FISHERY DEVELOPMENT SUPPORT SERVICES

WORKING PAPER SERIES

FACTORS INFLUENCING SUCCESS
OF FISHERMEN'S COOPERATIVES IN ECUADOR

FDSS Working Paper No. 18

International Center for Marine Resource Development
The University of Rhode Island
126 Woodward Hall
Kingston RI 02881-0804 USA

TO REQUEST COPIES OF FDSS WORKING PAPERS WRITE TO:

v

FACTORS INFLUENCING SUCCESS
OF FISHERMEN'S COOPERATIVES
IN ECUADOR

by

John J. Poggie and Richard B. Pollnac
Sociology-Anthropology Department
International Center for Marine Resource Development
University of Rhode Island

and

Miguel Fierro
Escuela Superior Politecnica del Litoral
Guayaquil, Ecuador

March 1988

FACTORS INFLUENCING SUCCESS OF FISHERMEN'S COOPERATIVES IN ECUADOR

BY

John J. Poggie, Richard B. Pollnac, and Miguel Fierro

The fishermen's cooperative is viewed by many as the ideal type of organization for use in improving the welfare of fishermen in development projects (cf. Jentoft 1986; Meynell 1984). Major development agencies such as the Food and Agriculture Organization of the United Nations and the World Bank also advocate their use. For example, a review of World Bank fishery projects between 1976 and 1981 indicated that 53 percent involved fishermen's cooperatives (Pollnac 1985). Judging from the relatively high failure rate that appears to exist for this type of organization, however, it is clear that their development is a difficult matter.

The success of fishermen's cooperatives depends on a large number of factors as evidenced by the numerous variables identified in the literature for local organizations in general (Esman and Uphoff 1984) and fishermen's organizations in particular (Pollnac 1988; Poggie 1980a; Meynell 1984). Pollnac (1985) identified no fewer than 21 important determinants of success for fishermen's organizations, some of which are clusters of variables.

It appears, however, that there may be several important dimensions which underlie the reported concomitants of the success and failure of fishermen's organizations. As a means of furthering our understanding of these basic dimensions which are related to fishermen's organization success, this study analyses a number of items reported in the literature to be associated with the success and failure of this type of organization.

Multivariate techniques are used to uncover the deeper, underlying communalities within a number of individual items, and the dimensions uncovered are examined to determine their interrelationships with cooperative success. This analysis will provide us with a more fundamental understanding of the basic relationships between the numerous variables which have been associated with the success and failure of fishermen's organizations, as well as allow us to discuss the phenomena in a more parsimonious and presumably realistic manner.

- / -

Three basic complexes of variables are examined to
determine their relationship with cooperative success: 1)
community context: variables which are related to the level
of development of the community within which the
cooperative is located; 2) material development: variables
indicating the level of material development of the
cooperative; and 3) membership and management: variables
indicating characteristics of organization membership,
management, and operations. Legislation concerning
fishermen's cooperatives, a factor related to problems in
organization development (cf. Pollnac 1988), is controlled
by examining cooperative success and failure within the
common legal context of a single country, Ecuador. Use of
a sample drawn from a single country also reduces, although
does not eliminate, variance due to cultural differences.

METHODS

Sample The sample consists of 48 fishermen's
cooperatives distributed throughout four coastal provinces
in Ecuador: Esmeraldes, Manabi, Guayas, and El Oro (for a
list of the cooperatives see Poggie and Fierro 1986). The
majority of the cooperatives (69%) are composed of
fishermen who devote most of their effort to capturing fin
fish used for human consumption ("white fish").
Twenty-three percent of the cooperatives are primarily
involved in shrimp culture (growing shrimp in ponds); four
percent in capturing shrimp; and one cooperative each is
primarily involved in tuna fishing and capturing
post-larval shrimp. Post-larval shrimp are sold and used
for stocking shrimp ponds.

