, I can't imagine that one, but we leave that ground open. The idea is to identify a single granting or contacting relationship with AID, but that relationship in terms of the management entity whether it's a lead university, a consortium, a non-profit corporation, or joint venture is open. That will be determined principally by the parties involved in doing the work.

Charles French:

Thank you very much Ross. I think we'll go ahead and get Hugh's comments in here and then if you do want to come back and clarify that any more, we'll take up those questions later. One thing that I did mean to say in my opening comments, I think that you interpreted me correctly if you did interpret me to say that this group should feel that it has some special advantage in this total program at the moment, in that it's been singled out for a planning grant. But I'd have to say also that I think you read in my remarks that explicit statement that you're not home free yet in terms of competition.

I'm also hoping that I have encouraged you to do more homework after you leave and that you will feel free, after the meeting, to move any kind of input into this study that you think will be helpful. You can talk with us and RDA about time tables and that kind of thing, and you have some time to do that. We certainly did not think that this meeting would be the final answer in terms of the solicited input that we are getting, and so I hope that that you will very much follow up with it.

I think many people for a long time have hoped that we could get some continuity and some mandate into university programs working for a long time trying to bring this about, and most of us see the Title XII legislation as being something that recognizes an important US constituency for a federal agency, a very valuable asset to them and raises a possibility for continuity, flexibility, and longer-term planning for universities than we've had before. One of the people that has been very instrumental in trying to bring about that type of thing for the past two decades is Hugh Popenoe. He's had a wide range of experiences that I'll not try to relate to you here; he's certainly one of the top people in this whole area, and has been very instrumental in JRC. We have asked him to summarize and pull together this conference for you, as he saw it.

SUMMARY STATEMENT

By Hugh Popenoe*

To supplement the five workshop reports I wish to respond to some specific points presented by them. And in addition there are some comments pertinent to the overall Title XII program that I wish to offer. These deal with program management and organization, some of its philosophy, and partly with its future.

Management

To begin, one point should be added to the description of management entities. These potential collaborative research grants are not restricted to universities or even eligible universities; other entities may become involved, such as federal agencies or private companies. In corn breeding work, for example, the private sector in many cases is doing as much as the universities. A purpose of a collaborative research program is to bring together the best expertise in the country to focus on some of the most important food and nutrition problems overseas although by legislative mandate the lead role is given to the eligible universities. Nevertheless anybody else who could possibly contribute to the solution of some of these very difficult problems should be included.

Regarding the structure of the Board of International Food and Agricultural Development (or "Title XII") we need to emphasize that there are two Joint Committees. We have talked a lot about the Joint Research Committee (JRC), but there is also the Joint Committee on Agricultural Development (JCAD). Some of the projects that have been discussed in the last few days are country-specific and may fit JCAD activities better than JRC. In the

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Joint Research Committee, we are addressing more generic issues or broadly based research that is needed to help many countries. However, fisheries research which may be needed in a particular country--for example to inventory and assess stocks, develop a management plan, or develop an appropriate infrastructure--may fall under the jurisdiction of JCAD. This point may have confused some of you on the issues which should be addressed at this workshop, especially since some of the useful information presented yesterday was in review of country-specific programs (i.e., statistics, contracts, grants). I shall touch on this again in responding to the fisheries and aquaculture reports below.

So far four topics have been selected by the JRC for planning process. It's an experimental effort. Two of these may be the most difficult to have chosen: fisheries and aquaculture, and nutrition. At several conferences I have attended these two areas have been identified yet the appropriate U.S. university role overseas appears to be somewhat elusive.

In contrast, in another planning grant topic, sorghum-millet, an appropriate university role appears more obvious. A limited number of researchers and universities are working in this area, and they can be identified through the USDA data retrieval system and through some of our national workshops. However, Sea Grant, fisheries, and aquaculture are identified in the Title XII legislation and the JRC felt it was urgent to try a planning grant in this area. Most of you would agree, though, that it is very difficult to determine exactly how to focus university expertise in fisheries and aquaculture on problems of developing countries.

Resources Development Associates (RDA) has been selected as the middle-man in this process. They have truly taken on a monumental task. One of the reasons they were selected was to avoid a conflict of interest that a university might face. A potential was that a university could conceivably take on

the planning job with the hope that it would be favored in receiving a subsequent grant. Of course, the opposite could happen whereby a university could undertake the planning and then be disappointed or embarrassed if aspirations for a subsequent grant were unfulfilled. RDA accepted this job to grant these potential conflicts. The Joint Research Committee has tried to assure itself that the process is completely open, that the best people have had a chance to participate, and that the most logical institutions have had a chance to be involved.

One other point that may not have been sufficiently impressed on the group is that in Title XII we are not restricted to what important problems overseas the universities are interested in and can do best, but in my view we are also looking at subjects where the U.S. is most competitive in the world. Thus, when we talk about aquaculture and artisan fisheries I come up with some questions. For example, it might be very easy to move into some topics and suddenly find ourselves outflanked by those nations that have a much longer tradition in them. It is important, then, to focus where U.S. expertise can really have a serious impact on the world food problem, and not be a source of embarrassment, because we find that we are amateurs dealing with quite sophisticated areas. We do need to identify our unique international capabilities.

Workshop Response

It was not surprising that areas one and two, fisheries and aquaculture, drew far and away the greatest audience yet probably in many respects, came back with the least specific recommendations. This situation seems chronic for the subject. One comment is that the fisheries people perhaps need to look a little bit more at generic issues. I think this was implied in their paper.

Discussion of the types of methodology to apply to these various countries reveals a very important problem that is also common in agricultural sector analysis around the world. We go into various

underdeveloped countries and insist that they have the same sort of agricultural data that we have in the United States, and if they don't we can't do a proper analysis. I think we need to develop some specific methodologies for countries that may not have quite the sophisticated data collecting machinery we have in this country. While there are many issues that go across the board, I again emphasize that when we get right down to the question of how to specifically help country X move ahead, then we are probably moving into the area of responsibilities of the Joint Committee on Agricultural Development. However, there is not a sharp break between the two Committees, there is going to be some overlap, and there are going to be some areas in which we need to move jointly; fisheries may well be one of them.

