Managing Redundancy in Overexploited Fisheries

Joshua John
Recent World Bank Discussion Papers

No. 183  Participatory Development and the World Bank: Potential Directions for Change. Edited by Bhuvan Bhatnagar and Aubrey C. Williams


No. 185  Military Expenditure and Economic Development: A Symposium on Research Issues. Edited by Geoffrey Lamb with Valeriana Kallab

No. 186  Efficiency and Substitution in Pollution Abatement: Three Case Studies. Dennis Anderson and William Cavendish

No. 187  The State Holding Company: Issues and Options. Anjali Kumar

No. 188  Indigenous Views of Land and the Environment. Edited by Shelton H. Davis


No. 190  Natural Gas in Developing Countries: Evaluating the Benefits to the Environment. John Homer

No. 191  Appropriate Macroeconomic Management in Indonesia's Open Economy. Sadiq Ahmed

No. 192  Telecommunications: World Bank Experience and Strategy. Bjorn Wellenius and others


No. 194  Social Gains from Female Education: A Cross-National Study. K. Subbarao and Laura Rancy

No. 195  Towards a Sustainable Development: The Rio de Janeiro Study. Edited by Alcira Kreimer, Thereza Lobo, Braz Menezes, Mohan Munasinghe, and Ronald Parker


No. 197  Korean Industrial Policy: Legacies of the Past and Directions for the Future. Danny M. Leipziger and Peter A. Petri

No. 198  Exporting High-Value Food Commodities: Success Stories from Developing Countries. Steven M. Jaffe with the assistance of Peter Gordon

No. 199  Borrower Ownership of Adjustment Programs and the Political Economy of Reform. John H. Johnson and Sulaiman S. Wasty


No. 201  Urbanization, Agricultural Development, and Land Allocation. Dipasis Bhadra and Antonio Salazar P. Brandão

No. 202  Making Motherhood Safe. Anne Tinker and Marjorie A. Koblinsky

No. 203  Poverty Reduction in East Asia: The Silent Revolution. Frida Johannsen

No. 204  Managing the Civil Service: The Lessons of Reform in Industrial Countries. Barbara Nunberg

No. 205  Designing a System of Labor Market Statistics and Information. Robert S. Goldfarb and Arvil V. Adams

No. 206  Information Technology in World Bank Lending: Increasing the Developmental Impact. Nagy Hanna and Sandor Boyson

No. 207  Proceedings of a Conference on Currency Substitution and Currency Boards. Edited by Nissan Liviatan

No. 208  Developing Effective Employment Services. David Fretwell and Susan Goldberg

No. 209  Evolving Legal Frameworks for Private Sector Development in Central and Eastern Europe. Cheryl W. Gray and Associates

No. 210  Marine Biotechnology and Developing Countries. Raymond A. Zilinskas and Carl Gustaf Lundin

(Continued on the inside back cover.)
Discussion Papers present results of country analysis or research that are circulated to encourage discussion and comment within the development community. To present these results with the least possible delay, the typescript of this paper has not been prepared in accordance with the procedures appropriate to formal printed texts, and the World Bank accepts no responsibility for errors. Some sources cited in this paper may be informal documents that are not readily available.

The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s) and should not be attributed in any manner to the World Bank, to its affiliated organizations, or to members of its Board of Executive Directors or the countries they represent. The World Bank does not guarantee the accuracy of the data included in this publication and accepts no responsibility whatsoever for any consequence of their use. The boundaries, colors, denominations, and other information shown on any map in this volume do not imply on the part of the World Bank Group any judgment on the legal status of any territory or the endorsement or acceptance of such boundaries.

The material in this publication is copyrighted. Requests for permission to reproduce portions of it should be sent to the Office of the Publisher at the address shown in the copyright notice above. The World Bank encourages dissemination of its work and will normally give permission promptly and, when the reproduction is for noncommercial purposes, without asking a fee. Permission to copy portions for classroom use is granted through the Copyright Clearance Center, Inc., Suite 910, 222 Rosewood Drive, Danvers, Massachusetts 01923, U.S.A.

The complete backlist of publications from the World Bank is shown in the annual Index of Publications, which contains an alphabetical title list (with full ordering information) and indexes of subjects, authors, and countries and regions. The latest edition is available free of charge from the Distribution Unit, Office of the Publisher, The World Bank, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A., or from Publications, The World Bank, 66, avenue d'Iéna, 75116 Paris, France.

ISSN: 0259-210X

The author is president of Joshua John Ocean Consulting, specializing in fisheries and oceans development and based in Dartmouth, Nova Scotia, Canada.

Library of Congress Cataloging-in-Publication Data

John, Joshua, 1930–
Managing redundancy in overexploited fisheries / Joshua John.
p. cm. — (World Bank discussion papers ; 240. Fisheries series)
Includes bibliographical references.
1. Fishery management. 2. Fisheries—Economic aspects.
Fisheries series.
SH328.J62 1994
338.3'727—dc20 94-15942
CIP
FISHERIES SERIES

Technical Paper Series
No. 147  The World Bank/UNDP/CEC/FAO, Fisheries and Aquaculture Research Capabilities and Needs in Asia: Studies of India, Thailand, Malaysia, Indonesia, the Philippines, and the ASEAN Region. Francis T. Christy Jr., David James, et al.


Discussion Paper Series
No. 135  A Strategy for Fisheries Development

No. 217  Managing Fishery Resources: Proceedings of a Symposium Co-Sponsored by the World Bank and Peruvian Ministry of Fisheries held in Lima, Peru, June 1992

Policy and Research Series
No. 19  Study of International Fishery Research

Booklet
Study of International Fishery Research: Summary Report
Contents

Foreword vii
Abstract ix

1 Introduction 1

2 Fishery management challenges and the problem of exit 3
   Policy objectives 3
   Open access versus property rights 4
   Economic theory 5
   Management control methods 6
   Considerations concerning the exit problem 7

3 Prescriptions for facilitating exit 9
   Industrial fisheries 9
   Artisanal fisheries 10
   Case studies 12

4 Summary and conclusions 17

Appendix A Draft terms of reference for a working party on fishery exit 21
Appendix B Terms of reference for this research paper 23
Bibliography 25

Tables
1 Control methods in eleven countries 6
2 Control methods and effect on employment 7

Figures
1 Impact of license limitation at the firm level 5
2 Impact of license limitation at the fishery level 6
Foreword

In the years since World War II the world’s fishing fleet has grown at a faster rate than fish production. As a result, over the past decade the number of major, underexploited fish stocks has decreased from nearly thirty to only seven. The shocking reality is that one of three major stocks is overfished. According to the Food and Agriculture Organization, in 1989 the world fishing fleet operated at a loss of $22 billion, not counting capital expenditures or revenue from unreported catches.

Management regimes that treat fishery resources as common property and allow open access to the resources have been the main cause of the overcapitalization of fishing fleets. Employment incentives offered to shipyards, attractive financing schemes for prospective boat owners, and fishing fleet subsidies have also contributed significantly to the world’s excess catch capacity. In industrial countries heavy subsidies are what allow many fleets to continue operating, a policy that will only lead to further depletion of fish resources.

To avoid crises in world fisheries requires the establishment of appropriate management regimes—ideally, ones based on a satisfactory form of property rights. And there is an urgent need to reduce fishing effort at the global level. But reducing fishing effort exacerbates unemployment and leads to redundancy of vessels, and is therefore a highly sensitive political issue. Accordingly, a fleet reduction strategy must incorporate special considerations.

This paper represents a first attempt to deal with the problem of “exit” of redundant labor and capital from overexploited fisheries. It recapitulates the existing knowledge, provides insight into a number of experiences in both large- and small-scale fisheries, and paves the way for further action. We hope that the paper will encourage fishery administrators and donor agencies alike to take concrete steps in a concerted manner toward more rational exploitation of fishery resources.

Eduardo A. Loayza
Fisheries Adviser
Agriculture and Natural Resources Department
Technology and Services Division
Abstract

Excess capacity in fishing and fish processing characterizes many, if not most, fisheries today. Because the capital and labor employed in fisheries are generally use-specific, their exit is often painfully slow. This paper reviews and catalogs current approaches for facilitating the exit of redundant capital and labor from overexploited fisheries. It begins with an examination of fishery management objectives and the different measures used to achieve these objectives. It then discusses, in the context of the challenges confronting fishery management, the problems surrounding the exit of capital and labor from overexploited fisheries.

The paper examines approaches that can be used to facilitate exit from both industrial and artisanal fisheries, citing several relevant case studies as well as the experience of different countries. For industrial fisheries, individual transferable quotas appear to offer a solution to the problem of overcapitalization and overfishing. For artisanal fisheries, an appropriate strategy is integrated (horizontal) community development.