Measures Community context was measured using a check
list of 17 items which can be seen in Table 1. Data from
the 48 cooperatives were factor analysed using orthogonal
rotation (varimax). The scree test (Cattell 1966) was used
to determine the cut-off point for the number of factors to
be rotated. The analysis resulted in two factors (see
Table 1). Factor One includes basic items; e.g., primary
school, public transportation, improved road, water supply,
etc. Factor Two includes more advanced or higher level
services such as secondary school, doctor, dentist,
telephone, etc. Factor One is identified as a Basic
Development Factor and Factor Two as an Advanced
Development Factor.

Cooperative material development was measured using
another checklist of 17 items which can be seen in Table
2. The same factor analytic procedure used in the analysis
of community context items was carried out and also
resulted in two factors. In this case, the first factor
includes productive items (e.g., boats, motors, nets, and a

-2-

Table 1. Factor analysis of community context items.

VARIABLE	FACTOR 1	FACTOR 2
Public transportation	.88	.24
Bar	.86	.23
General store	.79	.11
Electricity	.78	.16
Primary school	.75	.07
Church	.71	.33
Road	.67	.14
Public water supply	.50	.34
Postal service	.04	.83
Drugstore	.23	.82
Food market	.18	.80
Secondary school	.25	.76
Telephone service	.14	.74
Telegraph service	.05	.71
Rural dentist	.36	.62
Medical center	.38	.57
Rural doctor	.40	.48
Percent variance	30	29

Table 2. Factor analysis of cooperative material items.

VARIABLE	FACTOR 1	FACTOR 2
Boats	.83	-.32
Motors	.81	-.25
Nets	.77	-.15
Office Equipment	.59	.47
Drydock	.58	.11
Vehicle	.40	.27
Radio	.37	-.07
Motor repair facility	.33	.06
Furniture	.35	.44
Scales	.35	.48
Water	.07	.63
Toilet	-.19	.63
Lights	-.21	.61
Television	-.03	.60
Fish storage	-.04	.59
Dock	-.07	.45
Land	.09	.39
Percent variance	20	18

vehicle) as well as repair facilities for them (drydock and
motor repair facilities). The second factor includes
larger, more permanent improvements of facilities such as a
dock, fish storage facilities, and land. It also includes
elaborations such as a toilet, lights, running water, and
television. Items such as office equipment, furniture,
scales, and to a certain extent, a vehicle, are shared by
both factors. The first factor will be refered to as a
Productive Equipment Factor and the second as a Cooperative
Facilities Factor.

Cooperative membership and management characteristics
were measured using a check list of 18 items which were
factor analysed, again using the same technique used in the
preceding two analyses. As previously, the scree test
indicated a factor cut-off at two factors. The items and
their distribution across the factors are presented in
Table 3.

Table 3. Factor analysis of cooperative membership
and management characteristics.

VARIABLE	FACTOR 1	FACTOR 2
Receive development loan	.85	.18
Past loan paid-off	.84	.13
Administrators paid salary	.77	.01
Members follow orders	.77	-.29
Members sell only to cooperative	.62	.27
College educated administrator	.44	.32
Receive continuous government aid	.34	-.04
Full-time fish seller	.48	.24
Received government assistance	.21	.25
Members carry-out obligations	.15	.79
All members participate in meetings	.07	.73
Cooperative sponsors social events	.15	.72
Good relations among members	-.06	.70
Administrator with coop experience	-.08	.40
Cooperative sponsored savings plan	-.47	.39
At least 50% own their own boat	-.32	.36
Members trained to work together	.04	.36
Building owned by cooperative	.13	.36
Percent variance	22	18

The first factor derived is identified as a management
style factor. Items such as loans, education of
administrators, government assistance, and members selling
to the organization load highly. The second factor
includes items related to social solidarity such as members

-4-

carrying out obligations, attending meetings, social
events, and other positive relationships among members.
Even the presence of a savings plan on this second factor
points towards a fair amount of trust in each other and the
organization; hence, related to social solidarity. Both
factors are clearly related to style of cooperative
functioning. The first will be refered to as the
Management Style Factor, and the second as the Social
Solidarity Style Factor.