In aquaculture, there are many innovations. But salt water or mariculture in this country is not moving as fast as it has in other parts of the world, because of various constraints including the value of coastal lands for other uses, and American unfamiliarity with labor-intensive techniques. There are some other basic limitations and difficulties in being competitive.

In the fresh water field we seem to have gotten some good things moving: catfish in the South; yellow perch and some exciting work in Wisconsin. We may have some expertise, but remember that we are competing with people in Asia who have been doing this for centuries. (Some of you may have read the excellent resume of the history of aquaculture in China, including the development of specific breeds for polycultural systems.) Again, in looking at aquaculture, we need to see where we are unique in this area. One researchable topic worthy of further attention in this country, although we may not be very unique in it, is fitting aquaculture into a whole farm system.

The third group, processing and marketing, was attractive because it seemed more able to focus some of the US expertise, possibly because it is narrower in scope. We seem to be ahead of some of the developing countries in processing, marketing, and transportation. Now with the "energy crisis," we are seeking

low fossil fuel energy technologies. The group came out with a fairly interesting and definite list but some items may not contract for a specific piece of research. There may be some areas for collaborative research too.

The economic area wasn't too surprising. Past sessions with economists on Title XII reveal an important tool that can be used almost across the board. We have wrestled with this in the Joint Research Committee, and in effect have said that almost every commodity program whether it is corn or rice or soybeans, needs an economic component. They also will need a post-harvest, or food-processing component. In addition, a social science component would be important. It is not surprising that the economists often view their greater role as being involved in broad projects, early on, thereby developing research in terms of maximum economic pay-off. And of course there are a few things in terms of fine tuning of methodologies, in terms of looking at some of the basic infrastructural constraints, that they can perhaps be involved in quite independently. Many times I have almost been surprised to hear economists shun a more specialized role in favor of being a broader service to the other groups.

Finally, the international policy workshop may have been vague on the number of projects, but it made a very important point about the political role of universities. Certainly there are many things that need to be done at that level. Often universities can operate in situations where another government is unaware of its responsibility or opportunity. The university can provide a catalyst, get groups working together, and almost work sub-rosa on some of the problems that many of the smaller countries may refuse to tackle because this will involve some sort of governmental agreement. Here the universities can be and often have been extremely useful in handling a lot of these issues or helping with ground work. That is one of the reasons why international dimensions have now been written into the Sea Grant Act, to get the Sea Grant institutions more directly

involved with countries which provide an easier access for governments to negotiate treaties or other relationships.

Overall Trends

One overall consideration for all five workshop areas concerns delivery of programs directly to the poor. This may have been confusing in light of talk about freedom from hunger and the famine prevention act. Congress has mandate no more "trickle down" techniques in calling for delivery to the rural poor, yet Dr. Chichester posed a conflict in that it is usually the urban poor who are hungrier than the subsistence farmers who may be well fed but not have much income. We may be caught in a dilemma. Remember that we are still grappling with this issue in our own country. A new approach that seem to be emerging in Congress may supersede the "direct rural poor" mandate by advocating "growth with equity"--not just how to deliver directly to the rural poor, but how to involve them in the whole growth process. Traditionally they really haven't participated and we have many examples of this around the world. Thus fisheries priorities developed here have emphasized artisan fisheries and small boats although even research requiring a large organization, such as in the development of low cost protein, or aquaculture, can involve the small fisherman. That is important, even if it puts a much lower priced product on the local market. Although we do not want to be too preoccupied with this problem we should perhaps look at it more broadly. Hopefully our social scientists are getting a handle on methodologies.

In closing, a common and positive aspect of the workshops has been not just a good and representative attendance, but also some solid participation by the younger members in the group. This is important, especially in aquaculture and fisheries. Although in my estimation fisheries went through a recent lull after a period of general recognition and support, interest is again building. With the advent of extended jurisdiction it is important that some of the best young minds and new scientific

concepts be attracted. We hope their contributions are contained in follow-up to the workshop.

Finally, we re-emphasize two objectives of the meeting, namely (1) to identify research priorities in terms of university expertise, and (2) to begin identifying university resources equipped to address those priorities. Whereas the economics group most thoroughly identified pertinent campus activity, all participants may wish to submit new or supplemental information as Resources Development Associates now turns to describing priorities and capabilities. This can be done for a time after the workshop.

OPEN FORUM

Charles French, Chairman*

We would now like to open this session up to any kind of question from the floor particularly with regard to the intent of this meeting, of possibilities regarding what can be done under the Title XII Collaborative Research Support Program, and that kind of thing and we have several of us here that should be able to handle the questions. We would like to get some feeling from you concerning areas that may have dropped through the slats, or were preempted by those little discussion boxes you were pushed into. Several of you expressed concern about that. I think it was in many ways a thoughtful and helpful exercise that was designed to focus attention on specific problem areas, but it was not in any way intended to preempt you from discussion of other important projects. I know some of you felt somewhat constrained by this, and I suspect you may feel that some of the things you would have liked to have heard, have not been said by people you thought had that responsibility and jurisdiction. So contrary to my earlier admonishment about your having 37 different areas of interest, I'm opening the floor up for more.

The second thing we'd like to do is to get some feel of where there might be consensus about certain important problem areas for research. I've done quite a bit of priority assessment evaluation in recent years, and I know you can't really do priority assessment and sort these things out directly by this sort of conference technique, but we're going to try to get some feeling of what you think on some of these matters. We're ready now for questions, and would the speakers please identify themselves and their institutions.

Mic Pleass, College of Marine Studies, University of Delaware:

I don't want this to appear like an impassioned response. My hand shot up like a rocket and I know a lot of other people's did too. There is a touch of passion in this, though. Throughout this whole meeting, I've not heard a soul talk seriously about communication with the fishermen. And it seems to me that this

* Federal Liaison Representative to the Joint Research Committee

is rather important. We talk about getting out there and seeing what it's all about...getting a feel for it. We use phrases like this. But you must all realize that there's a lot more to it than that. How do you most effectively get through to the fishermen in the community that has a stylized format? They do things in a definite way. They use a language with a definite dialect that very few people may understand and they're difficult to get to. There aren't any roads along the coastlines, and you can't go out there in an expedition financed by AID and pad along and shake hands and find out about their problems. Also, when you come to do something that you all agree is desirable, you can't tell them what you're going to do. You can't enlist their support and that's vital. They have to want to do what you want to do. They have to want to cooperate with you. So we're not going to get anywhere at all, unless we develop our techniques in communication with these people.