The continuing dual existence of industrial and artisanal fisheries in developing countries poses special challenges to fishery management, which needs to recognize and treat each type of fishery differently. For artisanal fisheries, economic diversification and community-based nonfishery solutions need to be pursued and made an integral part of any comprehensive adjustment package. Such initiatives can be effective only if several agencies come together in cooperation with the community and its people. Fishery development must refocus on raising the standard of living of fishing communities, not just raising efficiency in fishing, fish processing, and fish marketing.
Introduction

This report reviews and catalogs some current approaches used to facilitate exit of labor and capital from overexploited fisheries, both industrial and artisanal. The term "exit" refers to the voluntary or forced departure of labor and capital. The report brings together comments and recommendations from many authors, including observations on individual transferable quotas (ITQs), nonfishery economic diversification of fishing communities, horizontally integrated community development, labor mobility, and supplementary and alternative employment opportunities for fishermen. The report discusses implications of these approaches for fishery managers and donor agencies. A selective bibliography is included, covering most authors and commentators on the subject.

The author acknowledges the helpful comments and suggestions of Dr. Anthony T. Charles, Dr. Max N. Aguero, Dr. Mike Sinclair, and Mr. Eduardo A. Loayza.
A substantial body of research exists concerning the determinants and control of entry into fisheries. Factors influencing exit from fisheries are equally complex but less well understood. In many fisheries, there is perceived to be an excessive level of factor inputs relative to that needed to catch the available fish, a problem variously termed “excess capacity,” “overcapitalization,” or simply “too many fishermen chasing too few fish.” Fishermen themselves represent a variety of constituencies and interests.

Many complexities warrant consideration in addressing the issue of exit from the fishery. Should policies to reduce participation in a fishery focus on conservation, economic, or social concerns? Is the target to be exit of fishermen, fishing capital, or fishing power? A balanced and scientific approach to these questions must address a variety of theoretical and practical considerations.

It is useful to begin an examination of the exit issue against the background of three broad management objectives, as defined by Lawson (1984):

- **Conservation**: maintaining biological resources
- **Economic**: maintaining fishery production, the economic objectives of which are higher income for fishermen, optimum utilization of resources, maximum employment, and development of the rural and urban economy
- **Social**: maintaining equity of income distribution.

Lawson also mentions a fourth objective, reducing overcapacity in the fishing industry, which is beyond the scope of this report.

**Policy objectives**

What is to be accomplished through efforts to reduce participation in the fishery? The extent to which exit is needed and the manner in which it is to be carried out depend on the goals a society wishes to achieve through its fishery operations. Unfortunately, these goals are often disregarded on the assumption that the objectives of policy designers match those of the society they represent. This may make policy development easier in the short term, but less realistic and more failure-prone in the long term. A common manifestation of this attitude is the assumption that only one fishery goal is valid. For example, the single-minded pursuit of maximum economic efficiency leads to reducing participation to the fewest fishermen capable of harvesting the available catch.

In reality, it is important to appreciate the complex social, economic, and cultural goals that drive most artisanal fisheries. If incomes in fishing communities are to increase, it is necessary to do more than develop fishery management programs, because management programs alone fail to deal adequately with fishermen who are displaced (Smith 1981).

There is growing realization that sustainable fishery development requires more holistic and interdisciplinary research, with a reasonable comprehension of interactions between the fishery and the ecosystem, as well as with the society as a whole. Charles (forthcoming) notes that “by and large fishery management and development efforts have historically lacked a system focus.” He attributes past failures to a neglect of the pervasive interactions
MANAGING REDUNDANCY IN OVEREXPLOITED FISHERIES

between the fishery and other components of the ecosystem and the society:

This neglect has led to a loss of socio-economic and community sustainability, which in turn threatens ecological sustainability. The potential for integration extends beyond the fishery to encompass other ocean and coastal development activities. Indeed, fishery sustainability may be best insured when fisheries programs take place within a framework of integrated coastal and community development. (Charles forthcoming)

Aguero and Costello (1986) make the point that if fisheries management is to be integral, it must be based on information, data, and interpretation which is also integral. The need is for research leading to an integral analysis and understanding of the fisheries sector where biological, technological, socioeconomic, cultural, and institutional factors are properly accounted for in active interaction with other components. (p. 819)

A key question in examining fishery exit options is determining an appropriate target for the eventual number of fishermen:

To accomplish this, it is crucial that both national fisheries administrations as well as donor agencies fully understand the multi-objective nature of fisheries. If the overriding goal is either ease of management or maximum economic efficiency, one might seek to arrive at the minimum number of fishermen that can still harvest the available catch. However, it is naive and failure-prone to base policy entirely on this one objective. In fact, exit policies and approaches must be designed to ensure simultaneous achievement of ecological, socioeconomic and community sustainability. (Charles, personal communication, 1992)

There is an increasing awareness among fishery planners and analysts of two promising options for management and development, based on models that are well established in various parts of the world:

- Self-regulation and territorial use rights in fishing, or TURFs (Christy 1982)
- Cooperative management, based on joint efforts of fishermen, community, and government (Pinkerton 1989).

These ideas, which tend to be based on developing country and indigenous experiences, are not well developed theoretically but may outperform industrial country models, such as buybacks and ITQs. They are especially suited to small-scale fisheries, producing higher levels of fishery efficiency (by coordinating effort) and regulatory efficiency (by reducing conflict and decentralizing management).

An appropriately designed fisheries management system is unlikely to lead to exit from fishing unless this exit is economically justified and the aggregate benefits exceed the aggregate costs. The problem is to distribute the costs and benefits appropriately. This may be socially impossible and in addition may not happen when possible. Hence, there will be a good deal of rational opposition to a structural rearrangement of fisheries even when the prospective aggregate benefits exceed costs. (Arnason, personal communication, 1992)

Open access versus property rights

Beddington and Rettig (1983) describe the dissipation of economic rent that occurs in open-access fisheries compared with rights-based fisheries:

In an uncontrolled fishery, initially, as the fishery develops, fishermen experience high catch rates on the abundant resources and make high profits. This attracts other fishermen into the industry and encourages those already there to increase their investment. Increasing fishing pressure then reduces the fish stock and increases competition amongst the fishermen for the dwindling resources. This reduces catch rates and hence profits to a level where the earnings merely cover the costs of the labor and capital employed to a level where the
economic rent (value of landings minus costs of catching and delivering the fish) is completely dissipated. (p. 1)

Arnason (1994b) describes the effects that occur when excessive fishing capacity develops:

Initially, when a fishery is first being developed, the resource stock is high. Therefore, catches are good and the fishers earn a high return on their investment... Thus, fishing capacity expands and fishing effort increases. This reduces the fish stocks, and the catch per unit of effort declines. Economic returns from the fishery are correspondingly reduced. ... Capacity continues to expand as long as the fishers can reasonably hope to extract a positive return from the fishery. Long before achieving a positive return ceases to be possible, however, the fish stock has normally been reduced far below the level corresponding to maximum sustainable yield. ... An open-access, competitive fishery will reach an equilibrium only when the expansion in fishing effort has reduced the stock to the point at which total fishing costs equal the value of the harvest. As long as harvesting revenues exceed costs there will be an incentive to invest in new capacity. (p. 3)

This open-access result contrasts markedly with the result in a fishery that is the property of a sole owner (Scott 1955). In this case, the ability of the owner to collect a rent creates a significant incentive for the fish stocks to be husbanded for future as well as current use. It also leads to harvest of the resource at much lower cost.

Economic theory

The following theoretical analysis of the most common approach to reducing fleets and limiting fishing licenses illustrates the dynamic and structural aspects of the exit problem. A simple graphic method, based on the work of Anderson (1986), focuses on key structural and dynamic considerations rather than the intricate details of a real-world situation. The discussion is in terms of "firms" rather than fishermen, because the theory is based on standard microeconomic assumptions about the behavior of firms rather than on a full multidisciplinary analysis.

Consider an initially unregulated, open-access fishery: lack of restriction on entry means that firms will enter the fishery up to the point where each is breaking even (covering opportunity costs, and a "normal profit"). At this point, the long-run average cost of providing one unit of fishing effort equals the resulting average unit of revenue. This represents economic equilibrium, because there is no economic incentive for entry to or exit from the fishery. The marginal firm is operating efficiently at a minimum average cost, because otherwise it would be impossible for it to meet average costs; potential rents have been dissipated because a relatively large number of firms are participating.

Figures 1 and 2 show this situation graphically. The figures assume that all firms are equivalent. In figure 1, each firm attempts to maximize profits but, given the number of other participants, can do no better than achieve normal profits. At effort level $e$, the long-run average cost (LRAC) per unit of effort and the long-run marginal cost (LRMC) match the average unit of revenue $R$. The latter is determined by industry-level analysis (figure 2) equating total industry supply and demand, at the intersection of the effort supply curve $S$ and the average industry revenue curve $AR$. Curve $S$ is given by the sum of all marginal cost curves; it shows the total effort that all fishermen taken together wish to provide at each

**Figure 1** Impact of license limitation at the firm level

![Figure 1: Impact of license limitation at the firm level](image)

Source: Anderson 1986.
MANAGING REDUNDANCY IN OVEREXPLOITED FISHERIES

Figure 2  Impact of license limitation at the fishery level

![Graph showing impact of license limitation at the fishery level]

Source: Anderson 1986.

possible level of fishery revenues. Curve AR gives the average long-run revenue corresponding to each effort level.