Relative success of each cooperative was evaluated by
the interviewers.[2] Each interviewer was instructed to
write a one-page summary of how well the cooperative was
working and indicate rationales for evaluation.
Cooperative success was measured by means of the
interviewers' four-point ranking from "poorly" to "very
well" concerning how well the cooperatives were
functioning. This measure of success was significantly
correlated with fishermen's evaluation of the functioning
of the organization on a two-point scale (Gamma = 0.97,
t-value = 12.03, $p < .001$), fishermen's evaluation of the
administration of the cooperative on a six-point scale
ranging from "terrible" to "excellent" (Gamma = 0.51,
t-value = 4.04, $p < .01$), and one of each of the
cooperatives' administrators evaluation of whether or not
the organization was "worse-off, the same, or better-off"
than when it was formed (Gamma = 0.42, t-value = 2.37, $p < .05$). The test of significance used with the Gamma
correlation coefficients is the Student's t value
associated with their asymptotic standard errors using a
conservative $0.3N$ for degrees of freedom (Brown and
Benedetti 1976). These correlations with other
evaluations of organizational functioning provide us with
considerable confidence in the measurement of the dependent
variable.

ANALYSIS

As a first step in the analysis, cooperatives grouped
according to their evaluation as working "poorly", "okay",
"well or very well" are subjected to an analysis of
variance across the six factors representing the
independent variables. The evaluations "well" and "very
well" are lumped together into a single "good" category due
to the fact that there are only four cooperatives in the
"very well" category. The results of this analysis can be
found in Table 4.

The analysis of variance presented in Table 4
indicates that mean factor scores on two of the six factors
differ significantly ($p < 0.05$) across the three levels of
success of cooperative operations. Community context, as

-5-

represented by the Basic and Advanced Development Factors
has little impact on cooperative success. Mean factor
scores on the Productive Equipment Factor increase as level
of success of cooperative increases, but the differences
are not statistically significant (p = .06). Factor scores
on the Facilities and Social Solidarity Style Factors
increase as level of success increases, and the differences
are statistically significant.

Table 4. Distribution of mean factor scores across
cooperatives characterized by level of success.

LEVEL OF SUCCESS

FACTOR	POOR	OK	GOOD	F RATIO	DF		P
Basic Development	.25	-.30	.01	1.22	2	45	.31
Advanced development	-.27	.44	-.12	2.26	2	45	.12
Productive equipment	-.36	-.06	.45	3.01	2	45	.06
Facilities	-.44	-.15	.61	5.83	2	45	.006
Management style	-.15	-.27	.46	2.14	2	39*	.13
Social solidarity	-.93	.27	.79	22.61	2	39*	.000

*Degrees of freedom (df) vary due to missing data on
last two factors.

The next step in the analysis is to examine the
interrelationships among the independent variables. Factor
scores on each factor were correlated with each other
factor and the results are presented in Table 5.

Table 5. Correlation matrix of independent variables.

VARIABLE	1	2	3	4	5
1. Basic development	----				
2. Advanced development	.00	----			
3. Productive equipment	-.20	.03	----		
4. Facilities	.18	.14	.00	----	
5. Management	-.03	.04	.59*	.08	----
6. Social solidarity	-.06	.05	.26	.47*	.00

* = p < 0.01

The results indicate that there are two significant
correlations. Management Style Factor scores are
positively correlated with Productive Equipment Factor
scores, indicating that as scores on management style

-6-

increase so do productive equipment scale scores.
Likewise, the analysis indicates that increases in Social
Solidarity Style Factor scores are associated with
increases in Facilities Factor scores.

Finally, we would like to examine the relationships
between the independent variables (the six factors), the
dependent variable (cooperative success), and several
potentially confounding variables. Ecuador's fishing
populations manifest a wide range of environmental and
cultural diversity; hence, it is important to determine if
variation in the independent variables is related to
region. To test for regional variation, factor scores on
the six factors are examined across the four geographical
provinces in the sample. The results of this analysis are
found in Table 6.

Table 6. Regional distribution of mean factor scores
for independent variables.