Now one of the problems the whole meeting has been beset with is this transition from the general to the specific. And I would not want to quit at this point with a nice general wishey-washey statement like "we need more communication with the fishermen." I'm going to try and nail it down into a specific at the expense of perhaps a little credibility. Perhaps this will be something that you can take away and work with.

In my experience, the transistor radio has been one of the prime factors enhancing the degradation of communities in the LDCs. It's available to everybody. If Bardeen, Bertain, and Shockley had known what they were going to achieve with their invention, when they invented it, they probably have put it right back in the box and hurried out of Bell Labs. The transistor has given people a desire for things. You see, mixed up with music and the beat is a desire for manufactured things, and that's changed many many societies. It's caused unrest, it's caused regroupings and it's caused tremendous pressures. Now can we take the transistor radio and do something with it as we try to communicate with individuals within the society?

At Delaware, we're working on a project that doesn't limit itself to Fisheries, but extends over the entire range of agricultural rural contacts with the transistor at its focal point. You've got to pay somebody to get this information across. Let's be absolutely frank about it, the radio stations are run by some hack who use to live in the USA, who knows the local dialects, and who knows all the techniques for advertising and making a buck. So you've got to gently ease your way into the system. You've go to find out how to get some influence on the local radio stations.

When you've done this, you have an access route. And you can do it without roads, and without terrifying problems of dialect. However, it needs specific research. It needs an anthropologist working with the communications man; it needs those two combined with the expertise of the fishermen. They've got to know what it is they've got to get across to the fishermen. And it needs people who understand the zoning. Let me stop there. I'm utilizing too much of the meeting's time. But I think the message is that there's much more to this game than has met our collective eye in the course of the last two days.

Ray Pariser, Massachusetts Institute of Technology:

I would like to continue what Mic has said very briefly and make a plea that, although it has already been mentioned in one or two places, I think it should be emphasized. It should come perhaps in front of everything else that has been said, and it is this: That since we are addressing the poorest of the poor, we are addressing a community of people that is highly intelligent, but in many cases cannot read or write. We need special ways of making them do what we think they ought to do and there must be an incentive. Otherwise there is not going to be much change. Motivation is needed.

The other point that I would like to make, and that needs research is what Mic has just said, the need for anthropologists in finding out what the food systems are. I've been chastised myself many times in working with fish protein concentrate and

offering people chocolate chip cookies containing FPC. There are certain things which will go and certain things which will not go. In other words, the anthropologist, who was not really sufficiently represented here, is, in my opinion, an essential ingredient to anything that is going to be done.

Joe Regenstein, Department of Poultry Science and Food Science, Cornell University:

Certainly some of the things we've heard here indicate a need for training programs in the United States to prepare people in each of the developing countries to carry on research programs, and the question of extension was addressed towards the end of the report on Workshop # 5. But many of these problems, once the research is done, may involve specific countries. It's not clear to me what mechanism is going to be used to deliver this to the countries that may need it. It may not be profitable for individual university researchers in this country to go from country to country to set these programs up. There may be a need for local people to deliver the systems, modified for each country, once basic principles are established. And I'm not sure in my own mind that I see how this is to come about.

Charles French:

That's a very good question and I'll make an opening comment and ask Hugh to follow up. This legislation mandates specifically that there be a research component, and there also is very much an educational implementation phase. That's in the congressional intent. The machinery is set up to cover both of these areas and we've been concentrating on the one, but I think I'll ask Hugh to discuss in somewhat more detail how he sees JCAD and JRC fitting together in this role.

Hugh Popenoe:

Actually, I think there's two questions there, the other one perhaps dealing with education in general. But as these proposals go forward, there is one component that must be very definitely addressed, and this is "how is the information going to get out, what are the subsequent steps?" It's not enough to say we're going

to have a product and that the product is going to sell itself. I mentioned earlier that there is a connection between ourselves (the JRC) and the Joint Committee on Agricultural Development, and we feel that many of these projects will be transferred over to the other committee, where you're talking about country specifics.

Now regarding the training component. I'm not sure you were addressing that question specifically, but the subject came up yesterday a couple of times, and we perhaps didn't answer it properly. Training is mentioned very much in Title XII. It's caused a lot of dialog around the country, particularly in the Land Grant Association, and at almost every meeting I've attended. Part of the problem here is how we structure training. In the beginning, there was some effort to set up another "Joint Committee on Training," but that was opposed on the grounds that it might remove training from technical assistance and research. Finally, the International Science and Educational Council, which is a joint council between the Land Grant Association and the U.S.D.A., set up a sub-committee that will be specifically addressing the training component issue. The problem here has been to not separate training out too much, while at the same time, not letting it get buried in everything else with the hope that somehow or another people will get trained. This is one of the things that many of us have struggled with as we moved into these international research programs. Additionally, we certainly hope that one of the efforts will be to get young graduate students and researchers overseas. Many of us in the university international development field are quite concerned because we seem to be dealing more and more with fewer people at the upper level, and we don't see sufficient numbers of younger people coming in at a time when things seem to be turning around in terms of longer project horizons.

John Glude:

I'd like to ask for clarification on one point. You have used the term "37 proposals" and I'm not quite sure where this number comes from. I have a feeling that you may have included the first 9 or 10 items that I identified this morning as being

discussed in the aquaculture panel meeting. There may be a problem here. I should have said that these were really listed as examples. They were not listed as areas of "the highest priority," or even with any attempt at developing priorities. I also didn't explain fully, I guess, that we did try to go through those to establish some kind of priority. We found that this isn't something you can do with this kind of a group, because these are primarily individual observations that specific people have made, based on their experience in foreign countries. The rest of the group with perhaps less experience, was not sufficiently informed to arrive at a criterion, or even to accept the criteria that we had, let alone arrive at a priority rating.

