Report of the National Seminar on the Reduction and Management of Commercial Fishing Capacity in Thailand

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Foreword

This document contains the report of the National Seminar on the Reduction and Management of Commercial Fishing Capacity in Thailand, which was held in Cha-Am, Thailand, on 11 – 14 May 2004. The Seminar was organized in collaboration with the Department of Fisheries, Thailand. Technical and financial support for the seminar was provided by the FAO Fisheries Department and the FishCode Programme, through the FishCode Trust (MTF/GLO/125/MUL).

The *FishCode Review* series publishes results of studies, missions, consultations, workshops, meetings and other project activities undertaken through the Programme, in furtherance of the objective of facilitating implementation of the 1995 FAO Code of Conduct for Responsible Fisheries and related international fisheries instruments and plans of action. Individual issues in the series are distributed to appropriate governments, regional bodies, meeting participants and Programme partners. For further information on Programme background, publications and activities, please consult **www.fao.org/fi/fishcode.htm.**

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ABSTRACT

The National Seminar on the Reduction and Management of Commercial Fishing Capacity in Thailand took place from 11 to 14 May 2004 in Cha-Am, Thailand, and was attended by 78 participants and observers, including senior officials from the Department of Fisheries and other relevant Government departments. Representatives of associations of the commercial fishing industry, leaders of small-scale coastal fishers, national and international resource persons and representatives of bilateral and multilateral agencies also attended.

The principal objective of the National Seminar was to contribute to the development of a national strategy for the reduction and management of commercial fishing capacity in Thailand. This is in keeping with international commitments, particularly those relating to the 1992 Convention on Biodiversity, the 1995 FAO Code of Conduct for Responsible Fisheries, the 1999 International Plan of Action for the Management of Fishing Capacity, the 2001 ASEAN Plan of Action on Sustainable Fisheries for Food Security and the 2002 Johannesburg World Summit on Sustainable Development.

The first day plenary session was devoted to formal presentations that emphasized the link between overcapacity in fisheries and the serious decline in variety of stocks and in biomass. It also provided some focus on the experience of other countries in reducing fishing capacity. On the second day Seminar participants broke into separate working groups to address the problems of overcapacity in (i) the demersal fisheries and (ii) the anchovy fisheries. Through these groups an approach to tackling the problem of overcapacity was developed. Working group findings were reported back to plenary on the third day of the Seminar, which was also devoted to preparations for a Policy Dialogue Meeting. This Meeting, which constituted the final session of the seminar, brought additional senior Government officials into the discussion.

Participants recognized that it was essential to undertake certain preliminary actions be undertaken before it would be possible to actually reduce Thailand's fleet capacity. These included recording details of all vessels, whether fishing legally or not, and then clamping down on all unlicensed fishing. Without the capacity to stop illegal fishing, it would not be possible to bring about a reduction in capacity. The construction of new boats also needs to be regulated.

The National Seminar succeeded in providing the Government of Thailand with a valuable opportunity to consult widely with stakeholders and provided specific guidelines for further developing a strategy for reducing commercial fishing capacity in Thailand.

Keywords: fishing capacity reduction, vessel buyback programme, Code of Conduct for Responsible Fisheries, International Plan of Action for the Management of Fishing Capacity; coastal fisheries; Thailand; southeast Asia.

CONTENTS

ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
CPUE	Catch per Unit Effort
DOF	Department of Fisheries
EU	European Union
GDP	Gross Domestic Product
GPS	Global Positioning System
IFQs	Individual Fishing Quotas
IPOA	International Plan of Action
ITQs	Individual Transferable Quotas
IVQ	Individual Vessel Quota
MCS	Monitoring Control and Surveillance
MEY	Maximum Economic Yield
MSY	Maximum Sustainable yield
NGOs	Non-Governmental Organizations
PFC	Provincial Fisheries Committee
SME BANK	Small and Medium Enterprise Development Bank of Thailand
VBP	Vessel Buy (or Buyback) Programme

INTRODUCTION

1. The National Seminar on the Reduction and Management of Commercial Fishing Capacity in Thailand took place in Cha-Am, Thailand, from 11 to14 May 2004. The first three days of the seminar were devoted to plenary sessions and working group sessions. This was followed by a half-day Policy Dialogue Meeting, which provided an opportunity to meet with senior Thai Government officials in order to discuss a proposed approach for the reduction and management of commercial fishing capacity in Thailand formulated during the seminar.

2. A total of 78 participants took part in the Seminar and Policy Dialogue Meeting. Participants included senior government staff from the Department of Fisheries, the Office of Agricultural Economics, the Ministry of Agriculture and Cooperatives, the Department of Marine and Coastal Resources, Ministry of Natural Resources and Environment, the Harbour Department, the Ministry of Transportation, and the Economic and Social Development Board. It also included representatives of the associations of the commercial fishing industry, leaders of the small-scale coastal fishing sector, national and international resource persons and representatives of bilateral and multilateral agencies.

3. Participants in the working sessions during the first three days are listed in Appendix A. Those who took part in the Policy Dialogue Meeting are listed in Appendix B. The Seminar Agenda is shown as Appendix C.

Background

4. Thailand has one of the ten largest fishing industries in the world, and the fifth largest in Asia. While the fisheries sector makes a relatively small contribution to gross domestic product (GDP), it makes an important contribution to export earnings and employment. Moreover, fish is the principal source of animal protein for the Thai population.

5. Prior to the 1960s, the fisheries of the Gulf of Thailand and the Andaman Sea were exploited by artisanal fishers and small-scale purse seining and drift-net vessels targeting pelagic species. The introduction of trawl fishing in the 1960s, however, led to the rapid and intensive development of fisheries. The development of the commercial subsector has not been matched by the development of fisheries management capacity. Today most fish stocks are overexploited by an overcapitalised fishing fleet.

6. Management instruments introduced to protect vulnerable fish stocks (closed areas and seasons, gear restrictions) and to contain the growth of the fishing fleet, have had little sustained effect. Catch per Unit Effort (CPUE) using trawl gear has fallen to 1/15 of the levels in 1960, and changes in the species composition of marine capture landings indicate severe degradation of the marine ecosystems, especially of the Gulf of Thailand.

7. The marine capture fisheries sector is more capital intensive than is appropriate for Thailand's resource endowment. As a result, there has developed a dualistic structure in which medium and large trawlers account for 70 percent of the catch using 30 percent of the labour, while the small-scale, artisanal fishery operates labour intensive gear with low returns.

8. There is an urgent need for improved fisheries management and the protection and conservation of fish habitats and other threatened coastal resources. Failure to achieve this will have serious consequences for the most vulnerable people in coastal communities, poor fish consumers and society at large.

9. Improved fisheries management can significantly contribute to national economic growth by capturing the large potential resource rents that are currently lost because of excessive fleet capacity and harvesting effort. Annually, the Thai fishing industry spends

millions of US dollars on redundant investment and the operating costs of fishing vessels that produce low value trashfish, deplete high value fish stocks, damage marine flora and fauna, and reduce biodiversity. This waste of human and financial resources cannot be afforded by the Thai economy.

Objectives and scope of the seminar

10. The principal objective of the National Seminar was to contribute to the development of a national strategy for the reduction and management of commercial fishing capacity in Thailand.

11. The Strategy would be in accordance with the commitments made by the international community in the 1992 Convention on Biodiversity, the 1995 FAO Code of Conduct for Responsible Fisheries, the 1999 International Plan of Action for the Management of Fishing Capacity, the 2001 Association of Southeast Asian Nations (ASEAN) Plan of Action on Sustainable Fisheries for Food Security and the Plan of Implementation adopted at the 2002 Johannesburg World Summit on Sustainable Development. These international instruments call on countries to remove excess fishing capacity and harvesting effort, restore depleted fish stocks, protect fish habitats and other coastal resources and conserve biodiversity.

12. The 2001 ASEAN Plan of Action commits members specifically to take measures to improve the registration of fishing vessels, introduce rights-based fisheries, and reduce the number of fishing boats and the level of fishing effort through government incentives.

13. An explicit objective of Thai fisheries policy is the reduction and management of fishing capacity. However, the reduction of fishing capacity and its maintenance at a lower level are complex tasks that require a multifaceted strategy endorsed and supported by all stakeholders. The National Seminar provided a forum that contributed towards such a strategy.

Opening of the seminar

14. The seminar was opened by Mr Arthit Namasolti, Deputy Director-General, Department of Fisheries (DOF). In his opening address Mr Namasolti referred to the varied fisheries and coastal management issues in Thai marine fisheries and the various schemes currently applied to address them. These include zoning systems, fishing gear regulations, the placement of artifical reefs and the establishment of fish sactuaries and marine reserves. A key problem, however, is to deal with the large overcapacities of the fishing fleets, especially of bottom trawlers.

15. One way with which Thailand has attempted to reduce the pressure on its fishery resources is to seek joint ventures with foreign coastal countries in the region and beyond. As these opportunities are becoming more limited, the need to introduce an effective limited licensing regime has become more urgent than ever.