PROVINCE	BASIC DEVELOPMENT	ADVANCED DEVELOPMENT	PRODUCTIVE EQUIPMENT
Esmeraldes	-.67	-.03	.41
Manabi	.33	-.04	-.22
Guayas	.40	-.11	-.23
El Oro	-.30	.17	.21
F-ratio	3.30	0.15	1.16
d.f.	3 44	3 44	3 44
p	0.03	0.93	0.34

PROVINCE	FACILITIES	MANAGEMENT	SOCIAL SOLIDARITY
Esmeraldes	-.12	-.66	.29
Manabi	.04	-.09	-.11
Guayas	-.40	-.08	-.11
El Oro	.37	.68	.08
F-ratio	1.11	3.02	0.30
d.f.	3 44	3 38	3 38
p	0.35	0.04	0.82

The analysis of variance indicates that two of the
factors manifest statistically significant differences
across the provinces. The Basic Development Factor has the
lowest values in Esmeraldes and the highest in Guayas.
Factor scores on the Management Factor are also lowest in

-7-

Esmeraldes in contrast to El Oro, which has the highest.

Turning to regional differences in the dependent variable of success rate of fishermen's cooperatives, success is cross tabulated with region in Table 7.

Table 7. Evaluation of cooperative success cross-tabulated with region.

EVALUATION OF COOPERATIVE

REGION	POOR	OK	GOOD	VERY GOOD
Esmeraldes	1	4	3	1
Manabi	8	4	4	1
Guayas	5	4	1	0
El Oro	3	3	4	2
TOTAL	17	15	12	4

Cell values in Table 7 are far too small to conduct a valid statistical analysis of the observed differences; hence, all categories above "poorly" were combined resulting in two categories: "poorly' versus "OK or better." Statistical analysis of the grouped categories indicates that the regional differences are not statistically significant (Chi-square = 3.19, d.f. = 3, p > 0.05). Even a pair-by-pair comparison of all regions failed to result in a difference which was statistically significant. For example, comparing the two regions which manifest the most marked differences (Manabi where 47 percent of the cooperatives are evaluated as operating "poorly" in contrast to only 11 percent in Esmeraldes), the differences are still not statistically significant (Yates' corrected Chi-square = 1.95, d.f. = 1, p > 0.05). Hence, we cannot conclude that there are regional differences in fishermen's cooperative success rate.

Finally, since there are two major types of fishermen's cooperatives, mariculture (shrimp) and capture, it will be important to compare the two types with respect to factor scores on the independent variables. The results of this analysis are in Table 8. The results indicate a large, significant difference between the capture fishermen and shrimp mariculture cooperatives with respect to scale scores on the Management Style Factor, with the mariculture cooperatives manifesting a much higher mean score. The shrimp mariculture cooperatives also have a higher mean score for the Productive Equipment Factor.

The differences between the two types of cooperative are not statistically significant with respect to the other factors.

Table 8. Distribution of mean factor scores on independent variables for different cooperative types.

TYPE OF COOPERATIVE	BASIC DEVELOPMENT	ADVANCED DEVELOPMENT	PRODUCTIVE EQUIPMENT
Capture	.04	-.08	-.21
Mariculture	-.13	.27	.73
F-ratio	0.24	1.00	8.85
d.f.	1 46	1 46	1 46
p	0.63	0.32	0.005

TYPE OF COOPERATIVE	FACILITIES	MANAGEMENT	SOCIAL SOLIDARITY
Capture	-.04	-.32	.11
Mariculture	.13	1.16	-.40
F-ratio	0.24	24.23	1.85
d.f.	1 46	1 40	1 40
p	0.62	0.000	0.18

The two major categories of fishermen's cooperatives were also compared with respect to levels of success. Level of success is cross-tabulated with cooperative type in Table 9.

Table 9. Evaluation of cooperative success cross-tabulated with cooperative type.