Charles French:

I think you raise a very good point. I credited you with eight items. Those were the ones which you summarized at the end: your breeding and seed production, nutrition, and genetics. I thought your list was a reasonable attempt to boil things down to something you could really get hold of. I didn't necessarily feel that you had thirty-seven collaborative grant proposals here, as such. I was trying to emphasize the point that the agriculturalists, for example, will probably come up with no more than six or seven items. I don't know if it's at all possible for you to narrow things down to this extent. You may argue your areas are much broader, and I do think you've got a problem. I agree with you that priority assessment is very difficult. I have a feeling that given the diversity of aquaculture interests, you may want to try to work with the contractor in some kind of a priority assessment technique in a manageable environment. And the only thing I think we could accomplish here today in discussing this, is to get some feel for whether there's really outstanding consensus. And that's a little dangerous because we did that in JRC. We tried to skim off the ones that were obvious to everybody, and we skimmed off some, and now they're not obvious to everybody. I don't know whether that answers your question.

Hugh Popenoe:

John, I probably need to answer the second part, because there may have been a misunderstanding. The collaborative research is addressing broader areas, but not too broad. It's not taking aquaculture on face value, but if tilapia or something else comes up as being a high priority with a high pay-off, and a lot of things need to be done, then you might be able to equate that with a similar project in Agriculture on corn, where you get specific species by way of contrast, if there's a project that's identified by AID missions overseas. For example, where they see that we need better techniques of feed pelletization, or something like that, and this is identified in their priorities, well, that's where you come right to a university and contract for that specific research, or maybe two universities. Then you don't get into the whole mechanism of collaborative research, the additionality, matching funds, and what-not. In collaborative research, you're not going to get into something as specific in livestock, for instance, as what is the effect of diet on ruminant feeding in tropical countries, unless you're able to pretty well exclude all the other major problems in livestock as being much less important. You'd probably have a bigger project in livestock feeding systems or something like that in cattle, or feeding systems in water buffalo, but I was trying to distinguish a little bit between the two. But the boundary question is one that we're agonizing over, and we really have no specific guidelines.

Charles French:

I'd have to say, I think, that a lot of the ideas generated here, in this kind of an interchange, getting them down to a format like this, that is going to be a helpful exercise, and I'd be surprised if this doesn't generate within this group certain initiatives that will impact on AID's centrally funded research. Now that was not the original purpose of this meeting, but I think you're getting a by-product out of this collaborative thinking here that may give you funding possibilities for pieces that are

not designed for the collaborative research mode. So I don't think it's a loss to have a lot of these other ideas.

John Glude:

Well, I think our dilemma is trying to rate the priority of, let's say, genetics as against nutrition, and this is nearly impossible, because in both areas you can find specific problems that are extremely important. And you really have to look at those, before you can say genetics is more important or less important than something else.

Charles French:

Well, we figured we started with about a thousand such programs in the National Academy study for the White House. With groups like this, we boiled it down to about a hundred and twenty-six. And in another subsequent process with a small group that cut across these areas, we boiled it down to twenty-two. So there are some ways to kind of bite the bullet, and unfortunately I have a feeling that you people are involved in something that is going to get down to that nitty-gritty before you get through. What I'm trying to do is to get you as much input here as possible, and I recognize the really difficult questions of getting priorities.

Harold Hagen, Colorado State University:

I think in the last two days there were two rather conspicuous flaws that I would like to call attention to. The major flaw I think came out in the rather magnificent orations that we heard both yesterday and that continued on today. One of these was very suggestive that the area of the "LDC" is limited to the tropical and semi-tropical regions of the world. I brought this out in Session 1, yesterday. If we look only at a point of view of latitude, that is from the boat deck or perhaps from an arm chair, it might seem that way. But if we take the altitudinal dimension, we find that a tremendous portion of the LDC part of the world is, in reality, within a temperate type of an ecosystem. Many of the available technologies perhaps might be dismissed in an assessment here,

through thinking that we're dealing only with a tropical or semi-tropical part of the world. There may be a failure to recognize those important part of the world that, despite the fact that they are in Africa, Central or Latin America, are very definitely within a temperate type of ecosystem. I would hope that in the deliberations this not be ignored.

Another point that very definitely parallels this is the idea that people who need help are in the coastal situation - the marine, urbanized area. In the experience that I have had in LDC countries, one of the problems is now to keep the man back on the farm. They are migrating to the cities; they are congesting; they are causing or magnifying the problem in those areas. Certainly they are hungry, but they don't want to be there and hungry. They would rather, if they had their druthers about it, be back up in the mountains, at home with their families, and the governments, I think would agree with this. So I think that if we are looking towards project areas to reach the poorest of the poor, we certainly cannot ignore these rural communities. We should do what we can to establish small pond programs, the aquaculture programs, and all the rest of these back on the farm - where I think the governments would like to see them.

A perfect example of this is a situation in Guatamala, where we had the opportunity to suggest the development of a small fish cultural pond in a very rural remote section as part of an irrigation system. During the recent earthquake, this community was completely cut off, but the fish, which were the pride of the community, were one of the mainstays of that little area, until it could be reconnected with the world and redeveloped. So I think that if we look at this as being primarily as marine brackish water type of problem or project area, I think we're overlooking an extremely essential and important part of the world food need.

Charles French:

I think that those points are well taken. If somebody wants

to comment on them, I would be glad to entertain comments, but I can do nothing but recommend them to the record. Yes.

Dick Croker:

It happens that the last discussion leads into mine, I've a very grave, philosophical reservation about our exercise here, and I think perhaps you two gentlemen might be able to clear this up. And that is the instructions in the Title XII legislation to aim our program at the "poorest of the poor." Now I know this is a reaction to past projects which have resulted in enriching the rich, and we're trying to overcome that, and that's fine. But somewhere we seem to have forgotten that animal protein food is the most expensive kind of food there is in the world, whether we're talking minor ruminants or cattle or fish, it's expensive to produce. I have no doubt that the cattle people can improve the social and economic status of shepherds and I have no doubt whatsoever that the fish people can improve the social and economic status of artisanal fishermen, which are in sum total the best fishermen in the world. We can make them relatively affluent, I think but in doing so, we cannot cut the cost of fish - we're going to raise the price, maybe double it. But even if we could find some way to cut the cost of fish in half, the poorest of the poor, whether they're been driven to the cities, or still live along the coast or in the mountains, still cannot afford any animal protein - fish or cattle. Now if we address 100% to the poorest of the poor, that means consumer as well as the fisherman, and that puts us in a dilemma. We can help the fisherman, but somebody else has to bring the income of the poorest of the poor up to where they can buy either pigs or goats or fish. Can you clarify this? I feel very uncomfortable with this, because it would seem that nothing we do is going to really help the "poorest of the poor."