The number of firms may be reduced through a license limitation program or a buyback to capture some of the potential rents. With fewer firms contributing to the supply curve for effort, the curve shifts inward to S' (figure 2). In this new supply-demand equilibrium, the total industry effort is reduced from E to E', but the average cost and revenue increases from R to R'. As indicated in figure 1, each of the remaining firms has increased its effort from e to e', due to increased unit profitability: effort e' is a profit-maximizing point, equating long-run marginal cost to the new average revenue level R'.

Overall, less effort is being exerted in the fishery; there are fewer firms, but each is induced to exert greater effort. From the perspective of rent generation, the desirability of license limitation will depend on the exact cost structure in the industry. In a "constant-cost" fishery (figure 2), there is a net economic gain (area A minus area B).

Management control methods

Gulland (1977) listed six control methods for fishery management:

- Restrictions on gear
- Closed seasons
- Closed areas
- Catch quotas: overall quotas or quotas allocated to vessels, plants, or other groups

- Limits on size or condition of fish that can be landed
- Limits on the number of vessels licensed and the amount of fishing by each vessel.

Table 1 shows how eleven major fishing countries use these methods to control their fisheries. Besides these direct methods of control, indirect management methods, such as taxes and subsidies, can also be used (Lawson 1984; Arnason 1994b).

The effects of major fishery management methods on socioeconomic, administrative, and biological factors were examined by Anderson (1980; table 2).

For a number of reasons many control methods fail to accomplish the intended goals. Lawson (1984) analyzed this lack of success and cited the following causes:

- Failure to implement controls soon enough to prevent serious overfishing
- Difficulties in enforcement
- Fishermen’s success in evading control measures
- The high cost of administration and implementation

Table 1  Control methods in eleven countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Control methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Vessel license</td>
</tr>
<tr>
<td></td>
<td>Individual quota</td>
</tr>
<tr>
<td></td>
<td>Personal license</td>
</tr>
<tr>
<td>Canada</td>
<td>Vessel license</td>
</tr>
<tr>
<td></td>
<td>Individual quota</td>
</tr>
<tr>
<td>El Salvador</td>
<td>Vessel license</td>
</tr>
<tr>
<td>Iceland</td>
<td>Vessel license</td>
</tr>
<tr>
<td></td>
<td>Individual quota</td>
</tr>
<tr>
<td>Japan</td>
<td>Vessel construction license</td>
</tr>
<tr>
<td></td>
<td>Vessel license</td>
</tr>
<tr>
<td></td>
<td>Transfer of vessels to other fisheries</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Vessel license</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Vessel license</td>
</tr>
<tr>
<td></td>
<td>Individual quota</td>
</tr>
<tr>
<td>Norway</td>
<td>Vessel construction license</td>
</tr>
<tr>
<td></td>
<td>Individual quota</td>
</tr>
<tr>
<td>South Africa</td>
<td>Vessel and processor license</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Vessel license</td>
</tr>
<tr>
<td>United States</td>
<td>Vessel license</td>
</tr>
<tr>
<td></td>
<td>Personal license</td>
</tr>
<tr>
<td></td>
<td>Combination of vessel license and individual quota</td>
</tr>
</tbody>
</table>

Source: Stokes 1979, updated by the author.
Fishery management challenges and the problem of exit

- Inappropriate and inadequate policies or objectives, and conflicts in objectives
- Administrative inefficiencies
- Divided authority
- Inadequate statistics and information
- Failure to make correct management decisions.

Considerations concerning the exit problem

Any objective prescription for addressing the exit problem in fisheries must consider two broad areas of concern: fishery configuration and factor inputs, particularly capital malleability and labor mobility.

Fishery configuration

Many participants and factors are typically involved in the fishery: user groups (commercial, recreational, and indigenous fishermen); scales of operation (artisanal and industrial); gear types (trawlers, longliners, gillnetters). Should exit from the fishery be targeted on particular sectors, or carried out in a balanced manner?

Differences in the perceived benefits of the various players in the fishery produce much of the conflict inherent in fisheries (Charles 1992). An understanding of societal objectives makes it possible to examine what balance is desirable. In Canada, for example, ongoing debates take place over the relative benefits accruing from recreational and commercial fishing in the Pacific salmon fishery, and from trawlers compared with longliners in the Atlantic commercial groundfishery. In developing countries, a fundamental question concerns the balance between artisanal and industrial fishing, both in
terms of access to the fish and in terms of developmental attention and support from government.

Lawson (1984) attributes governments’ emphasis on managing large-scale and industrial fisheries to the more advanced technological development in these fisheries and the fact that large-scale fisheries are the first to suffer from the effects of overexploitation. She notes that in developing countries, small-scale fisheries are most in need of management. For many of these countries, the major fish stocks are within 24 kilometers of the coast, and as small-scale fishing is labor-intensive, it is relatively easy for fishing effort to be increased.

According to Lawson, restricting entry into small-scale fishing

will be very difficult in many developing countries, especially if fishermen are currently underemployed and have little other opportunity for employment. Given the growing unemployment of unskilled labor in many developing countries, fisheries may be considered as providing a reserve occupation and attracting an increasing labor force, thus escalating the problems of excessive fishing. (1984, p. 81)

Aguero and Costello (1986) note that the rural population employed in agriculture is increasingly invading small-scale fishing communities in search of employment. The generalized stereotype that artisanal fishing does not require specialized skills and that fishery resources are free and infinite has not only reinforced this movement but has also encouraged government planning officers, economists, and politicians to support it. (p. 818)

Table 2 Control methods and effect on employment

<table>
<thead>
<tr>
<th>Method</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restrictions on gear, closed</td>
<td>Makes employment</td>
</tr>
<tr>
<td>season, closed areas</td>
<td>seasonal</td>
</tr>
<tr>
<td>Control on vessels (licensing)</td>
<td>Reduces employment</td>
</tr>
<tr>
<td>Tax on royalties on catch</td>
<td>Reduces employment</td>
</tr>
<tr>
<td>Tax on vessels and inputs</td>
<td>May reduce employment</td>
</tr>
<tr>
<td>Catch quotas</td>
<td>May reduce employment</td>
</tr>
</tbody>
</table>

Source: Anderson 1980.

Factor inputs

Within any single user group or gear type in the fishery, a variety of inputs combine to produce fishing effort, including labor, capital, technology, management, and enforcement. To what extent should each of these exit from the fishery? This question again depends on the objective pursued. The objective may be to promote labor intensity, capital intensity,
maximum efficiency, minimum governmental expenditures on management, or some mix of these and other goals. This choice will certainly influence the desired input mix.

Charles (1991a) notes that while there is often considered to be an excess of labor in the fishery, many developing countries may be able to reap substantial social benefits and stability by maintaining traditionally high fishery employment levels. When few employment opportunities are available outside the fishery, the opportunity costs of fishery labor are low. In such cases, policy attention might focus on promoting exit of excessive capital investment, which may dramatically increase catching capacity for some vessels in the fleet. In all cases involving exit policies, an important issue is the cost to government, a cost that depends on opportunity costs for each factor of production.

Another key issue in examining the use and the potential exit of factor inputs in the fishery concerns the malleability of capital. If capital is malleable, investments should be reversible; fishermen can receive a reasonable resale value for excess capital when it exits the fishery. It is not uncommon, however, to find that specialized vessels have few alternative uses, and that fishermen have few alternative employment options. This tends to make capital investment relatively irreversible and labor relatively immobile, exacerbating the exit problem (Clark, Clarke, and Munro 1979). Capital tends to be less mobile than labor.

The reduction of overcapacity and the regulation of fishing effort are overriding concerns of fishery managers today in both industrial and developing countries. In the context of the opportunities offered by the extension of fisheries jurisdiction, coastal states are rethinking and refining their fishery management strategies. Their goals are to achieve better balance between harvestable surpluses and the amount of fishing effort deployed, thereby reducing the overexploitation of fishery resources while meeting the mix of other fishery development objectives.

To a large extent, the factors employed in fishing—capital and labor—are use-specific (Garrod and Whitmarsh 1991). Therefore, the exit of these factors from overexploited fisheries is often slow and difficult to achieve. Under such circumstances, fishermen will make every effort to circumvent whatever controls are imposed and to continue fishing. This has induced fishery managers to seek direct ways of eliminating excess capacity, by restricting the labor and capital entering a fishery. A fundamental policy issue is how to facilitate the exit of capital and labor made redundant by a depleted resource base and programs to limit entry.