16. Awareness creation among, and cooperation with, the fisher and fishing industry are key requirements for attaining success in the management of commercial fishing capacity as well as in the promotion and establishment of community-based coastal fisheries management schemes. With regard to such schemes some successes have been achieved in the few pilot projects currently supported by DOF. Revision of the 20 year old fisheries law was urgently needed in order to create a better legal framework for effective management. In concluding, Mr Namasolti wished the seminar fruitful discussions and expressed his confidence that the seminar's outcome would provide valuable guidance to the Thai Government in instituting effective fishing capacity management and reduction measures.

17. Dr Somying Piumsombun, Senior Economics Advisor, DOF, introduced the scope and objectives of the seminar. She detailed the various elements that the development of a

national strategy for the reduction and management of commercial fishing capacity would entail, such as assessment of the extent of overcapacities in different fisheries, fishing grounds/areas and fleet segments, and of the socio-economic importance of fisheries for the livelihoods of different strata of fishing vessel owner, fishing crew and fishing communities.

18. These assessments would then lay the foundation for identifying the most appropriate measures to assist in fleet reduction and support mobility out of fisheries, and in estimating the financial requirements of a vessel buyback programme. Elements of a voluntary vessel buyback programme would include the criteria for eligibility to participate in the programme, the level of compensation according to various characteristics of the fishing vessel and the vessel owner, options for the disposal of retired vessels, the kind of incentives and training to facilitate the uptake of other occupations by fishers, and measures to prevent fraud and corruption.

19. With respect to the management of fishing capacity – an indispensable complement to any buyback programme – several issues need to be addressed. These include vessel registration and licensing, the possible introduction of preauthorization requirements for vessel construction or import, the development of capacity measurement criteria and unitization formulae, and the establishment of catch or fishing capacity or effort limits. Aspects such as whether and under which conditions transferability of capacity/effort or catch quotas should be allowed also need consideration. Moreover, there is the need to examine ways in which the current legal and institutional framework should be changed in order effectively to implement capacity management and reduction programmes.

20. Dr Somying Piumsombun concluded her introduction by detailing the arrangements for the seminar, including those for the Policy Dialogue Meeting.

21. The Secretariat provided an overview of the international background to the seminar including the Code of Conduct for Responsible Fisheries and the International Plan of Action (IPOA) on the Management of Fishing Capacity.

PLENARY PRESENTATIONS

Overview of the development of the Thai marine fisheries

22. Mr Sakul Supongpan, Director, Marine Fisheries, DOF, provided an overview of the historical development of Thai marine fisheries (see Presentation I, Appendix D). Taking as a starting point the 1930s and 1940s, he noted major market and technology changes that had a profound impact on the intensity, pattern and geographical expansion of marine resources exploitation in the country. He explained how, with the introduction of tuna canning and its growing demand for raw materials, the encircling net technology was developed. Later its application was extended to the capture of mackerel and anchovies. Subsequently this technology was combined with the use of lights for attracting fish.

23. In the case of trawling, catch rates started to decline quite soon after its initial introduction into Thai waters. This happened because of the rapid growth in the number of vessels, the drive to improve efficiency (which led to the development of pair trawling), the introduction of high-opening nets to increase bycatches of fin fish and, more recently, the use of double rigged gear in single and pair trawling.

24. On the other hand, local small-scale fishing gear, such as crab nets, continue to be used basically in the same manner as in former times. This has led to an increasing gap between the fishing power of modern gear, often with a destructive and indiscriminate impact on fisheries resources, and that of traditional gear types used by small-scale coastal fishers. As a consequence, catch rates and the diversity of benthic fauna have declined precipitously.

The number of commercially important species, for example, has declined from 394 in 1976 to only 88 species in 1995.

25. A compounding problem is the destruction of coral reefs as a result of various factors, including damage by fishing gear such as bottom trawlnets. It is estimated that some 80 percent of corals have been damaged or entirely destroyed in Thai waters.

26. Mr Sakul Supongpan concluded his presentation by providing some pertinent information on the positive effects of the artificial reef programme in the country, which has concentrated on the Andaman Sea coastal area.

Economic, social and institutional aspects of the transition to responsible fisheries

27. Mr Pongpat Boonchuwong, Director of the DOF's Economic Division, presented the results of a case study undertaken by DOF on the demersal fisheries of the Gulf of Thailand with the support of FAO through its FishCode Programme (see Presentation II, Appendix D). The study included resource assessments, bioeconomic modelling and the conduct of a socio-economic survey of fishing crew and vessel owner households. It sought to assess the extent of overcapacity in the commercial fleets, especially amongst trawlers and pushnetters targeting demersal resources in the Gulf of Thailand, and the economic gains that could be obtained from reducing this overcapacity. It sought also to assess the cost of the support measures to achieve such a transition to responsible fisheries. These would include a vessel buyback programme, retraining and other social safety measures to assist displaced fishing crew.

28. The study findings suggest that the size of the commercial fishing fleet (trawlers and pushnetters) is excessive by a factor of between 25 percent to 50 percent. The annual financial returns in the fishery could be increased from Baht 3 billion to Baht 5.2 billion if pushnetting were stopped and the fleet of trawlers reduced to 50 percent of its current size.

29. The socio-economic survey suggests that potential occupational mobility of the fishing crew is high, if appropriate support is provided. However, poor households with few assets, low levels of education, a high dependency ratio, and limited access to information on alternative economic opportunities are reluctant to exit the fisheries sector.

30. The fleet reduction programme would involve large up-front costs for government (approximatly Baht 5 billion budget deficit in the year of decommissioning) but these could be recovered through higher licensing fees.

31. Mr Pongpat Boonchuwong concluded his presentation with a discussion of some implementation issues of a vessel buyback programme, such as the purchase of inactive or barely active vessels, the potential danger of reinvestments and re-entry into the fishery, and how to finance the programme. Possible ways to address these issues include preventing the reuse of decommissioned vessels (e.g. by destroying them), and by increasing fishing licence fees to extract resource rent for use in financing fisheries management costs. Other measure could include the introduction of a rights-based management system (e.g. an effort quota system), the assignment of greater fisheries management responsibilities to the fishing industry and the provision of incentives for investments in alternative livelihoods or aimed at enhancing occupational and geographic mobility.

An overview of anchovy fisheries management

32. Mr Pairochana Saikliang, Senior Biologist with the Bangkok Marine Fisheries Research and Development Center, presented an overview of the issues in anchovy fisheries management, and how these have been addressed in Songkhla Province through an innovative zoning scheme. The anchovy fishery grew rapidly from the early 1980s as a

consequence of the development of a new and lucrative market for boiled-dried anchovies, which added to demand levels based on their traditional use in the preparation of fish sauce.

33. Since then, but especially from the 1990s, this fishery has experienced a continuous history of conflict between different groups of fishers, with the most severe confrontations arising in Songkhla province. The core of the problem is the unwillingness to let anchovy fishers from other provinces fish on grounds occupied by local fishers. Historically, the fishery was concentrated in the upper eastern part of the Gulf of Thailand. But it has now expanded throughout the Gulf of Thailand and even into the Andaman Sea, with a particular concentration in the southern coastal areas off Songkhla Province.

34. With support of FAO and its FishCode Programme, the Department of Fisheries has undertaken a series of studies and consultative workshops to develop a management plan for the anchovy fishery. A core feature of this plan is a zoning scheme which has been implemented on a pilot basis in Songhkla. The scheme provides for the following fishing zones being defined:

a) Area 1, from 0 to 5 nautical miles, is reserved for the local fishery.

b) Area 2, from 5 to 12 nautical miles from the coast, is for boats of no more than 14 metres in length using falling nets and anchovy lift nets.

c) Area 3, within 12 and 15 nautical miles, is a buffer zone.

d) Area 4, 15 nautical miles or more from the coast, is for boats of no more than 16 metres in length, using falling nets and anchovy lift nets.

35. The scheme, while not endorsed by all fishers' groups, was able to reduce the extent of conflict significantly in recent years. However, it has not yet addressed the critical issue of limiting capacity in the fishery. Reportedly, the number of anchovy vessels has increased to 330 boats in Songkhla Province, while the estimated optimal fleet size is about 170 vessels.

Vessel buyback programmes: problems and prospects

36. Dr John M. Gates provided an overview of fishing vessel buyback programmes (VBPs) based on experiences with several programmes that have been implemented in Australia, Canada, the European Union and North America (see Presentation III, Appendix D). Commencing with an explanation of the difficulties in defining fishing capacity (either output or input based), Dr Gates first detailed the objectives of VBPs, including provision of economic assistance to affected individuals and regions, and the reduction in fishery exploitation rates. VBPs usually pursue multiple objectives, among which the reduction of the exploitation rate is not always the priority.