Charles French:

Let me make one comment, and it's somewhat a personal opinion, and then I'll turn it over to people who have had more experience. I personally think that the congressional mandate that was given

to AID to work with the poorest of the poor, in many ways, really made it very difficult to do some of the more important things that were possible, particularly with collaboration with universities. As an university administrator I very much felt that this was very detrimental to the kinds of collaborative work that we wanted done, but that was the congressional mandate and the Agency undertook to work with it.

Now in this Title XII legislation, there is substantial elbow room to work with a lot of other different kinds of institutions. And in this program, two rather explicit intermediary types of groups are evolving through which we work. One would be the AID graduate countries, the Brazils, and this type country that could be brought back into the collaborative work with U.S. universities and be involved in helping some of the poor. There is also the possibility of bringing in the middle income countries in this type of involvement. There's a much better chance to work quite specifically with individual countries under this program, without worrying so much about their specific eligibility but only the capability of the individual institutions in those countries. So saying that, I think there is a chance here to relax the mandate on the Agency, somewhat, but there's still a substantial mandate there to work in this area, and this doesn't mean that this isn't very important work, but until the mandate is changed, AID will be forced to fund primarily with that target group in mind, whether we like it or not.

Hugh Popenoe:

Concerning the evolution of the mandate, some of you may know that foreign assistance passed Congress last year with one of the biggest majorities it has ever had since the Point Four program, and it passed with a very unlikely coalition of the extreme liberals and the extreme conservatives. The extreme liberals liked the humanitarian aspects of the "poorest of the poor," and the extreme conservatives liked the idea of no more massive investments in infrastructure and highways, so that while it might

appear to be a flimsy coalition, it really pushed it through, and there is a very strong mandate there from Congress.

Now in terms of animal protein, I'm not quite sure I agree with all the comments there. A recent survey of livestock in Latin America has shown that far and away the majority of livestock are really in herds of less than 10 or 20 on small farms as opposed to large herds on large farms. You may not be able to help the poor to directly buy meat, but we might be able to help them to produce it - and of course the same thing is true with all the hundreds of thousands or maybe millions of fish ponds in Asia. The people still have a low per-capita income but they are eating fish from their own fish pond. So I wouldn't be too concerned about that issue. The mandate is there; it's one that has really caused the university community and AID a lot of agonizing, because it's a complete turnabout in direction, but it's one that has presented us with quite a challenge, or an opportunity, depending on how you want to look at it.

Dick Croker:

Are we supposed to be helping the shepherd and the fisherman, or are we supposed to be helping the general public, who is typically more poor than the fisherman?

Hugh Popenoe:

Well, this is the "growth with equity" that I mentioned earlier. I think it really involves making sure that they participate in the growth process, whether it's the urban poor or whether it is the poor shepherd. If the fisherman is producing fish and he's selling it for one-tenth of the going price in the city, somehow there are some inequities there that can be addressed by research. Some of the issues are technological, some of them are economic. Maybe I still haven't answered your question. I think this type of dialog will probably go on for a long time, but I think there must be some ways to help them participate...and of course we're facing the same problem in the United States. We have the same mandate from Congress in the Rural Development Act in agriculture...and we're grappling with the same issues. They may

be impossibles, but Congress thinks they're worth grappling with.

Charles French:

I think we are asking whether in fact you can see a way, in your field of specialty, to contribute to solving a mandate that's given to this federal agency by Congress. Congress provided the mandate; but it's quite possible that the scientific community in the aquatic area does not see how it can work under such a constraint. I think it's terribly important to tell the agency that.

Hugh Popenoe:

And then if it's not possible aquaculture may not be supported, or fisheries, for that same reason.

Charles French:

But the Agency is bound to a mandate as to how they spend this money, and if you don't feel that you can help them effectively spend it, for this kind of problem, I think it's essential that you say so.

Bill Royce

It seemed to me that in looking at these problems we haven't given sufficient attention to the assimilative capacity of the LDCs, and I'd like to say just a few words about that.

A very important point was brought up by a couple of the previous speakers about communicating with the fishermen, and with the other people in the country. It is pretty obvious that this has to be primarily a responsibility of the country people themselves. When we go to the average lesser developed country, I suspect we will find that they have resources and a coastline perhaps double that of one of our average U.S. coastal states. They will probably be very fortunate if they have a half-dozen professional fishery people or aquatic scientists in the whole area of aquatic science--aquaculture, fisheries--and chances are that most of those people will be preoccupied with logistic problems such as a broken-down truck or an employee who has gotten in trouble in some way, and they may never get around to doing any professional scientific work. Their library facilities are probably

non-existent. The ability of these countries to work and to collaborate, not only with government people but with U.S. university people, who may well be in a rather similar situation, is a fundamental constraint on our activities.

Charles French :

I think we have a very difficult problem here in our planning grant system regarding how we get in put into actually defining the research areas. And I have a feeling in this particular area, as the consultant's team gets ready to go to the other countries to bring back this information we really have to give a lot of thought to how we go about that process. And I think the JRC is going to have to really interact with the team here, in being sure that we get the best input we can regarding that expertise abroad and the concepts and concerns of the farmer and the fisherman into this program.

Richard Gregg, University of Hawaii:

Notwithstanding the boundary conditions on what, in fact, is appropriate research under Title XII, it seems to me that the question of population growth and food supply is such an important one that at least someone in this conference should bring it up. Of course we recognize the political sensitivity of the question; that's something we tend to turn away from and try to avoid. But if in fact as Bob Abel mentioned yesterday, altruism is indeed not dead, I think we have to look at the humanitarian goals of what we're doing in providing food for the poorest of the poor in the long term as well as in the short term. And perhaps some discussion of the extent this issue fits in as a research priority under Title XII might be appropriate.

Charles French :

I think the issue of population is certainly an appropriate area. As far as the legislation and the programs that we're working with focusing directly on population itself, basically, that's not part of the legislation. I think I'm correct about that, Hugh. I don't believe that the mandate of the legislation focused

directly on this, but you cannot avoid the indirect implications and I do think that some of the discussion we've had in this conference about the relative potential of aquatic proteins versus other kinds of proteins in meeting the feed and food problem will be very helpful in orienting research with the issue of population in mind. It would not, however, be thought out that this particular group should come up with a proposal that was quite specific in terms of population impact.