EVALUATION OF COOPERATIVE

TYPE	POOR	OK	GOOD	VERY GOOD
Capture	13	13	9	2
Mariculture	4	2	3	2

Since cell values are relatively small, it was again necessary to lump success level categories into "poorly" versus all other categories combined. Thirty-five percent of the fish capture cooperatives and 36 percent of the

-9-

shrimp mariculture cooperatives were evaluated as doing "poorly". The difference is not statistically significant (Yates' corrected Chi-square = 0.08, d.f. = 1, p > 0.05).

The relatively large difference between the shrimp mariculture and fish capture cooperatives with respect to the Management Style and Productive Equipment Factors suggests that it might be important to conduct an analysis between the independent and dependent variables within each category of cooperative. Since there is a relatively small number of shrimp mariculture cooperatives in our sample, cell values would be so small that it would be inappropriate to conduct an analysis of variance across the success levels. Hence, Spearman rank order correlation coefficients are calculated between the four levels of the cooperative success measure and the rank-ordered factor scores. To facilitate comparison the same technique is used for both types of cooperative. Levels of significance are calculated using the small sample method for the mariculture cooperatives and Student's t test for the fish capture cooperatives (cf. Siegel 1956). The results of these analyses are in Table 10.

Table 10. Spearman rank order correlations between evaluations of cooperative success and factor scores within cooperative type.

COOPERATIVE TYPE

	MARICULTURE		FISH CAPTURE	
FACTOR	CORR.	N	CORR.	N
Basic development	.29	11	-.08	35
Advanced development	.12	11	.09	35
Productive equipment	.67*	11	.14	35
Facilities	.68*	11	.44**	35
Management	.85**	9	.15	33
Social solidarity	.90**	9	.76***	33

* = p < 0.05;   ** = p < 0.01;   *** = p < .001

The analyses in Table 10 indicate that only the community context factors are not related to mariculture fishermen's cooperative success. The other four factors are significantly and strongly related to cooperative success. With respect to the capture fishermen's cooperatives, only two of the factors are significantly correlated with success: Cooperative Facilities, and Social Solidarity.

-10-

DISCUSSION

All variables examined except community development manifest significant relationships with performance of at least one type of fishermen's cooperative in Ecuador. This lack of relationship between level of community development and cooperative success is similar to findings presented by Esman and Uphoff (1984:111-112) who report no relationship between infrastructure and success of local organizations in a worldwide sample.

Although there are some differences between the shrimp mariculture and fish capture cooperatives with respect to the correlates of relative success, two factors are shared by the two types of cooperatives as predictors of success: cooperative facilities and social solidarity. The fact that the Productive Equipment Factor is significantly related to success only among the shrimp mariculture cooperatives can be explained by the observation that a shrimp pond needs a boat, motor, pumps, and repair facilities for its equipment. It makes sense that the cooperative would own the equipment since it would be used in common by the members. In most fish capture cooperatives, individual fishermen own their own boats, motors, and gear which they operate independently; hence, the Productive Equipment Factor should be related to mariculture cooperative success, but not necessarily fish capture cooperative success.

The analysis indicated that the shrimp mariculture cooperatives score relatively high on the Management Factor. The Management Factor is also a strong predictor of success for the mariculture cooperatives. This can be explained by the fact that mariculture is capital intensive in comparison to the small-scale marine capture fishery and thus requires a more highly structured mode of management (cf. Pollnac 1982). Obtaining land leases, constructing ponds and water management facilities, managing cash flow for purchase of post-larval shrimp, feed, and fertilizer, and managing the complex culturing of shrimp demands a relatively high level of management skill as well as an initially high investment in terms of money. These requirements are related to the items on the Management Factor.

The Cooperative Facilities Factor is related to success for both types of cooperative. Although one could argue that the existence of such facilities is a consequence of success, they are more likely antecedents of success. Fish storage facilities and docks provide motivation for the capture fisherman to deal with the cooperative, while the same facilities can improve the

operation of a shrimp mariculture cooperative. Running water, toilet, lights, and TV are improvements that make the cooperative a more pleasant workplace facilitating social solidarity among workers. This interpretation is supported by the significant positive correlation between the Social Solidarity and Cooperative Facilities Factors (Table 5).