37. Dr Gates continued with a discussion of the technical and social issues that need consideration in the design and implementation of a VBP. Key technical issues relate to the following:

- the mismatch between private and social costs of fishing assets;
- the kind of changes in fishing capacity and fishing effort that are likely to take place in the absence of a VBP;
- whether the VBP targets the purchase of the vessel and/or the "right to fish";
- the fate of decommissioned vessels and whether they can be used economically in other fisheries or elsewhere in the economy;
- the response of the remaining vessels in the fishery, especially with regard to technological upgrading; and

- asymmetric information between the purchaser (government) and the seller of the vessels (owners), leading to problems of adverse selection (e.g. the least active vessels are bought) and moral hazard (owners speculate on the launching of a VBP)

38. Dr Gates noted that social issues are often the more influential in policy deliberations and therefore needed careful consideration. Most relevant are whether labour will be displaced what kind of support and social safety measures are needed, and the likely distributional impact of the VBP, and whether it would improve (or worsen) equity.

39. He then suggested criteria for the appraisal a VBP, as follows:

- resource conservation by reducing fishing mortality;
- conflict reduction by reducing the competition between fishers for scarce fisheries resources;
- benefits and expenses, depending on types of vessels targeted in the VBP;
- costs of monitoring and enforcement (reduced as there are fewer vessels to deal with);
- better use of inputs and products in the harvesting and processing sectors resulting from establishment of associated rights and removal of the "race for fish" incentive; and
- flexibility of decision-making (stochastic events, interaction with rights) by both harvesters and resource managers.

40. In presenting a series of VBP cases from Australia, Europe and North America, Dr Gates noted that VBPs can have multiple objectives and components, including such worthwhile items as job retraining for fishers and fish processors. VBPs that have worked well have generally been introduced as an integral part of a rights-based management system. Where VBPs have not been accompanied by such a system they:

- can work in the narrow sense of reducing the number of authorized vessels;
- are ineffective in reducing the exploitation rate, even if the initial target is in fact achieved;
- tend to reduce nominal inputs by less than the target because of tolerances allowed in the design of replacement vessels;
- will be accompanied by "input stuffing," which is a very general problem with input based controls, including VBPs;
- can encourage a special form of input stuffing that unnaturally accelerates the rate of technological change in vessels and, through cost inflation, can actually decrease economic efficiency.

41. In concluding his presentation, Dr Gates stressed the importance of carefully designing a VBP according to the specific conditions in a fishery, and to use the VBP as an entry point for the move towards a rights-based management regime.

Fisheries management through Individual Transferable Catch Quotas – the case of the Pacific halibut fishery

42. Dr Gates next provided a review of of the United States and Canadian Pacific halibut fishery, which has a long and well documented history that incapsulates the various experiences of fisheries management in the 20th century (see Presentation IV, Appendix D).

43. Alaska's waters sustained abundant halibut fishing for local fishers for a century and for indigenous people since time immemorial. By the 1970s and 1980s, that sustained abundance had begun to change dramatically. The local fishery had grown in size and fishing power and was extracting ever larger catches from the sea. By the 1990s, the Alaskan fishery was in serious decline. Fishery managers resorted to aggregate catch limits (total quota) in an attempt to conserve the resource. In biological theory, such an approach should succeed.

44. However, the aggregate catch limit did nothing to stop the race to fish. Instead, it induced a downward spiral in the length of the season as regulators and fishers tried to outpace each other. In such a regulatory regime, fishers, whose economic lives are endangered by the ever shorter seasons, generate intense political pressure to delay and emasculate the limits. As a result, the limits tend to be too timid and too late to stop the fall. Given fewer fish and less time in which to catch enough to survive, each vessel and its crew do all in their power to maximize catch before the season closes. The result is to further shorten the season. In the years prior to 1995 when Alaska adopted a rights-based system called Individual Fishing Quotas (IFQs), the Halibut fishing season had shrunk to as little as 48 hours.

45. Dr Gates noted that the shift to the new regime was an overwhelmingly positive experience for both the Canadian and the United States halibut fisheries. The major positive benefits were as follows:

- improved safety and less loss of life;
- improved resource conservation;
- higher landings;
- lower harvest costs;
- higher quality product;
- higher prices to fishers;
- higher consumer welfare;
- less discards;
- less ghost fishing;
- lower costs for product storage and distribution; and
- creation of valuable assets for the retirement portfolio of quota holders.

46. Negative attributes cited by some fishers were:

- loss of some jobs for crew members; and
- higher cost of entry.

47. The cost of quota is in effect a forced savings and retirement programme, as is the cost of any business asset to an aspiring small business. The regime change provided the income flow to pay into this retirement programme. Fishers may contribute to retirement plans of their choosing in the absence of rights-based fishing. However, income stream from fishing is likely to be too small to allow them to do so.

48. Crew members could have been allocated shares of the quota but they were not. This is a distributional issue for which there are human values but no uniquely correct answer. In the long run, however, society is better off if labour moves to jobs where the value added is at least as great as opportunity cost. This allocative principle was violated in the Pacific halibut fishery until rights-based fishing began a decade ago.

49. Dr Gates observed that rights-based fishing is a collection of approaches of which the IFQ and individual vessel quota (IVQ) systems are examples. It would be foolish to suggest that such systems are appropriate in all fisheries and no one would make such a sweeping claim. However, the conclusion seems inescapable that in the Pacific halibut fishery, theory and results are consistent and rights-based fishing has been a resounding success.

Panel discussion – demersal and anchovy fisheries management

50. The final session of the first day of the Seminar was devoted to a panel discussion. The panel members were Mr Somsak Julasorn, expert in marine fisheries with the Fisheries Department; Mr Somkiet Samattakarn, representing Non-Governmental Organizations (NGOs); Mr Viroch Chantanimi of the Thailand Fisheries Association; Dr Kangwan Jantarachot, Associate Professor, Faculty of Fishery, Kasetsart University; and Dr Somying Piumsombun, Senior Fisheries Economic Advisor of Thailand's Fishery Department. Panel members were requested to address the theme of fishing capacity reduction and management with regard to the trawl, pushnet and anchovy fisheries.

51. At the outset, the panel was in broad agreement that the current problems of overcapacity and overfishing have been recognized and acknowledged for some time. In the case of trawlers and pushnetters, these problems have been evident for some two decades. The core cause of the problems are the open access condition prevailing in Thai fisheries. Open access is also the underlying issue in the problems that arise with the migration of fishing fleets to different fishing grounds, and the often observed concomitant conflict caused with local fishers.

52. Another, and perhaps related cause of overfishing, is the circumvention or outright violation of existing regulations concerning closed seasons and areas, mesh size regulations, and the requirements for licensing. The current enforcement system is weak and ineffective and fines are hardly ever levied or are unrealistically low. At the level of the fishers and the fishing industry, there is sometimes also a lack of awareness that results in low compliance with regulations.

53. On the other hand, short-term relief measures such as the provision of fuel subsidies only make matters worse and encourage even more intensive fishing.

54. There was also broad agreement on the need to reduce fishing capacity, but the required costs would be high and there was a need for the industry to contribute its share.

55. Zoning by vessel size category was considered important and the Malaysian zoning scheme by size classes and types of vessels was mentioned as a good example in the region.

56. ITQ systems may not generally be well adapted to the multispecies Thai fisheries. For some fisheries that target specific stocks, there might be an opportunity for ITQs but there would be many implementation issues such as on the criteria for allocating quotas, and effective vessel monitoring, control and Surveillance (MCS).

57. There was also agreement that a buyback programme in isolation would not be sufficient to resolve the current management problems. In this respect, the example of Taiwan Province of China was mentioned. A buyback scheme implemented there in 1999 was evaluated three years later. The evaluation established that fishing effort had actually increased rather than declined, because the buyback funds were used to modernize the smaller remaining fleet.

58. Representatives of fisheries associations contributed several observations to the panel discussion. One representative agreed with the assessment that there were significant overcapacities in Thai commercial fisheries. He stressed the need for more closely associating the fishing industry, especially at the local and provincial levels, with the design and implementation of fisheries management plans.

59. Another representative expressed concern about the large number of unregistered and illegal vessels. He noted the inadequate cooperation between DOF and fishers' associations and the lack of coordination and harmonized procedures among different government agencies in addressing this issue. He further emphasised the urgent need for a buyback programme and proposed that budgetary allocations currently made for the construction and placement of artificial reefs be shifted towards use in a buyback programme. He also stressed that any buyback programme would have to be preceded by the establishment of an up-to-date database of all vessels, and by a decision on how to deal with currently unregistered vessels.

WORKING GROUP SESSIONS

Summary of discussion of working group on demersal (trawl and pushnet) fisheries

60. The discussions centred on four key areas – namely: (i) the effective implementation of a freeze of any further increase in the number of vessels and on fishing capacity; (ii) a voluntary buyback scheme and complementary support measures once there is confidence that a reduced fleet size can be effectively controlled; (iii) a zoning system by vessel size class and type of fishing gear; and (iv) measures to improve information needed for fisheries management.

61. The introduction of an effective limited licensing scheme is a challenging task in Thailand in view of the fact that it has been attempted, without lasting success, not less than four times during the last one and a half decades. It is realized that strong political will and widespread awareness raising are needed to overcome the constraints that have prevented past efforts from succeeding.

62. A first requirement is the establishment of a complete and accurate database on existing vessels, both those that are legally registered and the many that are fishing illegally, whose numbers are not known. According to a recent and reportedly fairly complete count, there are currently some 58 000 fishing vessels in Thailand's waters. Most of them are small-scale vessels.