Jay Hair, North Carolina State University :

I'd like to change the tone of the discussion now to one of a more practical nature, at least as far as we're concerned. There has been no discussion yet of the time frame for initiation and of submission of proposals. I'd like to know what AID and others are thinking along these lines. There was some general discussion yesterday of magnitude of funding. I myself am still somewhat uncertain as to what, potentially, we are talking about. I'd like to have a little clarification on that. Third, I would also like to have some clarification on the aspects of cost-sharing from the participating institutions. And fourth and last, what mechanism will be used to communicate with the potential eligible institutions in order to insure that there is an equitable chance for participation by all potentially available institutions?

Charles French :

I think one thing we ought to establish immediately is the term of the current contract.

Hugh Popenoe :

Right. The current planning grant will terminate in July. At that time, some high-potential problems will be identified together with potential universities. This will be presented to the Joint Research Committee. They will then take it upon themselves to try and put this together. If indeed the exercise shows that this is really something that can be done within Title XII, and it's competitive with the other programs, I would assume that after the July date the next process will be one of getting all the actors together and getting a long-range research proposal drawn up and

whatnot - shouldn't take more than six months, perhaps less. If it goes to that phase, where they'll be asking for details of the research program milestones--then we're talking about planning horizons of five years, a funding period for three years, and then...

Charles French:

The fiscal year starts October 1, you see, so that's the critical date.

Hugh Popenoe:

So we're trying to get it in before that date. Now part of the process is supposed to insure that everyone is notified. There will be, and have been, several mailings from RDA, and that's the reason most of you are here. We want to insure your participation in this planning exercise. The group that will finally decide on the actual research project participation will have to be the JRC, based on the evidence they have, and that in turn will be forwarded to the BIFAD board and to AID for final determination. Now the nature of the grant... is pretty hard to say, it depends on the specific research problem...but we've been talking in terms of perhaps a couple of million dollars per grant. It could be, I assume, three or four million; it could be a half-million or a million, but we been talking in terms of those figures... per year, right. And this implies that there would be several institutions involved.

The matching thing...some of you have dealt with matching grants...has raised a storm of controversy all over the country, and it hasn't been resolved yet. My impression is that we're dealing with a lot looser terms. There's a "strengthening component" in Title XII where funds will be given to eligible institutions to strengthen their capability to carry out programs. This is not related so much to specific projects. The university has to come up with matching funds, at least under present concept, for training foreign students, for faculty to teach a foreign-oriented courses, and in terms of other activities, so that's one side of the coin. In the collaborative research area, the issue has not been as sharply defined. What has been discussed

so far is some sort of additionality factor, I believe, where for example University X might be tremendously interested in working on corn and AID wants to contract for corn research University X, by expanding the dimensions of their research, may then be looking at disease problems, insect problems, soil problems, even specific varieties overseas that add to their program and perhaps their own resources. AID, by buying into their program, gets more than they're actually paying for. As an example, AID might put in one hundred thousand dollars, the University puts in one hundred thousand dollars, each of them get one hundred and fifty thousand dollars worth of results. We're not talking in hard dollar terms, but what we are asking universities is to show that university resources are being committed to the collaborative research program. And that's somewhat different from contract activities where AID completely pays for everything. What this means is that a university that does not have resources invested in this area at the present time has no business becoming involved...their input is not going to be completely paid for...so the concept here is that the university should not become involved in this with AID unless they think it's strongly in their self-interest. And they can sell their own campus on it.

Charles French:

I think it is terribly important to keep in mind that once a collaborative thing is put together it may well be that an institution, which could be another university with expertise to contribute, could come into the program specifically as a part of the management entity. In other words, it may be a sub-contractor for a particular job.

Hugh Popenoe:

But they would not be one of the major institutions or part of the basic management entity. For instance you might want to buy a particular service, and they may not be doing anything else. In this event, their full costs might be paid. The lead universities would still have to show that this is really in their own

self interest, that they were willing to make a commitment of personnel, space...

Charles French:

I know I picked up corridor talk, Hugh, concerning the small institutions that have not yet been involved. There will be a very substantial effort made to try to keep participation options open for this type of institution. I think since Hugh brought it up we should say just a word about strengthening. And do not confuse this with matching, or a collaborative grant. The two things that can give continuity to this program for the university will be the fact that we feel we have a chance to get 5 year contracts that roll ahead. So that you have a continuity of planning, and you have continuity of funding. There also is a formula concept being worked out, by which institutions which commit themselves to this area can get funding to be strengthened... not in the sense of the Hatch Act funding per se, but in somewhat of a lesser form. And that does take matching, on the part of those that want to get in.

Ross Whaley:

I don't want to beat this to death but there is this continued concern about the fact that there may be some matching here and we're calling it another name, and we're going to get stuck with a matching obligation, even though the word never appears in the collaborative research support program. And I guess personally, as an experiment station director, I'm confused as to why you're confused. I have two exercises which I undertake regularly. One is a matching obligation under the Hatch Act; another one is a matching obligation under the Smith-Lever Act, in which I sign on the dotted line that the university invested X dollars of state funds on those programs where there's a comparable amount of money coming in from the federal government. That's matching. That's not part of the collaborative research support program.

Separate from that I'm continually asked about those areas, in terms of thrust and direction, that our institution is going to be moving into. And so I can at any point in time talk about the long range plan of the College of Food and Resources, that says we're going to hang out our hat here and here and here, and this is a totally separate exercise from the matching grant obligation. Now I think one could say of the collaborative research support program, that if Whaley and his institution is going to "participate." when he talks about those areas where he's going to hang out his hat...one of them may be in the international sector. Now how can I keep the faith in terms of following through in terms of those commitments and indicate that that isn't just rhetoric but in fact the direction in which we're moving? And it's the latter problem that I think is the crucial part of the collaborative research support program, not the former, which is a very mechanical, matching thing which is dictated by Congress in the legislation, and I guess I just don't have quite the problem discerning those two as some of you seem to have.

Charles French.

If you have questions on this direct them to Ross. I want to get back to your communication question just a little bit, but if you have a point of clarification here with Ross, let's have some interchange on that.

Unidentified Speaker:

When you sign on the dotted line, are you including match-in-kind or strictly dollars? It's going to make a difference.