It appears, however, that the most important factors influencing fishermen's cooperative success in Ecuador are management style and social solidarity. Of the two, social solidarity seems to be the most important, related strongly and significantly to both mariculture and capture cooperatives. In an earlier analysis of the same data, Poggie and Fierro (1987) emphasized education level of administrator as an important determinant of cooperative success. The analysis presented here seems to show that education influences cooperative success through the items that form part of the Management Style Factor. Education of administrator is on that factor because it is related to other items on the factor, and it makes sense that a more highly educated administrator would tend to be a better manager.

While general aspects of these findings are far from being unique--it has been argued for some time that aspects of management and social solidarity are important determinants of cooperative success (cf., Esman and Uphoff 1984; Pollnac 1985)--this analysis has shed empirical light on several important aspects of these relationships. First, an analysis of a relatively large number of items associated with cooperative operations, membership, and management indicated that they covaried in such a way that we can conclude that they represent two different "styles" of operation. One style is associated with a more technical, entrepreneurial business management approach and the other with interpersonal relations, or social solidarity. What is significant about this is that it not only reduces a large number of variables to two distinct and independent dimensions (as is the case with orthogonally rotated factors), but it shows that while a high score on either scale is a predictor of shrimp culture cooperative success, only the Social Solidarity Factor is strongly and significantly related to cooperative success among capture fishermen. This does not mean that poor management will not cause a capture fishery cooperative to fail. It means that good management alone is not enough to ensure success--the capture fishermen's cooperatives also appear to need high social solidarity in order to be successful.

This finding makes sense in light of our knowledge

-12-

concerning the social relationships among capture
fishermen. While there is a great deal of interdependence
and cooperation within fishing crews, there is usually
extensive between crew competition. This results from the
fact that in most fishing societies the marine fishery is a
common property resource--the first vessel fishing a spot
has rights to the spot until the crew wishes to move
elsewhere (cf. Pollnac 1985; Poggie 1980b). Vessels are in
constant competition to get to the best spots first and
keep them secret if possible. This competitive spirit out
on the water must be countered back on land by other
measures (e.g., training in advantages of cooperation,
cooperative sponsored social events, etc.) if a fishermen's
cooperative is to succeed in dealing with the contingencies
of marketing, acquiring loans and supplies, and other
shoreside aspects of fishing operations.

The data presented here suggest that both of these
styles (management and social solidarity) are differently
related to the success of mariculture and fish capture
cooperatives. If this is the case, decision makers
interested in improving the welfare of fishermen by means
of cooperative development projects in Ecuador will be able
to promote the more culturally and economically appropriate
of these two alternative styles without having to be
concerned with the style of organization on mariculture
cooperative success. Emphasis on both styles, however,
will result in a greater probability of success. With
respect to capture fishermen more emphasis will have to be
placed on developing a sense of social solidarity among the
fishermen. Management skills are important for both types
of cooperative, but good management alone is not enough to
insure the success of a capture fishermen's organization.
Nonetheless, given the important potential impact of this
finding for development policy, it is imperative that this
finding be subjected to further research which rigorously
tests its validity and applicability in other populations
before policy is set.

NOTES

1. The research reported here was supported by the USAID
Cooperative Agreement DAN 4024 A-00-2072 "Fisheries
Development Support Services" S&T/AGR/RNR. Additional
in-country funding and support services were provided by
the Escuela Superior Politecnica del Litoral (ESPOL),
Guayaquil, Ecuador. A version of this paper was read at
the 1988 Annual Meeting of the Society for Applied
Anthropology, Tampa, Florida (April 1988).

2. Interviewers consisted of a team of 24 Ecuadorian
post-secondary students who, because of the time
constraints of travel in the rural part of the country,
were assigned only two cooperatives each. The students
were trained together for three days in interviewing
techniques and conducted practice interviews before going
out into the field.

REFERENCES CITED

Brown, M.B. and J.K. Benedetti
    1976 Asymptotic standard errors and their sampling
    behavior for measures of association and correlation
    in the two-way contingency table. Health Sciences
    Computing Facility Technical Report No. 23. Univ. of
    California, Los Angeles.