63. The group recognized that, in order for an effective freeze on new vessel entries to be successful, it is necessary to introduce controls on the construction of new fishing vessels. Boatyards need to be required to report any request for the construction of fishing vessels and should be regularly controlled through the recently established Provincial Fisheries Committees (PFCs).

64. PFCs are chaired by provincial governors and include representatives of provincial staff of concerned government departments, fishers' associations of Thailand (primarily comprising boat owners of commercial fishing vessels) and NGOs.

65. The Committees are tasked with overseeing the fishing licensing regime. It was noted that there were various kinds of frauds observed in the current licensing practices. These include:

- registration of vessels with the Department of Harbours, for a purpose other than fishing but with the intention of using the vessels for fishing;
- obtaining of fishing permits from DOF for fishing activity not covered by the permit;
- falsification of licence and registration documents;
- display of photocopied rather than of authentic documents; and
- outright corruption of enforcement officers.

66. It was recognized that, in addition to better control and the prosecution of those violating regulations (including corrupt enforcement officers), there was a need to create greater awareness of the damaging effects that flouting the law has on the long-term health of the country's fishery resources, the fishers, fishing industry and society at large.

67. Those currently fishing illegally should be given a time limit by which they need to legalise their operations on payment of a moderate fine. Once this time limit has been reached, those fishing illegally would have to be prosecuted with the full force of the law. In this regard, the problem of the courts' not supporting the seizure of fishing vessels has been noted as an issue. The courts' action is reportedly based on the role of vessels in the livelihoods of fishers.

68. One reason why fishers fail to renew fishing licences has to do with the process that is involved. In order to facilitate the administrative tasks and reduce the waiting time for fishers, it was suggested that the renewal of licences should be staggered throughout the year.

69. With respect to the replacement of old and obsolete fishing vessels, the licensing policy should require that a vessel can only be replaced by another one of the same fishing power, taking into account the impact of technical progress.

70. Once the licensing regime has shown to be effective in halting the further growth of the fishing fleet, a voluntary buyback scheme should be launched. This scheme should be funded primarily in two ways: by the levying of an incremental 1 percent *ad valorem* export tax on marine fish and fishery products; and by shifting DOF funds from the current artificial reef construction programme to the buyback programme.

71. Moreover, license fee increases could be directed to feed a provincial level fund for use primarily in fisheries development and management. This fund could be tapped to provide complementary support to buyback programme activities. In particular, they could be used for the retraining of displaced fishing crews, temporary income support, and in the creation of alternative employment opportunities. Regarding the latter, other measures, such as the provision of concessional credit for small-scale business in coastal areas, were also mentioned.

72. In order to protect the fishing opportunities of small-scale fishers, it was recommended that the 3 km inshore zone, where trawling and pushnetting are prohibited, should be maintained and more strictly enforced. The operation of pushnets would only be seasonally allowed for the harvest of the krill-like species used in the preparation of shrimp paste, a Thai staple food product. Experiments should be conducted with alternative types of fishing gear for the harvest of this species.

73. In the area between 3 km and 6 km only single trawl operations should be allowed, while fishing using all types of gear would be allowed beyond 6 km.

74. With regard to improving data collection and information, it is essential that there be better catch reporting and improved stock assessment. The 38 provincial-level fishers' associations would be in the best position to solicit from their members better catch and other fishing data. For this they should be provided with a budget by the DOF. One reason why currently fishers are reluctant to reveal correct data is their fear of this information being passed on to the tax authorities (Department of Revenue). This fear needs to be overcome through awareness-raising and confidentiality provisions.

Summary of discussion of the working group on anchovy fishery

75. The working group first discussed the need for the systematic collection of catch data so that policy and decisions could be better informed. Accurate annual catch statistics needed to be compiled according to gear type, vessel type, and location. Data also needed to be collected on the number of vessels operating in the fishery and gear being used. A competent statistician was needed to assist with this task. The DOF expressed the view that

there should be a daily reporting requirement of catch for vessels. Demographic data and broader ecosystem data also need to be collected. Pilot projects are under way in Chumporn and Songkhla Provinces, and have shown that there is a change in the formatting and submission of data is required.

76. The need for inspection of vessels was consdered. This required the cooperation of the DOF, official local fisheries committees, Provincial Fisheries Offices, Fishery Associations and fishers themselves. A system for controlling the relocation of legally operating fishing boats from one area to another was discussed. There needed to be a clampdown on illegal fishing operations and "responsible units" needed to ensure enforcement measure were put into effect.

77. Fishing licences are issued for a period of one year at present. An application to extend a licence needs to be submitted 90 days prior to the expiry date of the licence and must be submitted together with the official records of the fishing boat. Late applications for an extension are subject to a fine. There was discussion regarding the length of time for which a licence is issued but there was no consensus reached regarding a recommended change. Licences are fishery specific. If a fisher wishes to move from one fishery to another, the existing licence must be surrendered and application made for a new licence within the destination fishery. The question of licensing fishers in areas where there is coral was raised, but it was pointed out that fishers tended to avoid corals and the net damage they cause.

78. There was a lengthy discussion in favour of fishing zones for anchovy. The Thai Constitution does not normally permit restrictions on migration, but such restrictions are permissible if required for reasons of conservation. Thus the zoning announced by the Ministry of Agriculture and Cooperatives dated 23 March 2001 (BE2544) is permissible and remains in force. A quota for the number of fishing boats permitted to operate in each area should be based on the migration patterns of the anchovy resources.

79. Some areas have experienced a considerable increase in the number of licensed fishing boats operating in recent years. The moratorium, officially in effect for the last 20 years, needs to be effectively implemented. Fishers in the group argued that it was first necessary to establish how many boats were fishing illegally and then to act against them.

80. Discussion then turned to reducing the number of vessels in the fishery. The group expressed the view that the reduction in the number of vessels should be undertaken on a voluntary basis, taking into consideration the social impact of doing so. Another approach suggested was to increase the licence fees but this was opposed by some in the group. The condition of the boats and gear needed attention, and the regulations relating to the size of the mesh needed to be enforced.

Presentations of the findings of the working groups

81. The findings of the working groups discussed above were presented back to the Seminar plenary, and formed the basis of the presentation made to the Policy Dialogue Meeting the following day. A summary of the findings of the working groups can be found in Appendix E.

POLICY DIALOGUE MEETING: MANAGEMENT OF MARINE FISHING CAPACITY

82. The half-day Policy Dialogue Meeting brought a greater number of senior civil servants into the discussion. Results of the deliberations of the previous three days were presented and discussed at the Meeting.

Evolution and management of the marine fishery

83. Fishing in Thailand is subject to open access, with no restriction on the number of fishing boats engaged in the fisheries. Open access to the fisheries facilitates the seasonal movements of fishing activity. Implementation of the gulf closure policy in some areas and provinces, has helped labour in those areas by reducing the number of people attempting to fish and improving conditions for those that remain in the fishery. However, when the fishers move their activities to areas not covered by the gulf closure policy, an increase of labour occurs in those areas instead. Problems arise even where the local communities have attempted to improve fisheries management themselves, since they are only empowered to implement fishing gear regulations. It is important to consider what will become of labour if the reduction in capacity results in fishers no longer being able to work in the industry.

84. The reason why there is a focus on the use of trawlnets, pushnets, and anchovy fishing gear is because these kinds of nets cause damage to aquatic animals. The mesh sizes of these fishing nets are 2.4 to 2.5 centimetres for trawlnets and pushnets, and only 0.6 centimetres for anchovy purse seine nets. These are too small. Up to 50 percent of fish caught by push and trawlnets are small fry and are of low economic value.

85. At present, the exact number of fishing boats and fishing licences is not known. This causes difficulty in correctly evaluating fishing capacity. As a result, the management process is not effective. Fishing regulations are still not fully enforced. As the fishers are not attuned to complying with rules and regulations, this creates conflicts among people who use fishery resources. In addition, the natural resource base has been degraded. It is important, therefore, that the management of labour and capital inputs should begin.

86. Management of fishers in the past has not been as effective as intended. Thus, the Thai Government felt that it should consider whether or not their current system provided adequate management processes, rules and regulations. In addition, the Government should focus on building the most sustainable and economical fishing industry for the benefit all fishers.

87. The long-term resolution of the problem lies in focusing on all aquatic natural resources, the extent and nature of investment in fishing boats, and on labour. It is important to analyze and evaluate whether all resources are being efficiently used and provide a reasonable return. If there is surplus input of labour and investment, this margin should be reduced in order to create a balance directed towards reducing production capacity.

Situation and problems

88. Catch per Unit Effort (CPUE) for marine resources has been decreasing continuously. The aquatic composition has also been declining. There are fewer types of aquatic animals and they are of a smaller size. The extent of investment is too great, resulting in overcapitalization.