Ross Whaley:

The question is when I sign on the dotted line on a matching grant, or in my matching obligations, am I talking about funny-money-match-in-kind, or am I talking about hard dollars? As an administrator, I don't differentiate between those two. This is getting into a mechanical thing which may not be terribly relevant here. It happens that the State of Massachusetts does not make a line item appropriation of State funds for the experiment station.

Now because it doesn't do that, it means that the way I have to show matching obligation is to identify those portions of faculty time which are committed to the support of the Massachusetts Agricultural Experiment Station, and account for that time and those salaries and state expenditures related to it as part of the match. Now whether you call that funny-money or match-in-kind or whatever I'm not sure but in our particular institution that's the way we match it, so it is an "in-kind" kind of match.

Charles French:

I think, from an Agency point of view, that the collaborative research commitment by an institution is going to be interested rather liberally with a lot of dependence on the JRC to tell us whether they really think this institution is meeting the need. I think on the strengthening thing, there have to be some rather definite notions worked out as to what counts and doesn't count. That's not hammered out yet. We don't know. On the collaborative thing, I think there's going to be a lot of judgment about whether or not institutions that are showing interest in an area can in fact get the job done. And I don't think it's going to resolve itself around an accounting problem of the type we've all fought with in many of the federal funding projects.

If I could, I want to get back to the communications part of your problem and just mention a couple or three things. One is that much of the burden for communication with the university community lies with the BIFAD staff, of which Woods Thomas is the Executive Director. So that staff will be attempting to communicate with you. They've done some very explicit things fairly recently and we felt this group might have had less access to them than some other groups, so I want to mention them explicitly. One is that they have put out the first annual report of what had happened in BIFAD. It's a document about this thick and was prepared specifically to go out at the land grant meetings in Washington. That has in it everything that's happened, really; it's a full document of what's gone on. Five of those were sent

out to each of the eligible universities on the list, and others have been made available, and most universities I think that have shown interest in this area in one way or another have some of those floating around. Now, whether we got them out to the president's office etcetera, we don't know, but BIFAD attempted to do that.

The other thing that has happened is that the BIFAD office has been asking the universities to specify someone in their organization to be the liaison person, hoping that that person would know who on campus would be the relevant people that should be informed and that has just now been completed and that roster is compiled and you should find out in your university who that is. If you don't have a representative, I think you should contact the BIFAD staff and talk with them about how you can be communicated with in this process. Also there are now underway plans to put out a newsletter. BIFAD and the Joint Research Committee and the JCAD group, and also the Agency staff, are very much aware of the problem of the lack of information and misinformation. And so we now think we have got much better information to go to the field, and whenever we get a chance with a group like this to give you more information we're trying to really lay it on the line and give you the best answers we can, but a lot of this is evolving, and you're going to have to keep up with it, because it's not all spelled out.

Hugh Popenoe:

You might also mention the international land grant newsletter... all members of the land grant association get that...as a matter of fact the editor now sits in on most Title XII meetings.

Charles French:

The agency has a similar campaign under way to advise its people in the field. We are sending out aerogrammes as we can to give them additional information, so we're getting much better information abroad, particularly in the last month or six weeks.

Joe Regenstein:

I'd like to address Dick's remarks of the feeding of the the urban poor. Certainly, my understanding of some of the work that the food science technology types at least have been involved in is that it is aimed at giving the fishermen a higher return, but if they're catching much more fish and are able to use more of the catch, then certainly if the proper delivery systems are developed the hope certainly will be that some of this protein, which in principle because it's not agriculture and doesn't have the energy involvement that goes into land agriculture, should be available for the urban poor. I think it may not have been as explicitly addressed in the separate groups and in the group reports. My understanding of what we're trying to do is to produce more food in these countries. If this is available, particularly the so called underutilized species, and properly presented to these people, and of course this may involve some government input in delivery systems into the urban areas, then it's a new resource that then becomes available for this purpose. Maybe some of the economist types would want to comment also, but I think that working with the fisheries as such can lead to a better food supply for everyone including the urban poor.

Charles French:

Anybody want to comment on that? I certainly don't have any quarrel with it. Are there other questions?

Unidentified Speaker:

Charlie, I had just one comment. You're talking about so many different areas and concerns, that I think you expressed concern as to how now they are to be divided. I'm concerned too. There are too many areas. You're talking about one to five million dollars or thereabouts, and obviously you can't address all those problems. Well, the question comes to my mind, what if we can't solve all those problems? Well, the area I really relate

to is the aquaculture...that's the area we have, and I understand a little bit about. The "eight problem areas" mentioned earlier would seem to translate into three. So my suggestion is reduction rather than adding more. To me, genetics and breeding; nutrition, food and feeding; and aquaculture management were the three areas that really were covered. So I would suggest that that be put in the record.

Charles French:

You have that in the record, I hope.

Unidentified Speaker:

I talked loud enough, that hopefully it will be.

Dick Dudley, University of Georgia:

I just want to reiterate a point made by a gentleman a little while back concerning the importance of inland fisheries, particularly in land-locked countries or in the interior portions of coastal countries, where transportation may be poor. A lot of riverine fisheries, for example in southern Africa in some of the land-locked countries there, can supply a lot of local people with fish. There's one other point I'd like to make, and that is a point that came up both in the fisheries section and also in the aquaculture session, and that was the supplementing of stocks through the use of hatcheries. This is something that we have kind of shied away from in the U.S. to a certain extent, saying it's not useful and of course it's because we don't exploit our fisheries to the fullest. In places like the Republic of China, this is apparently done on a very wide scale, really almost creating single-species populations that are semi-natural, semi-cultured, and I think this is something that has a tremendous potential, although it may go against some of our modern day ecological view of things. In other words we may be making tremendous changes in the ecology of an area, completely wiping out certain species perhaps, and maybe and I hate even to

use the word, but perhaps introducing new species as well. I just thought I'd make that comment because I think it does have a lot of potential.

Walt Goldberg, Florida International University:

We've heard many comments today and yesterday concerning the collaborative research efforts and not too much has been said concerning centrally funded research efforts. I'm wondering if the reason for that is that perhaps the requirements for both are the same. I'd like to find out if centrally funded research will be given the same constraints regarding priorities that collaborative research has had, or will have, and whether or not a request for proposals will be solicited, if so when? And how will smaller universities, such as mine, be able to participate in centrally funded research?