A major theme relating to adjustment processes is the question of labor migration into and out of the fishery. Fishery labor processes, particularly in developing countries, are intimately related to the overall socioeconomic environment (Panayotou and Panayotou 1986). High labor mobility implies that fishermen will be able and willing to exit the fishery in pursuit of better alternative occupations if that is in their individual interest.

Policies to persuade people to fish in one location and not in another may not be beneficial in the long run. They could result in fishermen being locked into a location they find difficult to leave when fishing conditions deteriorate. Studies on Thai fisheries indicate that fishermen respond to economic incentives and move between occupations and locations (Panayotou and Panayotou 1986). Although fishing labor is quite mobile between occupations, it is less so between locations. People feel attachment to their area of residence and distrust unknown places. Fishermen cherish the freedom and independence of being their own bosses. Panayotou and Panayotou also noted that mobility in and out of fishing, although considerable, was lower than mobility in and out of non-fishing occupations.
Prescriptions for facilitating exit

Significant differences apply to policies concerning large-scale, industrial fisheries and those concerning artisanal, small-scale fishery operations.

**Industrial fisheries**

Fleet reduction programs in industrial countries are typically based on one of two “rationalization” approaches: license limitation and quotas.

License limitation and vessel buyback mechanisms are designed to reduce or control the number of participants. License limitation programs are not easily implemented in ways that ensure cost minimization for any given level of catch.

Fishing capacity, it turns out, is like a many-headed monster; if you chop off one head, two new ones appear. Fishers and boat designers cooperate to circumvent regulations on fishing vessels, increasing fishing capacity through new designs that satisfy the restrictive rules while including new fish-finding devices and better gear. This has led to growing disappointment with license limitation programs. (Hannesson 1994b, p. 92)

Individual fish quota schemes are programs in which fishery participants are assigned or acquire rights to harvest specified quantities of fish. Each participant can adjust operations accordingly to increase economic efficiency. If quotas are transferable among participants, markets become established to facilitate the trading of rights; in theory, those who are less efficient exit the fishery after selling their rights to others. Quotas can be nontransferable, which leads to fewer exits but may serve other policy goals.

**Individual transferable quotas**

Individual transferable quotas (ITQs) are particularly applicable to industrial fisheries. An ITQ is the right to harvest a fixed volume of fish in one or more fishing zones. Quotas are allocated for a fixed period or in perpetuity and may be bought, sold, or transferred. ITQs bring many benefits. Among other things, they:

- Impose limits on total catch levels based on sustainable fishery principles
- Enable quota holders to plan fishing to maximize returns
- Transfer to fishers the responsibility for protecting and managing the resource
- Reduce conflict and competition among fishers
- Allow reduced reliance on fishery controls and regulations
- Give fishers freedom to enter or leave the fishery by buying and selling quotas
- Can be used as securities for financing purposes
- Provide incentives for fishers to enter less developed fisheries and to engage in product development as well as value-added activities, as a result of secure property rights and established quotas.

Quotas must be enforceable in order to yield beneficial results. An effective catch monitoring sys-
tem is fundamental to the success of quota management, although such systems are rare. In principle, ITQs can provide the following benefits (Clark 1994):

- Conservation of fish stocks
- Long-term stability and long-term planning in a secure resource environment
- Efficient distribution of fishing and fish-processing effort
- Opportunity for owners of quotas to borrow and invest in modernization and technological upgrading of machinery, equipment, and processes
- Economic surpluses for investment in the economy.

The ITQ system has certain attractive features with respect to exit from fishing in industrial fisheries: no participant is forced to exit, and those who do secure compensation when they sell their quota share. In fact, only those who feel that the compensation for leaving is greater than the benefits of staying will exit (Arnason, personal communication, 1992).

According to Dr. Mike Sinclair (personal communication), the enterprise allocation system in Canada has not yielded many of the cited benefits, except perhaps in very specific fisheries, and quota management has not been successful.

**Decommissioning of vessels**

In the United Kingdom, grants to decommission fishing vessels were made available at a flat rate of £400 per gross ton. Under this program, 225 vessels were decommissioned during 1984–86. On surrender of the vessel’s license, the owner was free to sell the vessel outside European Community (EC) waters or to convert the vessel for use in nonfishing activities in EC waters. This decommissioning policy was discontinued in 1987. In the opinion of the U.K. Committee of Public Accounts (1988), the policy was “grossly expensive for what it achieved” (para. 2(10)).

In 1989 a new system of “license aggregation” was introduced, ending restrictions on license transfers between vessels in different length categories and the ban on transfers that increased either the tonnage or the horsepower of vessels. Instead, licenses of one or more vessels could be surrendered in order to license another vessel, provided that the capacity of the newly licensed vessel did not exceed 90 percent of the aggregate capacity of those vessels that surrendered their licenses. As licenses are aggregated, the size of the fleet can be expected to decline. One of the problems of this program is that profitability must decline to very low levels before large numbers of vessels exit from the fishery. Furthermore, quota levels may have to be fixed at low levels to encourage labor and capital to leave the industry. Such quota reductions may have to last a long time in order to persuade fishermen to exit from fishing altogether. According to Garrod and Whitmarsh (1991), the U.K. fleet structuring policy indicates a turning away from direct grant-assisting schemes toward greater reliance on market forces.

**Transfer of fishing vessels to other fisheries**

In Japan, one of the methods used to reduce the number of fishing vessels in a certain fishery was to transfer them to other fisheries; for example, offshore trawling vessels were transferred to the tuna longline fishery. Government subsidies were given for remodeling the trawlers into tuna boats. To ensure effective transfers, the new fishery had to be under government control at an early stage of development, with specific conditions of entry spelled out.

The reduction in fishing effort in Japan was followed by mutual compensation among entrepreneurs in the industry. To facilitate this, the government assisted the industry through loans and subsidies for interest payments. Since license holders do not pay fees, the government is not legally required to pay compensation for canceling the licenses. The principle of respecting the right of those currently engaged in the fishery has succeeded in preventing new entrants, but it constituted an obstacle to the reduction of fishing effort (Asada 1985).

**Artisanal fisheries**

Neither buybacks nor ITQs are especially suitable in developing country environments where capital is limited (Charles, personal communication, 1991). From a financial viewpoint, the main constraints are lack of funds for successful buybacks and lack of capital investment and operating funds to generate the high levels of governmental enforcement asso-
associated with ITQs. Policies that reduce the number of fishermen in artisanal fisheries without creating nonfishery employment opportunities inevitably fail. This is because fishermen will merely fish illegally, obtain a new boat, or do whatever else is necessary to continue to make a living.

**Integrated (horizontal) rural development**

Given these realities, the only feasible option may be one based on integrated coastal development, a subject that has been addressed by several analysts. Smith (1983) indicates that

in contrast to the focus of traditional fisheries development on fish production, the objective of new development programs is to raise the standard of living of fishing communities. . . . This re-direction in emphasis is important because it permits the search for solutions to the problems of low standards of living in fishing communities to expand beyond those areas which are fishery-specific. . . . Solutions are beginning to be sought in the context of rural development programs and have as their objective a general uplifting of rural areas. The fisheries sector should be understood in a broad sense with its linkages to other sectors in rural areas. In the absence of alternative income opportunities, fishing effort can be expected to intensify in the rural sector, thereby exacerbating the pressure on an already dwindling resource. With little or no education and few non-fishing skills, the fishermen have little hope to shift to another occupation. The need for a holistic approach to fishing community development is obvious. What is implied is the necessity for viewing the fish production sector on the one hand as vertically integrated with factor input markets and with product markets and on the other hand as horizontally integrated with other non-fishery sectors and institutions within the rural area. (p. 2)

Pomeroy (1991) commented that "the standard package" approach to new development programs in fishing communities fails to take into account variations in the physical environment and the limited resources available to fishermen.

An alternative is a community-based approach designed to be responsive to the diversity of factors which exist among fishermen and fishing communities. Such an approach will address direct management and development issues of the fishery as well as issues outside the fishery but of direct consequence to fishermen and fishing communities. (Pomeroy 1991, p. 101)

Fisheries must be viewed as part of the larger rural economy. With the rate of population growth in rural areas, increased dependence of households on fishing can be expected. This means continued strong pressure on the open-access fishery resources and the persistence of poverty. Solutions to the problems of poverty must be found in the development of the rural sector as a whole. Policies must recognize the totality of the environment of the fishermen and the complementarity between fishing and other aspects of this environment, including agriculture and other nonfishing activities.

On this point, Afful (1990) stated that

the emphasis of horizontal integration is the development of the fishing community and not just the fishing sub-sector. Small-scale artisanal fisheries is not a transition to industrial fisheries but an enduring part of the fishing landscape of developing countries. (p. 54)

Where fishermen live, more alternatives to fishing would need to be promoted. Fishermen are already engaged in other activities. Thus, what is needed is the provision of support activities, such as infrastructure, credit, and the dissemination of information on employment opportunities, new technologies, and markets. Nonfishing activities should be promoted in conjunction with effective controls on entry through the granting to small-scale fishing communities of exclusive territorial use rights to the coastal fishery. Panayotou and Panayotou’s study (1986) of the Thai fishery indicates that “for such a policy to be successful, the new opportunities should
not only be at least as profitable as fishing, but they should be located in the vicinity of the fishing communities" (p. iv).