Government's policy on fishing capacity reduction

89. The Thai Government's fisheries policy in relation to the reduction of fishing capacity is to:

- speed up the registration of all fishers in order to control their numbers by using incentives and strategies that emphasise the benefits of proposed changes;
- control fishing in accordance with availability of aquatic animals;
- provide new occupational choices for fishers in order to increase alternative work opportunities and improve incomes;

- motivate fishers to adjust their fishing gear by changing from gear that damages marine resources, and adopting techniques that are responsible and oriented towards conservation; and
- accelerate the setting up of fishing zone boundaries that are appropriate for harvesting marine resources.

International instruments on fishing capacity reduction

90. The 1995 Code of Conduct for Responsible Fisheries encourgages States to reduce fishing capacity "to levels commensurate with the sustainable use of fisheries resources" and that they should establish mechanisms for monitoring the capacity of fishing fleets. States are also encouraged to ensure that fishers operate under economic conditions that promote responsible fisheries (Art.7.6.3).

91. The 1999 International Plan of Action for the Management of Fishing Capacity has, as its immediate objective, the achievement by States and regional fisheries organisations of efficient, equitable and transparent management of fishing capacity by 2005. States and regional fishing organizations that have a problem of overfishing should adopt a phased approach to addressing the problem. Initially the level of fishing capacity should be controlled through the adoption of management measures; the level of fishing capacity should then be reduced.

92. The 1992 Convention on Biodiversity requires States to conserve biodiversity and rehabilitate degraded ecosystems through the development of appropriate management strategies.

Summary of guidelines for the management of fishing capacity

93. As a contribution to the development of a national strategy for the reduction and management of commercial fishing capacity in Thailand, the National Seminar produced the following guidelines:

94. Measures are needed to ***ascertain the real number of fishing boats***, and ***bring under control the construction of new boats***. It is proposed to do the following:

- Details of all fishing boats with no fishing licences should be added to the database of fishing boats.
- All fishing licences should be checked and all fishers not legally entitled to fish should be fined.
- A deadline should be set, after which fishers who are not legally licensed to fish will be fined in proportion to the boat sizes. In addition to a fine, fishing gear and fishing boats could be confiscated or destroyed.
- Fishers who do not operate in accordance with the terms of their licences should have their licences, fishing boats, and fishing gear confiscated.
- Fishers should not not be permitted to build any kind of new fishing boats without authorization. In cases where a new boat is built to replace an old one or for another purpose, fishers should first get approval from the relevant Provincial Fisheries Committee (PFC), composed of the Provincial Governor (Chair) and representatives of the Marine Department, the Office of Industrial Affairs, the Local Fisheries Association, the Department of Fisheries, and other related organizations.

95. A ***fishing boat capacity control programme*** should then be put into effect. A main objective should be to sustain the current level of employment in fisheries. Essential data for the control programme consists of the following items:

- size of each fishing boat and details of its fishing gear;
- power of its main engines; and
- the mesh size of fishing nets.

96. Use should continue to be made of ***fishing zones*** as a measure for controlling fishing:

- Fishing using trawlnets is permitted only beyond 3 000 metres from the shoreline; use of pair trawlnets is permitted only beyond 6 000 metres from the shoreline.
- Fishing using pushnets is permitted beyond 3 000 metres from the shoreline. An exception is made for marine shrimp nets that may be used within the 3 000 metres restricted area, providing they abide by the Department of Fisheries' conditions with regard to season, size of fishing boat, rod or pushnet, and engine power.
- Fishing using anchovy fishing gear (i.e. anchovy lifting gear and attracting light gear), with a boat size of less than 14 metres length, is only permitted outside the restricted boundary of 3 miles from the coast. There is an exception for Songkhla province, where fishing is only permitted beyond 5 miles from the shoreline. If the fishing boat is longer than 16 metres, the fishing is permitted only beyond 15 miles from the shoreline.

97. The ***reduction in the number of fishing boats*** should be approached as follows:

- Retirement from fishing should be voluntary.
- The government needs to create incentives that encourage fishers to seek alternative livelihoods.
- Rules and regulations should be enforced.
- Capital funds for the buyback of fishing boats may come from the following resources:
    - A premium charged for the export of marine products.
    - Part of the budget for the installation of artificial reefs.
    - Increased tax revenue from increases in the sale of marine animals.
    - Revenue through increases in fishing gear fees.

98. A ***database of marine resources*** should require:

- a survey of marine organisms caught by anchovy fishing boats;
- catch-by-weight data collected for the anchovy fleet;
- fishers to record their catch in a logbook; and
- efforts to promote understanding and awareness of the importance of having good fishing records, which will enhance the management of fishing capacity.

99. Effective ***monitoring, control and surveillance*** is needed. The organizations responsible for this programme are Department of Fisheries, Marine Department, Royal Thai Navy, and Fishery Associations. They will need to enhance their investigative capacities and make better use of available technology to implement the programme.

100. ***Further research** is needed* in order to manage fishing capacity effectively. Data and analysis of those data, will be needed on the fisheries resources, and on social, economic and political aspects of the fishery.

101. The main objectives of ***monitoring and evaluating*** the programme on management of fishing capacity, both during and after the work is done, comprise the following:

- present results of fishing capacity reduction to a senior management team;
- publish results of programme implementation; and
- amend the programme plan and procedures as the situation changes.

Discussion session

102. A question and answer and discussion session then took place.

103. **Destruction of boats/gear**: Disagreement was expressed with the idea of destroying fishing boats and fishing gear. Boats and gear should rather be confiscated and sold for alternative use.

104. **Reduction of capacity**: The question was raised as to what the effect on particular groups of fishers might be as a result of the reduction in boat numbers, early retirements, and modifications to engines and gear. It was also asked how many fishers would be affected and whether the capacity reduction programme would primarily be targeted at those with small, medium or large boats.

105. The response from Mr Chayakul was that these details need to be worked out in consultation with fishers and the seminar was organised to set this process in motion.

106. Dr Somying Piumsombun (a senior fisheries economics advisor) also responded by saying that a case study suggests that the fleet would need to be reduced by about 10 percent to maintain fishing at the highest level of biological productivity (MSY), and by 40-50 percent if it is to be maintained at the highest level of economic gain (MEY). The Department of Fisheries would first attempt to persuade fishers to withdraw from the sector by offering incentives for them to do so.

107. A fishery association representative, speaking from the floor, endorsed the idea of first seeking voluntary withdrawals from the sector. He proposed that a clear programme be established and specific criteria be worked out to reduce the number of boats. He expressed the view that compensation should be paid to those who ceased fishing.

108. The idea was also proposed that the Government should support a low interest loans scheme to be run by the Small and Medium Enterprise Development Bank of Thailand (SME BANK) that would assist fishers wanting to move out of fishing and into alternative careers. It was pointed out that the Bank for Agriculture and Agricultural Cooperatives provides loans for the “change of career” projects and that this facility could be extended to fishers’ groups.

109. A comment from the floor made the point that the fisheries focused on the export market and not the domestic market. If the programme to reduce the number of boats fishing for the export market, the supply of fish to the domestic market would not be negatively affected.

110. **Authorization for building new boats.** The question was posed as to wheter the regulations covered fishing in foreign countries. The Director of the Institute of Marine Fisheries Technological Research, Mr Rungson Chayakul, responded that fishers may build new boats for fishing abroad provided they receive a concession from the county in whose waters they wish to fish.

111. **Use of lighted anchovy purse seines.** The comment was made from the floor that there were too many boats in the fisheries and that action should be taken in form of encouraging early retirement or setting up of zones in certain areas. Another participant

added that the zoning should include marine protected areas in which harvesting would be limited to “appropriate fishing”.

112. In response to a comment that **Government departments should work together** more effectively, Dr Jedjinda Chotiyaputta, a representative of Department of Marine and Coastal Resources, explained that the Department of Fisheries and Department of Marine and Coastal Resources, the two departments responsible for marine natural resources, did work well together, but that is was fishers who sometimes did not understand the respective responsibilities of the officers of the two departments.

113. Another speaker noted that there were three teams involved in managing fishing capacity. These are: i) The environmental and natural resources team, ii) The statistical and social study team, and iii) the legal team. He proposed that two more teams be created, namely, a team that enforces the marine fishing acts, and another that focuses on closure during the spawning periods.

114. **A fund for a buyback programme** A proposal was made that a fund be established that gets 1 percent of the revenue collected by Government though taxing exports. This would provide a contribution from the processing sector.

115. **How to put into action a boat reduction programme.** The suggestion was made to form a “steering team” to implement the capacity reduction programme. The speaker expressed a lack on confidence that the Department of Fisheries would produce practical results and pointed out that he had been to “at least ten” such meetings and that nothing had been implemented.

116. It was also felt that a start date for the implementation of the programme should be set. In response Mr Chayakul pointed out that the fishers at the seminar has not come up with such a suggestion. In response to a later related comment, Dr Somying Piumsombun said that implementation of the capacity reduction programme was the next step and that Department of Fisheries, Economic and Social Development Board, and other related organizations would be responsible for this.

117. The Senior Fisheries Officer representing FAO, Mr Rolf Willmann, pointed out that, although it might be possible to fish in international waters or in the waters of other countries where the marine resources are rich and abundant, these opportunities are few and far between as many countries have similar problems of excess capacity and overfishing. The focus should be on effectively managing fishing within Thailand’s own waters. He also noted that successful attempts at reducing and managing fishing capacity elsewhere in the world are largely associated with fisheries that have clearly defined and enforced fishing rights.