Charles French:

This question is one which I cannot be quite as explicit about as I would like to be, because frankly, the Agency is not sure what's going to happen. And some things are evolving. I would be less than candid if I didn't tell you that in the last few months there has been quite a serious evaluation and to some extent a downgrading of the research component in the Agency. At least as far as central funding programs. The reorganization that the Agency has just undergone has also, I think, tended to decentralize the research function substantially from the centrally funded concept. The assumption that we're operating under is that we will have both types of programs, and that there will be better coordination between the two. The centrally funded program as it has evolved, and presumable as it would continue to function, would be much more adaptable to small institutions specific problems and this type of thing. I think the criteria are somewhat different. In terms of the Agency's specific needs, they are much more explicit in what is to be delivered. They're much more versatile in terms of the

organizational arrangements and particularly tend to be slanted toward shorter-term types of things and individual specific institutions. I am somewhat of a neophyte in what my job is in the Agency with regard to these, but there are some things going on in the Agency right now that leave these specifications, unresolved particularly with regard to central funding. The JRC and the BIFAD mechanism is mandated by law to look at the total programs of AID, and as a result they will be evaluating, making input into, and jointly working out with the Agency in all aspects of the research, including international center funding, contract research, and collaborative work. Now that's just about as honest and straight-forwarded as I can get and I may be in trouble when I get home.

Dick Croker:

This is something practical. In several of the committee reports, it was brought out that before we start spinning our wheels and plunging into even assigning priorities of research I think we should go once more on record to mention the overwhelming need to carry on...I don't know whether its research or what-but we do have to get together all the known data that there is, published and in internal reports of all the bilateral, unilateral, international, and national programs that have been conducted regardless of altitude or latitude in the impoverished countries before we can make a start, because there's a lot of things that have been done, and I think we'll find a lot of answers that I'd hate to see spending a hard-to-come-by money finding again. At the same time I think it's extremely important to take a look at ongoing projects of all types, whether its survey by the research vessel Oregon II, or whether its a program by some university station, or whatever, and look at the results because the lessons to be learned from the literally hundreds of failures and hundreds of successful operations are substantial; there must be some reason for these failures and successes, and we're going to save an awful lot of wheel-spinning and money, if we take a look at these projects. I've talked to Bill Ripley this morning and I gathered he would welcome some kind of objective

review of the U.N. programs. Whether AID has the courage to withstand a survey of its programs, I'm not sure. I think until we have that in hand, I would hate to see us going off on an expensive research program. I'd like your comments on that, Charlie.

Charles French:

Well, first I...your comments are extremely well taken. I see some...I see Title XII being somewhat catalytic along this line. I think there is a certain mandate evolving about evaluating about what has been done, and learning something from the past. I have been impressed with the amount of data and documentation of what has been done by AID. I have also been impressed to this point with the paucity of evaluation. I think you're putting your hand on a very important area. I can't tell you how much is going to be done there, but I'm encouraged that that type of research is going to have credibility. I think frankly in this meeting it was awfully easy for some of the more sophisticated types of research interests to say that's old hat and that's not research and this and that, and at the same time some of us I think see the value of learning something from the past. I would hope that there would be room for both types of things and I don't have any trouble with your point at all. I think that there's a lot that could be learned and it has to be learned in a rigorous, systematic, evaluative way and not by the kind of evaluation that I think is a sign-off on many of the things before they go to the archives.

Warren, I turn it over to you.

Warren Ketler:

Really, I think we're all finished up. I don't really have anything more to add to what has been said here, except that I want to thank the hard core here who have stuck it out to the bitter end. We are going to write up the proceedings of this day-and-a-half, and get it out to you as quickly as possible. We would hope that this would stimulate more responses from you than we have gotten so far ... responses in terms of what you

think needs to be done, what you can do, because we have had precious little of that so far. Now we did send out a letter to all the eligible universities. We've gotten three or four responses...maybe, as of this meeting, five or six...which would indicate perhaps there isn't all that much interest in collaborative research. I think that interest exists, but you need to get the information in to us if we are to include it in this planning process.

For those of you who somehow missed getting a copy of the BIFAD report, we have maybe a dozen of them with us that we would be glad to share with you. That's it. Thanks again. I think we certainly benefited by this. I hope you did also.

APPENDIX A

WORKSHOP ATTENDEES

WORKSHOP ATTENDEES*

<u>AFFILIATION</u>	<u>NAME</u>
Auburn University	H.R. Schmittou Wayne Shell
Colorado State University	Harold K. Hagen D.A. Jameson
Columbia University Graduate School of Business	Giulio Pontecorvo Maurice Wildinson
Cornell University	R.C. Baker John G. Nickum Joe M. Regenstein
Florida International University	Walter M. Goldberg
George Mason University	Bob Wall
Hawaii Institute of Marine Biology	Richard W. Grigg
Kansas State University	Keith C. Behneke Tom Brandt John R. Kelly, Jr.
Louisiana State University	S.P. Meyers Jack Van Lopik
Louisiana Tech. University	Bill Davis
Marine Resources Institute, South Carolina Sea Grant Program	Paul A. Sandifer
Massachusetts Institute of Technology	E. R. Pariser
Michigan State University	John W. Allen Howard E. Johnson Niles R. Kevern
Mississippi State University	Roland E. Reagan Robert P. Wilson
Montana State University	Robert V. Thurston

* As handwritten on and deciphered from the sign-in list
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New Mexico State University	Paul R. Turner
North Carolina State University	Jay D. Hair William L. Rickards
Oklahoma State University	Eugene Maughan Hugh Rouk
Oregon State University	C.E. Bond John V. Byrne Fredrich J. Smith Dick Tubb
Rutgers University	Churchill B. Grimes
Sam Houston State University	Eddie L. Dye
Southern Illinois University at Carbondale	William M. Lewis John H. Yopp John Guyon
Texas A & M University	Robert Abel T. R. Greathouse Richard L. Noble James G. Teer
University of Alaska	Richard A. Neve
University of Arkansas at Pine Bluff	Jan C. Dean
University of California at Davis	Wallis Clark Fred Conte Serge Doroshov Graham A. E. Gall Warren Johnston
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