In this connection, Poggie and Poltnac (1989) stated that "there is evidence for the assertion that the environment and occupation of fishing differs from many other occupations in ways that can impact the design of development projects" (p. 5). Bailey (quoted by Smith 1983), in his study of the social relations of production in Malaysian fishing, rice farming, and rubber tapping, indicates that because of the geographic dispersion of alternative production activities for fisher folk, extension officers and other agents of change will have to identify the temporal and spatial aspects of fishermen's work patterns in order to design training programs or projects.

Implementing integrated rural development, according to Pomeroy (1991), requires the following steps:

- Community organization initiated by a trained community organizer.
- Consultation with local elected officials.
- Meetings to identify problems, needs, and opportunities, and to establish the needed organizations.
- Establishment of links among local organizations.
- Development of a municipal management and development strategy, including specific recommendations for the management and development needs of each community.
- Municipal strategies to serve as the foundation for a regionwide and nationwide fishery development strategy. Broad development program areas should be identified with funding and technical assistance components.

On integrated rural development, Ben-Yami and Anderson (1985) stated that most problems affecting fishing communities are unlikely to be seriously tackled unless equal attention is also given to non-fishery needs in the community. . . . Both vertical and horizontal integration are needed before sustained programs can be achieved. The vertically-integrated production chain is the engine which can help establish and maintain the horizontally-organized aspects of community welfare. Non-fishery options include development which will diversify the social services and communal activities in the community, thereby improving the quality of life and creating employment and income, e.g., cottage industries, handicrafts, sport fishing for tourists, guest houses and seafood restaurants. (p. 9)

Case studies

The following are summaries of some case studies in nonfishery economic diversification and integrated (horizontal) development of fishing communities.

Puerto Thiel, Costa Rica

This case study of a fishing community in the Gulf of Nicoya on Costa Rica's Pacific coast (Charles and Herrera 1994) addresses problems of heavily exploited fisheries in a developing country. The study highlights the importance of policies that simultaneously pursue (1) development to increase local socioeconomic and community fishery benefits within resource limitations and (2) economic diversification to reduce the impact of fishery management restrictions by creating nonfishery employment alternatives.

The dual focus of such an approach emphasizes development within the fishery that seeks to maximize the benefits flowing directly to fishers. It also emphasizes economic diversification outside the fishery sector to maintain socioeconomic and community sustainability in the face of conservation-oriented management institutions being established in the sector.

The authors note the existence of a common development dilemma in the Gulf of Nicoya. Even though coastal inhabitants are among the country's poorest, immigration to the coastal areas has nevertheless taken place. The immigrants are people displaced from inland areas, where land has been lost to such pursuits as government-supported cattle ranching and banana plantations. With few other employment alternatives available for these people, the fishery is seen as the "employer of last resort." This situation provides an excellent example of the need to combine fishery regulation with efforts directed at nonfishery economic diversification.
In Puerto Thiel, the fishing cooperative wished to develop alternative economic activity that would not affect the fishers' principal activity of fishing, but would provide paid work to women wishing to diversify from traditional domestic work and childcare. Utilizing the resources of a joint program of the Universidad Nacional and a Canadian nongovernmental organization, the cooperative undertook to diversify its activities by starting a tree nursery. While a major departure from traditional fishing activities, this project appeared promising, given governmental encouragement for reforestation in the region, the project's forecasted profitability, and its potential to provide formal employment to women in the community.

Accordingly, 2.5 hectares of land near Puerto Thiel were purchased, providing a potential annual production of 185,000 young trees. The tree nursery appears capable of providing an alternative source of continuing employment while demonstrating to local residents the possibility of developing other economic alternatives. The project may relieve pressure on the fishers to increase their harvesting effort in an attempt to maintain incomes as stock levels decline.

**Philippines**

Pomeroy's study (1991) in 1983-84 of three villages in one municipality in the Philippines produced the following conclusions:

- As a short-run survival strategy to meet basic family needs, fishermen took advantage of the limited nonfishery employment available to them by working as farm laborers or in the village industry.
- There is a great deal of heterogeneity among fishing villages and rationality among fishermen. These should be factored into fishery development programs.
- A community-based approach designed to be responsive to the diversity of factors that exist among fishermen and fishing communities would be realistic. Because such an approach is based on the process of self-realization, the government does not reduce but refocuses its development effort.

Smith (1983) discusses the BFAR Blue Revolution program in the Philippines, which concentrates on species that can be cultured in the foreshore area, such as oysters, mussels, and seaweed. These might be attractive to fishermen as a source of supplemental income.

Baum and Maynard's study (1976) of five communities indicated that anywhere from 20 to 60 percent of the fishermen respondents were willing to leave fishing for other occupations (such as tile making, cement or pipe manufacture, road building, and public works). Smith (1983) indicates that "what this means for development policy is that traditional fisheries must be visualized as enmeshed in larger rural and national frameworks of communication and interchange" (p. 29).

**Bay of Bengal**

The Bay of Bengal Program, established in 1979, involved Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka, and Thailand. The objective was to use "the integrated approach" and to "promote the integration of technological and economic inputs of a social nature to encourage comprehensive community development as a means of achieving the purposes of the project" (Afful 1990, p. 58).

One of its specific goals was to encourage increased participation by fishing communities in rural development projects. During 1979-84, the program undertook several horizontally integrated projects, including:

- A project to stimulate development activities in the fishing communities of Adirampattanam, India (1980). This project involved leadership training, water supply improvement, loans for fisher folk, nonformal education, and infrastructural development.
- Projects to raise incomes and the social status of women in Tamil Nadu (1981), Sri Lanka (1980), and Bangladesh (1981).

A program for marine fisheries extension officers identified lack of credit as the biggest constraint facing the fisher folk's efforts to improve their living standards (Afful 1990).

**Indonesia**

Afful (1990) analyzes an effort designed to integrate small-scale and large-scale fisheries operating in a symbiotic relationship with each other. Under this
scheme, big fleets recruit labor only from the small-scale fishery sector. The large fleets provide funds for training and credit to small fishermen. Small fishermen are also employed in the processing plants owned and operated by big fleets. The waste from fish plants is converted into fish feed and sold to fish farmers. The small fishermen and fish farmers sell their crustacean catches to the big fleets for processing and export.

West Africa

The Integrated Development of Artisanal Fisheries (IDAF) project was established in 1984. The project involved special emphasis on people's participation and women's activities. The main objectives were to:

- Improve the effectiveness of projects for artisanal fisheries in West Africa through an umbrella program of technical assistance
- Prepare and propagate an integrated approach to the development of artisanal fisheries, involving community participation and sharing of responsibilities in planning and implementing local projects
- Provide direct assistance through the implementation of a model project
- Help maintain in each country, through training and demonstrations organized within the framework of the model project, a system of fishery development units
- Help increase regional technical competence in the development of artisanal fisheries.

Within major activity areas in IDAF, specific projects were established in the regions and localities indicated in parentheses:

- **Fishery development**: training at sea (Benin); introduction of new gear (Benin, Shenge); improvement of pirogues (Shenge); improved motorization systems (Benin, Shenge); launching and retrieval of pirogues (Benin); engine repair and maintenance (Benin, Shenge)
- **Community development and village infrastructure**: alternative income-generating activities, such as small-scale farming, pig rearing, improved salt production, coconut production for women and underemployed youths (Benin, Shenge); building feeder roads (Benin); construction of wells for portable water (Benin, Shenge); setting up health committees and demonstrating methods of improving hygiene and sanitation (Benin, Shenge); training of mothers in preparation of improved baby-weaning foods from locally available materials (Shenge)
- **Institution building**: establishment of fishery development units and village development committees (Benin); establishment of cooperatives or alternative institutions to run savings and loan projects (Shenge, Kaback); setting up women's enterprise groups (Shenge)
- **Extension**: training of fisheries staff in the region; introduction of improved ovens to help with processing (Benin, Shenge)
- **Management information**: providing socioeconomic information to develop policies and to help in decisionmaking; monitoring and evaluating projects.

Afful (1990) concluded that the concept of integrated development of artisanal fisheries was a viable approach. He added that to be really fruitful, the projects should go beyond building little economic enterprises, and emphasize instead the building of local and provincial organizations which give local communities the power to influence decisions taken by others which affect their lives.

Afful also commented that every component in fishing operations that increases productivity makes fishermen redundant if the increased production is not to be swamped by excess fishing effort. The government must be making efforts to help develop other sectors so that redundant fishermen can find alternative employment.