118. There was consensus that the National Seminar succeeded in providing the Government of Thailand with a valuable opportunity to consult widely with stakeholders and provided specific guidelines for further developing a strategy for reducing commercial fishing capacity in Thailand.

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Ms Seangtein AugjimaKol Lecturer	See Appendix A

Name and Position	Institute and Address
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Mr Manu Naemnean Field Coordinator	See Appendix A
John Gates Professor of Environmental & Natural Resource Economics	See Appendix A
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Kelvin Passfield Expert – Fisheries	See Appendix A
Mr Somkiat Samutakarn NGOs	See Appendix A
Mr Suthin Che-paknum Executive Committee of Fisheries Association	See Appendix A
Mr Sa-ngiam Sumranrat Executive Committee of Fisheries Association	See Appendix A
Mr Anan Chusak Executive Committee of Fisheries Association	See Appendix A
Mr Prachit Reonraetai Executive Committee of Fisheries Association	See Appendix A
Mr Sompol Chouwongpaisarn Fisher	See Appendix A
Mr Soltorn Seangtongsamarnsin Fisher	See Appendix A
Mr Wason Laoton Fisher	See Appendix A
Mr Sonti Itsarowutakul Fisher	
Ms Arpasara Jarupa Fisher	

APPENDIX C

SEMINAR AGENDA

Date		Items
11-May-04	08.00-08.30 am	Registration
	08.30-08.45 am	Opening (Mr Arthit Namasolti, Deputy DG)
	08.45-09.30 am	Fisheries Management Policy (Mr Arthit Namasolti, Deputy DG)
	09.30-10.15 am	Introduction of workshop objectives & agenda and participants (Dr Somying Piumsombun)
	10.15-10.30 am	Coffee break
	10.30-11.00 am	An overview of fisheries situation (Mr Sakul Supongpan)
	11.00-12.00 am	1).Economic, Social and Institutional Aspects of the Transition to responsible Fisheries: A case study of the demersal fisheries in the Gulf of Thailand 2).Anchovy fisheries Zoning: A case study in Sonkla Province (Mr Ruangson Jayakul, Mr Pongpat Boonchuwong and Mr Pairoch Clia-Kliet)
	12.00-13.00 pm	Lunch break
	13.00-14.30 pm	1).A case studies on decommissioning programmes EU and USA 2). A case studies on ITQ system (Dr J.M.Gate)
	14.30-14.45 pm	Coffee break
	14.45-16.30 pm	Panel: Demersal and Anchovy fisheries management (Dr Kangwan Chantarachote, Dr Somying Piumsombun, Mr Somsak Chullasorn, Mr Viroch Chantanimi and Mr Somkiat Samutakarn)
12-May-04	09.00am-16.30pm	Working group Group1. Demersal fisheries Group2. Anchovy fisheries
13-May-04	09.00-12.00 am	Presentation of working group
	13.00-16.30 pm	Preparation for policy dialogue meeting
14-May-04	9.00-12.00 am	Policy dialogue meeting Closing Remarks

APPENDIX D

SEMINAR PRESENTATIONS*

Presentation I: Overview of Marine Fisheries in Thailand

Sakul Supongpun
Senior Marine Fisheries Advisor

In the past, marine fisheries in Thailand were not well developed. The aquatic animals found were sport bodied mackerel, hard pomfret, and herring that are normally used to make a salted dried fish and eaten with rice gruel. However, both silver pomfret and salted herring fish, which are consumed in Thailand, were imported from China.

Development of fishing gear categorized by aquatic animals

Pelagic fish

In the beginning the fishing gear was the fishing stakes. Then there was the development of fishing gear by the Japanese who introduced the Chinese purse seine (Tangkei purse seine). After the Chinese purse seine, fishers used black seine and lamp seine. In that period, fishers used kerosene for lighting coconut palm leaves to make an attracting light; when the fish came to the attracting light, the fishers rounded up these fish. Next, the surrounding seine fishing tool was developed, which is used to round up fish in both daytime and night-time. At that time the fishers used the surrounding seine as they spent about 5 to 6 days at sea, as this was more cost effective to secure a full catch of fish. A small surrounding seine was not cost effective over such a long period of fishing time, as the fish were not fresh, and they attracted a lower market price. Since the fishers did not gain cost effectiveness from surrounding seine investment, they changed to use light from the seashore area instead. Before going out to catch fish in the morning, the fishers generated electricity during the evening, and returned to shore within one day, thus they brought fresh fish back to shore.

Then the fishing gear was developed into the mackerel purse seine. In the past, the mackerel purse seine system used a normal black seine to catch the mackerel. Then, when the mackerel could be sold at a higher price as they were being used in the mackerel and tuna canning industries, they were exported to other countries. The fishers developed their surrounding seines or black seines with a small mesh size of 2.5 centimetres into the gill seine, with a bigger size of seine mesh of 9.0 centimetres. In order to catch a large amount of mackerel fish swimming very fast, the size of the seine was deeper and longer at more than 1 000 metres in length. The method of mackerel fishing in Thailand differs from other countries as Thai fishers adopt a group technique using five fishing boats. They use a sonar signal to search for the surrounding mackerel groups. The boats in each group that found the mackerel first will catch those fish. If some of the mackerel escaped the fist fishing boat, the second boat then caught these fish. This fishing procedure will be used repeatedly by the five fishing boats in each group. The mackerel fish would have absolutely no chance to escape from this fishing technique, resulting in a rapid reduction of the mackerel fish numbers. As a matter of fact, in the past, only the Spanish mackerel gill seine could catch such a large number of mackerel fish.

* Largely unedited text, as submitted to the Seminar Secretariat.

I used to survey Spanish mackerel gill seines catching the tuna at Chalok Lang. These days, the rich Chinese owner named TaoKae Auan Ri, bought only the Spanish mackerel fish to make salted dried fish. At that time, the Spanish mackerel gill seines caught a very large amount of tuna fish but the price was only 2 Baht per kilogram. The rich Chinese owner caught the tuna; however, he could not sell them. As there was no tuna canning factory nearby at the time, he had to throw them away at sea. This story revealed the abundance of marine resources in the past. However, after the method of tuna fishing was used for a few years, the number of tuna diminished rapidly. This is the development of surrounding purse seine.

Anchovy purse seine

In the past, Thai fishers used purse seine and small fishing boats to fish anchovy fish in coastal waters and sold them to the fish sauce factories. At that time in 1981, fishers bought the purse seine boats from Malaysia; however, the fishing activities were managed by Thai people and they caught fish in the daytime only. The fish caught were boiled in the stoves located on the boats, and then dried on the boats' deck. At that time, there were 6-7 fishing boats. In the meantime, Trad province had about 63-64 boats that had the lighted tuna purse seines. Then, in 1985, the anchovy purse seine used during the day was developed into the lighted anchovy purse seine, but using different seine types; the day anchovy purse seine used horizontal mesh but lighted anchovy purse seine used vertical mesh. Moreover, sizes of mesh used by these two seines were totally different. The use of the anchovy purse seine has progressed a lot and currently they are about 200 boats using these nets.

Gill seines and entangling seines

In the past, the gill seines and entangling seines used a small size of seine of about 1 metre deep and less than 300 metres in length, with a seine mesh of 4.7 centimetres. Due to the gulf closure rules, which prohibited fishing using any kind of surrounding seines, the fishers began using gill seines and entangling seines that can fish legally in the gulf closure areas in three provinces in the South. The adopted gill seines and entangling seines are ligament seine types. Presently, many of the fishing boats use different kinds of fishing gear such as, trawls, stunted trawls, single trawls, lighted surrounding seines, lighted boats for surround fishing. The big gill seines and entangling seine boats, were adapted to use ligament seines instead. Ligament seines used for marine fisheries are categorized into three types as follows:

1) Ligament seines consist of 50 seine meshes, about 1.2-1.5 metres deep, and 4-5 miles in length. This kind of boat does not have an echosounder tool or any means to measure the depth of the water. (The fishers sail the boat from the seashore, then anchor it at a sea level depth of 40-50 metres.) This kind of boat doesn't have either a sonar tool or a fish searching tool. Using this boat type, the fishers spend about 10-15 days at sea, and this requires preparation of food, gasoline, and ice to support their fishing activities. They also employ about 10-12 additional crew to prepare the boat tackle (attaching car tires and providing slots in the centre where they can pull the seine in). This boat type is mainly used to catch pelagic fish as the fishers will set down the seine only in the pelagic area and laying down the seine could be done both during the day and night. After setting down the seine for two hours the fishers will return to shore, to ensure the fish caught are fresh. If left in the boat more than five hours they cannot be sold at a high price. Therefore, the fishers will finish the fishing activities within one day.
2) The big gill seines and entangling seines use the same seine type; however, instead of using ligament seines of 50 meshes, they increase the mesh up to 200, 250, or 300 meshes, according to size of the boat stem. The seine length is about

4-5 miles. The fishers will fish in a Thai number fishing pattern and use the echo sounder tool to search for schools of fish. When the fishers find the fish they will immediately set the seine to catch these fish by using a seine of 300 meshes and 9 metres deep.