Cattell, R.B.
    1966 The scree test for the number of factors.
    Multivariate Behavioral Research 1:245-276.

Esmar, M.J. and N.T. Uphoff
    1984 Local Organizations: Intermediaries in Rural
    Development. Ithaca: Cornell University Press.

Jentoft, S.
    1986 Fisheries cooperatives: Lessons drawn from
    international experiences. Canadian Journal of
    Development Studies 7:197-209.

Meynell, P.J.
    1984 Small-scale Fisheries Cooperatives: Some
    Lessons for the Future. COPAC Occasional Paper
    No. 2. Rome: Committee for the Promotion of Aid
    to Cooperatives.

Poggie, J.J.
    1980a Maritime anthropology: socio-cultural analyses
    of small-scale fishermen's cooperatives -
    Introduction. Anthropological Quarterly 53: 1-3.

    1980b Small-scale fishermen's psychocultural
    characteristics and cooperative formation.
    Anthropological Quarterly 53: 20-28.

Poggie, J.J. and M. Fierro
    1986 Sociocultural correlates of success in
    Ecuadorian Artisanal Fishermen's Cooperatives.
    International Center for Marine Resource Development
    Report. Kingston, R.I.: ICMRD, University of Rhode
    Island.

    1987 Correlacion sociocultural del exito de las
    cooperativas pesqueras artesanales ecuatorianas.
    in (Mariscal, C., F. Carrion, & A. Kallweit, eds.)
    La Pesca Artesanal en el Ecuador. Quito: el Centro
    de Planificacion y Estudios Sociales.

Pollnac, R.B.
    1982 Sociocultural aspects of implementing
    aquaculture systems in marine fishing communities.
    in (Smith, L.J. & S. Peterson, eds.) Aquaculture
    in Less Developed Countries: Social, Economic, and
    Political Problems. Boulder, Colorado: Westview
    Press.

    1985 Social and Cultural Characteristics in small-
    scale fishery development. in (M.M. Cernea, ed.)
    Putting People First: Sociological Variables in Rural
    Development. New York: Oxford University Press.

    1988 Evaluating the Potential of Fishermen's
    Organizations in Developing Countries. Kingston,
    Rhode Island: International Center for Marine
    Resource Development.

Siegel, S.
    1956 Nonparametric Statistics for the Behavioral
    Sciences. New York: McGraw-Hill Book Co., Inc.

TO REQUEST ASSISTANCE

To request assistance or obtain more information about
Fishery Development Support Services (DAN 4024-A-00 7073)
ask your AID country mission or write to:

Dr. Donald E. McCreight
Program Director, FDSS
International Center for Marine Resource Development
University of Rhode Island
126 Woodward Hall
Kingston, RI 02881
Tel: (401) 792-2479

Dr. Spiros Constantinides
Deputy Director
International Center for Marine Resource Development
University of Rhode Island
126 Woodward Hall
Kingston, RI 02881
Tel: (401) 792-2133

Mr. George Aelion
Assistant Director, Operations and Training
International Center for Marine Resource Development
University of Rhode Island
126 Woodward Hall
Kingston, RI 02881
Tel: (401) 792-2479

Dr. Richard Neal
Program Officer, S&T/AGR/RNR
Office of Agriculture
Agency for International Development
Washington, DC 20523
Tel: (703) 875-4027

Dr. Lamarr Trott
Project Monitor, FDSS
S&T/AGR/RNR
Agency for International Development
Washington, DC 20523
Tel: (703) 875-4098

Fishery Development Support Services (FDSS) is a program of the
United States Agency for International Development (USAID), implemented
by the International Center for Marine Resource Development (ICMRD) of
The University of Rhode Island (URI) with collaborative support from
the Bureau of Science and Technology of USAID. FDSS provides to
developing countries fisheries technical assistance, information
services and training programs as well as applied research in fisheries
development in the following areas: sociocultural factors, postharvest
technology, resource utilization, management and mariculture.

$\mathcal{16}$