From the African experience, it would seem that projects, whether fishery or nonfishery, should be the kind that ease supply rigidities. Such projects include spare parts making, production of motor rickshaws, construction of rural houses, and preventive health care.
Malaysia

According to Majid (1985)

the problems of the Malaysian fisheries were an excess of units, too many fishermen, intensive fishing, and competition for limited fishery resources leading to declining catch rates and reduced incomes especially in the traditional fisheries sector. (p. 320)

Resource management policy was not based solely on conservation, but also on social, economic, and political aspects. The main objective was to control excess capacity, taking into account socioeconomic and political considerations. Because fishing communities are geographically isolated from the rest of the country, successful relocation required the provision of a conducive environment. It was also necessary to increase the educational level of fishermen to enhance their job opportunities. This included training within fishing communities for skilled jobs in the plantation and construction sectors.

Majid noted the need for other government agencies that deal with fishers to be made aware of the fishery policies, to avoid being counterproductive. He underscores the need for the implementing personnel to be in tune with the real objectives of fishery management—not only to embrace the goal of increased production but also to be aware of the urgency of the resource problem and of excess capacity.

The success of a license limitation plan depends to a large extent on reallocating excess fishers from the fishery sector, and the degree of success in this depends on the job environment outside the fishing sector. The Malaysian government took steps to identify alternative sources of employment in the fishing sector itself, such as aquaculture and liberalization of licenses in deep-sea fishing. Majid emphasized the need for:

- Support at the political level
- Coordination of all relevant government agencies directly or indirectly involved with fishery development, in order to ensure that their policies are not counterproductive
- Involvement of other agencies in reallocating excess fishermen, through alternative job opportunities, skill training, and special land programs for fishermen
- Compensation for fishermen to be relocated or excluded from the fishery
- Survey of the economic profile of the fishermen affected by the management measures implemented.

An earlier study by Lawson (1975) noted that surplus fishing labor on the east coast of Malaysia would be absorbed by the alternative activities generated by the Malaysia Fisheries Development Plan (Labon 1974). Smith (1983) doubted that this would materialize. According to Yap (1977), those absorbed by the industrial fishery sector were more likely to be unemployed urban youths than former traditional fishermen, although limited numbers of traditional fishermen have been absorbed, according to Smith. He concluded, based on his analysis of Malaysian and Javanese experiences, that larger numbers of traditional fishermen will not easily be attracted to full-time work in capital-intensive fish ponds with their low labor requirements.

Asia

A study of small-scale fisheries in Asia (Panayotou 1985) indicated that:

- Government objectives for increasing fish production and improving incomes of fishermen could be achieved through land-based development, particularly promotion of coastal aquaculture and revival of inland fisheries. Study findings offer support for shifting development efforts away from the marine fishery and toward alternative employment opportunities.
- The scope for supplemental nonfishing activities should be explored in cooperation with other government agencies responsible for such activities as agriculture, coastal development, tourism, and the environment.
- Nonfishing occupations serve very useful purposes in small-scale fishing households.
- Job opportunities both supplementary and alternative to fishery employment are needed. Supplementary job opportunities include employment in rubber and coconut planta-
tions, subsistence rice farming, and unskilled labor. Alternative job opportunities include cash crop farming, livestock raising, fish farming, retail trade, and government office employment. Supplementary activities can be carried out on a part-time basis along with fishing activities, while alternative opportunities can be pursued after exiting the fishery.

- During the rise of the industrial fishery, small-scale fishermen were expected to enter the rapidly expanding industrial fishery or switch to some other occupation. Many were unable to do so because of a lack of investment funds and the capital-intensive nature of fishing—as well as rapidly rising unemployment in the rest of the economy. Small-scale fishermen need credit, training, and possibly eventual relocation in order to survive.

Newfoundland, Canada

Sinclair (1983), after a study of limited entry licensing in northwest Newfoundland, concluded that the measure was a flawed strategy in isolated fishery-dependent regions. For such areas, it was important that limited entry programs should be preceded by a regional development plan. Fisheries policy would then be a part of comprehensive strategy which might offer hope of adequate employment to residents excluded from the protected fisheries. (p. 307)

According to Sinclair, the “social injustice of limited entry to fisheries of depressed regions is a compelling objection to this policy” (p. 313).

Rowe (1991) analyzed the effects of the fishery crisis on women employed in the fishing industry in Newfoundland, examining the skills of women employed in the fishing industry and the extent to which such skills were transferable. In this light, the study discussed the kind of skill training that could be offered to women to facilitate their absorption in other occupations in the community.

Strategies for fishery development in various countries

An FAO Expert Consultation in 1983 discussed fishery development in Brazil, Cuba, Indonesia, Japan, Norway, Peru, Poland, Senegal, Somalia, Sri Lanka, and Tanzania. Among the elements of alternative strategies for fishery management suggested at this consultation were:

- Integrated rural development, including fisheries, agriculture, and other sectors, under one coordinating body; area development
- Creation of new employment opportunities for crowded coastal areas
- Short-term credit for small-scale fishermen
- Upgrading skills.
Summary and conclusions

Overcapacity is becoming a pervasive characteristic of many, if not most, fisheries throughout the world today. This is true in both developing and industrial countries and of both industrial and artisanal (survival) fisheries. The accelerating popular appeal of sustainable development influences resource development in marine and inland waters, just as on land. In light of this, fishery managers are targeting problems of overcapacity and overexploitation through a variety of effort control measures, such as limitations, closure of fishing areas, and other means. The prime focus of these measures appears to be on the resource rather than the people: fishermen and their communities. The "noncandidacy" of redundant capital—and especially of labor resulting from capacity reduction—makes the present policy stance somewhat one-sided.

Juxtaposed with policies concerned with overcapacity and resource conservation are the potential and actual hardships—higher unemployment and poverty—in fishing communities. The main brunt of such economic and social distress is borne by women, children, and unskilled fishermen, as well as by those unskilled people who are directly and indirectly dependent on the fishing industry. Integral elements of this prevailing scenario are a high level of unemployment or underemployment, lack of ready alternative and supplementary employment opportunities within the fishing community, a growing population and pressure to find additional protein food supplies from the sea, lack of credit, and the paucity of institutional mechanisms to undertake systemwide development.

This dilemma calls for a wider vision of the fisheries system, going beyond fisheries-specific activities to embrace agriculture and other activities of the rural community. A systems approach demands that, while considering the capacity reduction problem, consideration should also be given to the people affected by such control measures. Failure to do this can only heighten the already high level of unrest and tension prevailing in fishing communities. An interesting case in this context, pertaining to industrial fisheries in an industrial country, concerns the moratorium on the northern cod fishery off Newfoundland, Canada, for a two-year period: although the social context and the retraining and education of people affected by this closure have been taken into account, social unrest and hardships are widespread. Other examples include the redundancy of people arising from privatization of parastatal fishery enterprises based on industrial fisheries.

In practical terms, commitment to the application of sustainable development principles implies an increased focus on people-related issues and on communities, as well as on the resource; increased consultation of people in decisionmaking; and empowerment of people so that the will of the community can be expressed synergistically in seeking, adopting, and pursuing community and systemwide development initiatives.

There is, presently, only a hesitant approach to the resolution of overfishing problems in a systemwide and sustainable context. Initiatives in this area can be effective only if several agencies come together in cooperation with the community and its
In essence, this represents a holistic and systemwide approach to fishery development. The focus here is the development of the fishing community as well as the fishing subsector. Several experts have proposed this concept, including Smith, Pomeroy, Afful, Charles, Emmerson, Panayotou, Ben-Yami, and Anderson.

The fundamental principles behind this integrated (horizontal) development strategy are that:

- Development of the fishery sector should be within the context of integrated rural development.
- The active participation of communities and people is mandatory in planning, formulating, and implementing development activities. The FAO World Conference on Fisheries Management and Development (held in Rome in June-July 1984) strongly endorsed this integrated approach to small-scale fishery development. Examples of such integrated programs include the Bay of Bengal Program (under way), the Small Fisherfolk Community Program in the Bay of Bengal (1987), and Integrated Development of Artisanal Fisheries in West Africa (1984). All these comprised model projects involving an integrated and flexible approach to community development, with special emphasis on community participation and the needs of women. Aguero and Costello (1986) stated that the imposed nature of most management programs which are more concerned with consistency with government’s goals rather than with fisher folk welfare and needs provides very little opportunity for fishermen to participate in the design, adoption and implementation. The fact that “fisheries management” is really “people and fisher folk management” is usually forgotten. The emphasis is to get to know the fish, the resource environment, fish behaviour, its taxonomy and physiology and the best technique for capture. Rarely is the emphasis and the interest in getting to know and understand the fisherman, his rationale for fishing, his acceptance and denial of management regulations or his adaptation of new technologies. (p. 819)
Horizontal integrated development is a difficult task because of the complex planning and coordination activities involved, embracing several sectors. The Bay of Bengal Program and the Integrated Development of Artisanal Fisheries in West Africa indicate that the challenge is worth the effort. These projects lend themselves to a special focus on women and unskilled labor. The establishment of fishery development units would be a practical and effective step in integrated development. Nonfishery development options include development that will diversify social services and commercial activities in the community, thereby improving the quality of life and creating employment. Afful (1990) suggested that nonfishery employment projects should be the kind that help ease supply rigidities in the community.