Tuna gather and move location in a circle shape, which we can observe at the Marine centre, Rayong province. In daytime, tuna will stay pelagic, thus the strike-surrounding method is not lawful. As a result, in daytime fishers must use the non-strike surrounding method, which will create a Thai number pattern. The fishers will finish catching within one day.

3) The small and medium size boats use a ligament seine size of 50 meshes, with a depth of 1.2-1.5 metres, and length of 4-5 miles. The fishing activities will be in daytime only, by using the echo sounder tool to search for schools of fish. Once the fish are found, they will lay down the ligament seines in parallel, using a zigzag method instead of fishing in a Thai-number-shape. This is not quite as effective since the ligament seine's depth is only about 1.2-1.5 metres. Time to put down the seines is 2 hours starting from 05.00 to 07.00 hrs, after that, the seines will be drawn up. This fishing method uses about 5 hours at sea and will finish fish catching within 1 day.

The fishers catching demersal fish without the echo sounder tool will put down the fishing seines in such a way that the seines can flow along with the current. The seines will be laid down only in the flood tide, ebb tide, and a current. After the seines are laid down, they will flow with the current flow and catch aquatic demersal fish and animals. As the fishing time is only 2 hours, the distance that the seines will drift to depends on the speed of the current. The main marine animals caught are demersal fish, such as, Uliptus threadfin bream, cantus, spotted junior, and some kind of vulture fish, because these kinds of fish are plentiful.

On the other hand, the tuna ligament seine will be set up or defined so that when the tuna are found, these fish will be forced to swim into the seines, instead of running the seines to where the schools of fish are found. This is one difference in the style of fishing.

Another kind of fishing gear used to catch the demersal fish, which produces similar problems, but not too serious, are lift seines and falling seines. These seines were developed from squid lifting seines and squid falling seines. In the past, local fisheries caught squid only in at night using a cast seine, a small fishing boat with a crew of only one per boat, and a calcium carbide charcoal lamp. While the squid swum around attracted to the light, the fishers throws a cast seine to catch these fish. The attracting light fuel was changed from calcium carbide charcoal to gas.

The fishers at Paknam, Chumporn, were originally catching squid using falling cast seines and a mosquito seine. When schools of fish came to the attracting light, the fishers tried to gather them into one area, and then dropped the cast seine onto them. In the mean time, the fishers found that there was an abundance of anchovy fish, swimming around the fishing boat, so they thought of catching the anchovy fish also, thus they developed a fishing gear for anchovy fishing. In addition, the fishers could see a trend of good income, as the price of anchovy at that time was quite high, so they tried to implement falling seines for anchovy catching that used an attracting light.

Presently, the anchovy falling seines are implemented according to the different colours of the attracting light and a fluorescent light bulb with only 3-5 watts is largely used to replace the old light bulb. Anchovy fishing can be undertaken by one fisher using a small boat catching about 40-50 kilograms per night, thus the fisher will get about 1,000 Baht a night. The anchovy fisheries are found more in the Gulf of Thailand than in the Andaman Sea.

Demersal or marine benthos fishing

During the first stage from 1971of the development of fishing gear for demersal fish or marine benthos fishing, otter board trawl boats were used. The marine fishery division imported the boats from Germany for trial use. At that time, Thai people started to consume marine fish. Since the use of the otter trawl boat was very effective, many fishers decided to fish by using the otter trawl seine. The development of otter trawl seines from 1971 to 1973 caused a huge reduction in marine resources. As a result, in 1973, some fishers moved to fish far away from the territorial waters.

The otter board trawl seine was then developed as a pair of trawl seines since the paired trawl seines can cover a towing area about 10 times greater than the single otter board trawl seine. Currently, the development of trawl seines has seen much progress, even beyond the expectation of the fishery specialists. This huge development has caused a rapid reduction of the marine benthos biomass.

The next development in fishing seines was the push seine (bag-net), which in the past, was mainly used to catch marine shrimp. The marine shrimp seine was developed into a purse seine, which is very effective in catching marine animals of all sizes. The Indian trawl seine is the next development after the purse seine net, and uses 2 seines towed along by the fishing boat.

In 2003, 20 tuna fishing boats, using gill seines and entangling seines, were changed to ligament seines. It turned out that the fishers who changed their boats to ligament seines for tuna catching lost money, and presently there is only one boat left. The other 19 boats used Indian trawls. As the Indian trawls are very efficient at catching fish, they damage many species of Thailand's marine benthos. Besides, as many kinds of trawl seines damage marine resources, the Indian trawl is also another fishing gear that damages a lot of marine animals. Nowadays, the development of trawl seines should stop at the pair trawl seines, and there should be no more fishing seine evolution, except a modification of fishing methods in order to catch fish in large numbers.

Other aquatic animals

Other aquatic animals refer to the invertebrate animals, which are shrimp, shellfish, crab, and fish. The main fishing gear is the otter board trawl, which mainly catches crab, usually at night. The fishers use crab locking seines to catch ark shell, undulated surf clam, and squid.

Crab trap

Mr Suphong manufactured and promoted the use of horse crab traps. He learned this seine model from ZipTac and distributed it to the fishers in Chantaburi province but received little attention from them.

About 30 years ago, more that 92 percent of the local fishers used fishing tools developed within the community as well as using human labour to do fishing activities, and there were just 20 percent of fishers who used power engines. However, nowadays, 70 percent of the fishers changed to use power engines instead of human labour. The local fishing tool models are still not changed or developed from the past; except for the crab trammel seine where the mesh was reduced from 3.7 to 3.5 inches.

Purse seine, trawl, and Indian trawl

The Technical Development Division, Department of Fisheries, conducted a research study on the fishing gear that damages the young fish, listed below according to the level of serious damage:

1) Push seines.
2) Trawl seines, especially paired trawl seines.
3) Indian trawl seines.

In order to find out how much economic damage is caused to young fish from the fishing gear, the research divided the fishery areas by zone. The result showed that the push seine damaged the young fish to a value exceeding 2 000 million Baht a year. Moreover, the result showed that the push seine and trawl are the fishing tools that cause economic damage to more than 60 percent of young fish.

Young fish can be caught by a paired trawl seine at the rate of 2 400 kilograms per hour. Based on 12 hours a day, the fish caught can be up to 28 800 kilograms. If using a local fishery method, the catch will be only 20-25 kilograms per day. According to these numbers, it can be seen that using local traditional fishing methods for young fish will require more than 3 years work to achieve the same as for one day's fishing using the paired trawl seine system.

The Department of Fisheries invested about 1 000 billion Baht to install artificial corals for marine resources. However, there are some techniques using the push seine, trawl seine, and anchovy purse seine, that can damage these artificial corals. Suggestions of criteria to control these kinds of fishing seines are as follows:

1) The mesh size of a paired trawl seine as used in other countries and that used within Thailand should be compared. In the past there was a three-day meeting requesting to extend the seine mesh to 0.5 centimetres; however, the request was not approved.
2) The law, Section 32, should be considered with the local fishers to examine whether it is adequate, since nowadays the local fishers are suffering hardship as the population is increasing, but the natural resources are declining enormously and rapidly. Is the standard criteria we have been using to protect the local fishers, which prohibits the use of push seines and trawl seines to catch fish within the coastal area of 3 000 metres, sufficient or not? According to research undertaken in 1972, the fish catch rate was 96.6 kilograms per hour, but in 1999, the fish catch rate declined to only 17.89 kilograms per hour.
3) How might it be possible to support the education for the local fishers' children to study up to diploma, vocational, and graduate levels? The question must be asked about a suitable career for a fisher's child who achieves a graduate or doctorate level? Is it worth it if they come back to work in the fishery field? Currently 90 percent of fisher's children, who completed only an elementary level Prathom 4, are working in the fishery area.

According to the law, section 32, there was a project conducted in order to study the management of natural resources with participation of the local community at Bang Sa Phan Bay. The first item to be surveyed was all of the local fishing tools that are used in the project area. Then, we invited the representative officers from the Department of Agricultural Extension and the World Bank to join the meeting with the local district administrative organizations in the project area, in order to get agreement and suggestions of how the

authorities will manage the problems. The methodological ways provided a good result; for example, there was a question asked to the local fishers who used small fishing boats as to how far away they catch fish from the coastline. Then, the project team divided the fishing zone areas for the local fishery and the commercial fishery. After that, the project team organized the meeting in order to summarize and have discussions with the committee team members focusing on standard criteria from the department of fisheries. After the committee team agreed on the discussed rules and regulations, these items would be sent to the ministry office. If the ministry office agreed with the proposals, the rules and regulations will be forwarded to the governor of the province for the next approval process. That is the fishers could not use some types of fishing gear in the project area.