Fisheries should be part of a comprehensive community development strategy, with emphasis not just on building enterprises but also on establishing community organizations and institutions to participate in decisionmaking. In the words of Sinclair (1983),

limited entry in depressed regions without regional (area) development is an invitation to either rural depopulation or resettlement by covert means or increased regional unemployment. (p. 313)

From the standpoint of development assistance agencies, the approach to fishery development could move closer to sustainable development principles through:

- Redirection of attention from resources to people, communities, and their empowerment.
- A shift from purely sectoral approaches to an "ecosystem" or systemwide perspective. A practical difficulty is the prevailing division of sectoral responsibilities in national governments across different ministries. This would necessitate innovative and practical approaches to the organization of government in order to facilitate the concerted implementation of sustainable development and sustainable fisheries principles in a synergistic manner.

A prerequisite of donor assistance for privatization in fisheries should be development of strategies for assisting the people and communities affected. The transferability of skills and people to other, nonfishing occupations must be thoroughly examined as part of any privatization strategy, particularly for single-industry communities. Assistance for the development and implementation of appropriate fishery management regimes is needed to address the problem of overfishing and overcapitalization. This in turn should assist in improving economic and social returns from the fishery, providing means for much-needed modernization of fishing vessels and equipment.

The continuing "dualism" or coexistence of industrial and artisanal fisheries in developing countries poses challenges to fishery management. Each fishery type must be treated differently, especially in dealing with the problem of redundant capital and labor from overexploited—particularly artisanal (survival)—fisheries in depressed and isolated regions. Community-based, nonfishing solutions must be found and must become part of any comprehensive package of adjustment. Integrated (horizontal) rural and community development involving the economic diversification of fishing communities will have to be vigorously pursued. Until such nonfishery solutions begin to supplement fisheries-specific initiatives, the frustrations of redundant labor are expected to grow.

Individual transferable quotas (ITQs) appear to offer an effective solution to the problem of overcapitalization and overfishing in industrial fisheries. If enforced, such quotas will be beneficial in a variety of ways, including in conservation of fishery resources and generation of economic surpluses for reinvestment in fisheries and other sectors of the economy. In the context of efforts in developing countries to put in place effective management regimes—comprising a fishery management system; a monitoring, control and surveillance system; and a fishery judicial system—and the privatization of parastatal fishery enterprises, a realistic policy mix of ITQs (for industrial fisheries) and integrated (horizontal) rural development (for artisanal fisheries) would be an effective approach. The success of ITQs depends on an effective catch monitoring system and a quota enforcement infrastructure.

The aim of this paper has been to review the literature and to assemble the ideas and comments of various authors on the question of facilitating exit
of labor and capital from overexploited fisheries, industrial as well as artisanal. The immediate objective is to suggest the next steps to assist in preparations for a future working party to examine this question in greater depth. This report is intended to serve as a background to this effort. Draft terms of reference for the working party are given in appendix A.

Sustainable development is expected to guide and govern all facets of global development during the remainder of this century and into the next. Therefore, the time is ripe for searching out and implementing people-oriented approaches and solutions to the continuing predicament of overcapacity in fishing and fish processing, and over-exploitation of fishery resources. It is time to launch policy initiatives in fishery management, comprising a judicious balance of ITQs, integrated community development, and other appropriate measures.
The need to develop appropriate policy approaches for facilitating the exit of capital and labor from overexploited industrial and artisanal fisheries is caused by the growing adoption and implementation of capacity reduction and conservation-oriented policies aimed at rationalizing and restructuring fishing. The focus of fishery managers in this area has been primarily on industrial fisheries. The question of what to do with the redundant capital and labor from artisanal fisheries, especially in developing countries, is a very complex socioeconomic issue. Such problems are exacerbated by such factors as growing populations, sluggish economies, a paucity of nonfishery employment opportunities, limited transferability of and rigidities in the movement of use-specific capital and labor, and the lack of a coordinated and integrated approach to horizontal rural development blending fishery and nonfishery sectors. There appears to be a lack of policy focus on the specific approaches that could be pursued. This is the suggested focus of the working party.

Objectives

The overall objective of the working party is to examine socially, economically, and ecologically appropriate and integrated approaches to facilitating the exit of capital and labor from overexploited industrial and artisanal fisheries. More specifically, the objectives are to:

1. Identify the nature of the problem of exit and the constraints arising from (a) capacity reduction and conservation-oriented policies in industrial and artisanal fisheries, (b) privatization policies, and (c) economic diversification in developing countries. This examination would include the following:
   - Analysis of the interactions of labor and capital mobility with fishery management
   - Examination of labor adjustment processes
   - Analysis of the behavioral response of fishermen and their interaction with the broader socioeconomic environment
   - Study of the objectives and behavior of fishermen and fishing communities pertaining to ease of entry into and exit from fishing in social, economic, cultural, and technological terms
   - Study of the benefits and costs of broadening the scope of development of fishing communities
   - Examination of ways to prevent wasteful application of capital and labor in fisheries
   - Approaches to regional development involving promotion of alternative and supplementary nonfishery employment opportunities, especially in those areas where geographical mobility is most limited
2. Outline the research areas for further study
3. Develop, design, and formulate implementation strategies for projects of a microeconomic and macroeconomic nature, including pilot projects
4. Identify the institutional, human development, and funding requirements for implementing such exit policies
5. Outline the implications of such exit policies for fishery development managers in donor agencies and national fishery administrations.
Study team

Because the focus of the project is on fisheries in developing countries, it would be useful to have a group drawn primarily from developing regions with some minimum representation from industrial countries. The group should have a balanced representation of social scientists, economists, community development specialists, and policymakers, especially those from developing countries with experience in the practical difficulties of managing quotas.
Appendix B  Terms of reference for this research paper

In most developing and industrial countries, fishery resources continue to be exploited under conditions of open access. While entry into fishing, fish processing, and fish marketing has been relatively easy and often facilitated by incentives of one kind or another, exit has been exceedingly difficult. Exit problems and their policy solutions have received only scant attention as subjects of study and investigation. There is, therefore, a need to undertake a comprehensive study, including case studies in developing countries on the barriers to exit as well as on possible approaches to facilitating exit from overexploited fisheries.

Before undertaking such a detailed field and case analysis, a preliminary desk study of exit problems and approaches in developing and industrial countries, with a view to cataloging the variety of approaches used to facilitate exit, would be useful. Such a desk study would include:

- Identification of the major studies, if any, conducted on this subject, summarizing their findings relative to barriers to exit and possible approaches used or suggested to facilitate exit
- Suggestions for developing countries that could be included in a detailed case study
- Identification of successful examples, if any, where exit approaches have been implied
- Identification of the policy implications of exit approaches for donors as well as for national fishery administrations
- Drafting of terms of reference for a comprehensive field study or working party, which could be undertaken later.


Chaumel, Jean-Louis. 1984. "Labour Developments in the Fishing Industry." Canadian Special Publication of Resources and Aquatic Sciences 72. Ottawa, Canada: Department of Fisheries and Oceans.


Distributors of World Bank Publications

ARGENTINA
Carlos Hirsch, SRL
Galeria Guemes 38
Florida 163, 4th Floor-Ofo. 453/465
1333 Buenos Aires

AUSTRALIA, PAPUA NEW GUINEA, FJI, SOLOMON ISLANDS, VANUATU, AND WESTERN SAMOA
D.A. Information Services
648 Whitehorse Road
Mitcham 3132
Victoria

AUSTRALIA
Gerald and Co.
Graber 31
A-1011 Wien

BANGLADESH
Micro Industries Development Assistance Society (MIDAS)
House 5, Road 16
Dhansonndi R/Area
Dhaka 1209

Bench offices:
Pine View, 1st Floor
100 Agradab Commercial Area
Chittagong 4100

BELGIUM
Jean De Lannoy
Av. du Roe 202
1060 Brussels

CANADA
Le Diffuseur
151 A Soul, de Montagne
Boucherville, Quebec
JAB 5E6

Renouf Publishing Co.
1294 Algoma Road
Ottawa, Ontario
K1B 3W1

CHILE
Inversiones Asociadas Ltda.
Avenida Helvecia Norte 631
Santiago

CHINA
China Financial & Economic Publishing House
8, Da Fo Si Dong Jie
Beijing

COLOMBIA
Infonace Ltda.
Apartado Aereo 34270
Bogota D.E.

COTE D'IvoIRE
Centre d'Edition et de Diffusion Africaines (CEDA)
04 B.P. 541
Abidjan 04 Plateau

CYPRUS
Center of Applied Research
cyprus College
6, Diogenes Street, Engomi
P.O. Box 2006
Nicola

DENMARK
Samhuldsforbundet Roskilde A/S
DK-1970 Frederiksberg C

DOMINICAN REPUBLIC
Editora Taller, C. por a.
Resauracion e lsabel de la Catolica 309
Apartado de Correspondencia 2190 Z-1
Santo Domingo

EGYPT, ARAB REPUBLIC OF
Al Abram
Al Ghas Street
Cairo

The Middle East Observer
41, Sheriff Street
Cairo

FINLAND
Akateeminen Kirjakauppa
P.O. Box 128
FIN-00101 Helsinki 10

FRANCE
World Bank Publications
66, avenue d'Iena
75116 Paris

GERMANY
UNO-Verlag
Poppelsdorfer Allee 55
D-5330 Bonn 1

HONG KONG, MACAO
Asia 3000 Ltd.
46-48 Wyndham Street
Winning Centre
2nd Floor
Central Hong Kong

HUNGARY
Foundation for Market Economy
Dobmvari Ut 17-19
H-1117 Budapest

INDIA
Allied Publishers Private Ltd.
751 Mount Road
Madras - 600 002

Bench offices:
15 J.N. Heraclia Marg
Bailort Estate
Bombay - 400 038

13/14 Aatil Al All Road
New Delhi - 110 002

17 Chittaranjan Avenue
Calcutta - 700 072

Jayadeva Hostel Building
5th Main Road, Gandhinagar
Bangalore - 560 029

3-5-1129 Kachiguda
Gosip Road
Hyderabad - 500 027

Pattal House
16-A Ashok Marg
Lucknow - 226 001

Central Bazaar Road
60 Bajai Nagar
Nagpur 440 010

INDONESIA
Pte. Indira Limited
Jalan Borobudur 20
P.O. Box 181
Jakarta 10320

IRAN
Kowkab Publishers
P.O. Box 15975-311
Tehran

IRELAND
Government Supplies Agency
4-5 Harcourt Road
Dublin 2

ISRAEL
Yediot Literature Ltd.
P.O. Box 56035
Tel Aviv 61560

ITALY
Libros Commissionaria Sansoni SPA
Via Duca Di Calabria, 1/1
Casella Postale 502
50125 Firenze

JAPAN
Eastern Book Service
Hongo 3-Chome, Bunkyo-ku 113
Tokyo

KENYA
Africa Book Service (E.A.) Ltd.
Quaran House, Ngatunage Street
P.O. Box 45245
Nairobi

KOREA, REPUBLIC OF
Pan Korean Book Corporation
P.O. Box 101, Kwangwhamun
Seoul

Korean Stock Book Centre
P.O. Box 34
Yeoeido
Seoul

MALAYSIA
University of Malaya Cooperative Bookshop, Limited
P.O. Box 1127, Jalan Pantai Baru
59700 Kuala Lumpur

MEXICO
INPTEC
Apartado Postal 22-860
14060 Tijuana, Mexico D.F.

NETHERLANDS
De Lindeboom/In-Ordenheden
P.O. Box 202
7480 AE Haaksbergen

NEW ZEALAND
EBSCO NZ Ltd.
Private Mail Bag 99914
Newmarket
Auckland

NIGERIA
University Press Limited
Three Crowns Building Jericho
Private Mail Bag 59915
Ibadan

NORWAY
Narvesen Information Center
Book Department
P.O. Box 6125 Entsredet
N-0021 Oslo 6

PAKISTAN
Mirza Book Agency
65, Shahrah-e-Quaid-e-Azam
P.O. Box No. 729
Lahore 54000

PERU
Editorial Desarrollo SA
Apartado 3824
Lima 1

PHILIPPINES
International Book Center
Suite 1703, Cityland 10
Condominium Tower 1
Ayala Avenue, H.V. dela Costa Extension
Makati, Metro Manila

POLAND
International Publishing Service
Ul. Placiza 31/37
00-677 Warszawa

For subscription orders:
IPS Journals
Ul. Okrema 3
02-916 Warszawa

PORTUGAL
Livraria Portugal
Rua Do Carlos 70-74
1200 Lisbon

SAUDI ARABIA, QATAR
Jari Book Store
P.O. Box 3196
Riyadh 11471

SINGAPORE, TAIWAN,
MYANMAR, BURMESE
Gover Asia Pacific Pte Ltd.
Golden Wheel Building
41, Kallang Pudding, 04-03
Singapore 1334

SOUTH AFRICA, BOTSWANA
For single titles:
Oxford University Press
Southern Africa
P.O. Box 1141
Cape Town 8000

For subscription orders:
International Subscription Service
P.O. Box 6010
Craighall
Johannesburg 2024

SPAIN
Mundi-Prensa Libros, S.A.
Calle 37
28001 Madrid

Libreria Internacional AEDOS
Conseil de Cenc, SPF
08009 Barcelona

SRI LANKA AND THE MALDIVES
Lake House Bookshop
P.O. Box 244
100, Sir Chittampalam A.
Gardiner Mawatha
Colombo 2

SWEDEN
For single titles:
Fritze Packstolaforslaget
Regeringsgatan 12, Box 16356
S-103 27 Stockholm

For subscription orders:
Wennesgern-Williams AB
P. O. Box 1305
S-171 25 Solna

SWITZERLAND
For single titles:
Librairie Payot
Case postale 3212
CH 1022 Lausanne

For subscription orders:
Librairie Payot
Service des Abonnements
Case postale 3312
CH 1022 Lausanne

THAILAND
Central Department Store
306 Silom Road
Bangkok

TRINIDAD & TOBAGO, ANTIGUA BARBUDA, BARBADOS,
DOMINICA, CRENADA, GUYANA,
JAMAICA, MONTserrat, ST.
KITTs & NEVIS, ST. LUCIA,
ST. VINCENT & GRENADINES
Systematics Studies Unit
9 Waca Street
Curepe
Trinidad, West Indies

UNITED KINGDOM
Microinfo Ltd.
P.O. Box 3
Alton, Hampshire GU34 2PG
England
Recent World Bank Discussion Papers (continued)


No. 212 Institutional Options for the Provision of Infrastructure. Christine Kessides

No. 213 The Contributions of Infrastructure to Economic Development: A Review of Experience and Political Implications. Christine Kessides

No. 214 From Macroeconomic Correction to Public Sector Reform: The Critical Role of Evaluation. Eduardo Wiesner D.

No. 215 China: Reform and Development in 1992-93. Peter Harrold and Rajiv Lall

No. 216 The Reform of Public Expenditures for Agriculture. Bonni van Blarcom, Odin Knudsen, and John Nash


No. 218 Cooperatives and the Breakup of Large Mechanized Farms: Theoretical Perspectives and Empirical Evidence. Klaus W. Deininger

No. 219 Development of Rural Financial Markets in Sub-Saharan Africa. Sabapathy Thillairajah

No. 220 The Maritime Transport Crisis. Hans J. Peters

No. 221 Policy-Based Finance: The Experience of Postwar Japan. The Japanese Development Bank and The Japan Economic Research Institute


No. 223 The Development of the Private Sector in a Small Economy in Transition: The Case of Mongolia. Hongoo Hahni

No. 224 Toward an Environmental Strategy for Asia. Carter Brandon and Ramesh Ramankutty

No. 225 “Fortress Europe” and Other Myths about Trade: Policies toward Merchandise Imports in the EC and Other Major Industrial Economies (and What They Mean for Developing Countries). Jean Baneth

No. 226 Mongolia: Financing Education during Economic Transition. Kin Bing Wu

No. 227 Cities without Land Markets: Lessons of the Failed Socialist Experiment. Alain Bertaud and Bertrand Renaud

No. 228 Portfolio Investment in Developing Countries. Edited by Stijn Claessens and Sudarshani Gooptu


No. 230 Raising the Productivity of Women Farmers in Sub-Saharan Africa. Katrine Saito

No. 231 Agricultural Extension in Africa. Aruna Bagchee

No. 232 Telecommunications Sector Reform in Asia: Toward a New Pragmatism. Peter L. Smith and Gregory Staple

No. 233 Land Reform and Farm Restructuring in Russia. Karen Brooks and Zvi Lerman

No. 234 Population Growth, Shifting Cultivation, and Unsustainable Agricultural Development: A Case Study in Madagascar. Andrew Keck, Narendra P. Sharma, and Gershon Feder

No. 235 The Design and Administration of Intergovernmental Transfers: Fiscal Decentralization in Latin America. Donald R. Winkler

No. 236 Public and Private Agricultural Extension: Beyond Traditional Frontiers. Dina L. Ulnaci and Lisa Schwartz

No. 237 Indonesian Experience with Financial Sector Reform. Donald P. Hanna

No. 238 Pesticide Policies in Developing Countries: Do They Encourage Excessive Use? Jumarnah Farah

No. 239 Intergovernmental Fiscal Relations in Indonesia: Issues and Reform Options. Anwar Shah and Zia Qureshi