The project pattern used in the Bang Sa Phan Bay project covers 150 000 rais, prohibits fishing within 23 kilometres of the coast, prohibits use of purse seine, push seine, any kind of trawl seine, and any kind of lighted purse seine. The exception is for anchovy purse seine that can fish outside the coastal area of 3 kilometres. However, there is no prohibition for lift seines and falling seines. This is the project methodology that is being used right now. In addition, there is another project underway in the Pa Tiw Bay area getting support from ZipTac. The project pattern used in the Pa Tiw Bay project could persuade the fisheries organizations in Asean to try using this method, and the methodology could be used at Prachuab Bay if applicable.

Artificial Reefs

The Department of Fisheries built the artificial reefs with a budget of about 1 000 million Baht. However the paired trawl seines seriously damaged them. We would like to recommend that the specialists and marine fisheries research and development bureaux extend their management attention to solve the problem. We will not focus on specific main items but we will show an example of the Bang Sa Phan Bay project. In this project, the nine villages will look after the fishery activities in the project area and make sure that the local fishers will not use the prohibited fishing tools. When they find use of an illegal fishing tool, they will report to the project officers who stand by at that project unit. Then, the project officers will use a rapid boat and use a global positioning system (GPS) tool to check where the illegal action takes place in order to go to that place promptly. The project officers will not go out and arrest the illegal boat alone, but others participate such as the fishers, the police, and voluntary groups. That is, we will not arrest the illegal group alone, but we get participation from local community in the project area to help in arresting and managing the project. The Bang Sa Phan community has successfully performed this project for two years and the community got a budget for artificial reefs installation. Currently there are more than 300 Dalbergia (Shing Song) trees. Moreover, we found that the community accepts participation in management of their natural resources and this collaboration should be increased in the future.

The lighted anchovy purse seine is still causing problems to marine resources since it has a very small mesh size and it has a light attracting device. The marine specialists know that the young fish cannot escape from being caught as they immediately swim to the light source. The anchovy fish seine damages 28 percent the small economic marine animals.

I made a survey in Trad province for the lighted anchovy purse seine to compare the percentage of anchovy caught to the total catch sought by the fishers. I spent seven days there during the first survey visit. During my second survey, comprising of 6-8 people, the fishers sent a boat and took our group to the fishing area; although they promised that they will take good care of us, they left us suffering from hunger. Because at that time they found a lot of mackerel, they caught the mackerel instead of fishing for the anchovy as planned. That was because the fisher could catch only 400-500 kilograms per night of anchovy fish at 2 Baht per kilogram, that is, 800-1 000 Baht per night, compared to 5 000 kilogram of

mackerel priced at 25 Baht per kilogram, which earned them up to 100 000 Baht per night. This point reminded me that the purse seine was highly efficiency at catching fish at the rate of about 5 000 kilograms per night. This statistic could reveal that our marine resources could all be gone one day.

The fishers at Pak Nam and Samut Prakarn complained to me that the purse seine mesh size of 2.5 centimetres is very small, and that it should be larger. I studied the optimum mesh size of the purse seine and found that the 2.5 centimetres mesh size was appropriate, since the greentail fusilier fish was very popular. Thus, the mesh size of 2.5 centimetres could catch the big size of greentail fusilier fish while the fishing boat was anchored far away from the coast, so as not to destroy the young fish breeding in the coastal area. I think the mesh size of 2.5 centimetres is the optimal size for purse seine fishery. If the fishers use a purse seine of 2.5 centimetres to fish in the coastal area, they will sometimes be unable to clear the seines if the greentail fusilier fish blocks the seine mesh. The solution is that the fishers who would like to catch the bigger size fish have to go far away from the coastal area. However, nowadays the numbers of greentail fusilier fish is not as great as in the past, as only three fishing boats, with the lighted purse seine, can catch about 50 000 kilograms per night, compared to the past practice of a few kilogram a night.

Light boat for squid fishing with falling and lift seine, and for anchovy

The fishers will use an echo sounder to search for the location and quantity of fish. If they found many of them, they will contact purse seines to do fishing, even in the prohibited period. However, they will not catch the fish until the sun rises, since it will not be legal. This kind of technique is another problem we are facing.

Blue swimming crab trap

These traps cause a serious problem as the fishing grounds are moved from time to time, returning about 3 000-5 000 pieces per month. Moreover, the merchants will come to buy the crabs from the fishing boats and hire the people of local community to take off their shells. The size of the blue swimming crabs that are caught nowadays is very small, so the problem that needs to be solved is to regulate the crab traps. But there is uncertainty as to how to do this effectively.

Squid trap

Another fishing gear used in local fisheries is the squid trap. Actually, a squid trap is quite similar to a crab trap; however, all people in the village will go together to fish for squid. That is, they will move their family with them and stay together until the monsoon ends. One time, in 2003, there were more than 10 fishing boats moving to catch squid at Sa Phan Bay, Prachuab Khirikhan province. Department of Fisheries tried to press them to move out of this fishing area because the local community people were taking care of their natural resources. Since it was not right if people from other communities came and used their resources, the Department of Fisheries had to press the non-resident groups to move out. In conclusion, the effective co-management involves participation of the local community in order to manage their natural resources.

As we have a co-management style in the project area by using section 32 of the law, I would like to suggest that numbers of the small local fishing tools used in the project area also should be limited; otherwise, the project will not be a success as expected.

The idea to control an increase of fishing boat numbers comes from the Fishing Right project in Japan. I made a tour of inspection of this project in Japan. There was a village named Moo Ban Thai that, through the Fishing Rights project, have managed fishing rights that are based

on the home port of the fishing boats for more than ten years. Since 1994, there were 58 fishing boats and the number still remains the same today. The population has increased more than ten times since the project started. However, the fishers cannot increase the number fishing tools. The new members in each family will be hired as employees and this action will be carried out continuously. This action kept exactly the same numbers at the fishing port and, at the same time, all the villagers had work to do. The project counted how many were in each family and assigned one person to manage the fishing tools. If a person managing the fishing tools dies, is over the age of 60 years or is working in other careers, the fishing tool management will be carried out by someone else. The number of the fishing tools will not be increased.

In 1976, the Department of Fisheries studied the number of species of the marine benthos, caught using the purse seine, the push seine, and the Indian trawl seine. There were 394 species. Then, in 1995, the study showed only 88 species, a reduction of 300 percent. As there is not sufficient food for the fish, the types of marine benthos were declining significantly.

Some 80 percent of the natural coral reefs have been seriously damaged by trawl. The installation of artificial reefs, according to the Japanese model, requires that there be a 1:10 ratio of the height of the coral and the depth of water. Thus, in any particular area the location point to install the artificial reefs should not be less than ten metres deep. The current will flow through the artificial reefs wherever it is installed, thus it will immediately create a water whirlpool at that location. If we build the reefs according Japanese theory, the water current will flow through the coral, creating an abundance of mineral deposits and microorganism activity. In addition, the chemical reaction of water, carbon dioxide, and sunlight, will create the food chain; for example, starting from a small food chain, where the big fish eat the small fish, it develops until a variety of kinds of food chain are formed and become a food web. Therefore, the 1:10 ratio theory could encourage the growth of various kinds of marine animals, including marine benthos, day fish, middle water fish, and demersal fish, occurring naturally in the areas that have the artificial reefs installed. This demonstrates a sequential order of consumers in the food web as it starts from sunlight, as the primary food production unit, and ends with humans as the final consumer.

Various kinds of marine fish will come to stay in the artificial reefs. Then, the artificial reefs will create an ecosystem inviting fish to visit and stay. Moreover, released animals will have a readymade home with plenty of food to live on. The Department of Fisheries conducted an experiment, lead by Dr Vichan, to breed red sea perch fish and released them where there reefs were installed. Many marine resources such as sea grass, seaweed, and any other small animals, came to stay and survive. The ecosystem, which was lost in the past, is rebuilt where the artificial corals were installed. Presently, the artificial reefs can re-establish enriched ecosystems in the sea, and we, in the Department of Fisheries, would like to ask all the meeting participants and other related organizations to help in recovering the marine ecosystem. In addition, please raise these concerns to others to promote an awareness of natural resources, so that we stop destroying natural coral reefs, help each other to take care of marine resources, and effectively manage our natural resources by preserving and recovering them.

Presentation II: Management of Marine Fishing Capacity in the Gulf of Thailand

Rungson Chayakul /Pongpat Boonchuwong/Pairochana Saikliang /
Director of Marine Fisheries Research and Development Bureau/ Director of Fisheries Economic Division/ Senior Biologist

A. Overall Picture Trawlnet, Pushnet and Anchovy Purse Seine Fisheries
(Rungson Chayakul)

Marine resources and anchovy fishery in the Gulf of Thailand

From 1983 to 1991, there were a number of notifications announced regarding anchovy fishing, however, to be brief, I will focus mainly on 1996. On 15 March 1996, the Ministry of Agriculture and Cooperatives issued a notification regarding mesh size of anchovy nets used with an electricity generator, stating that the fishers may not catch anchovy fish if their mesh size is smaller than 2.5 centimetres and used with an electricity generator. This notification imposed an obligation on coastal provinces. Lift nets and falling nets are exempted. In 1995-1996, anchovy fish had increased in importance for the Thai economy as customers in other countries consumed a large number of anchovy fish. In the past, Thai people consumed anchovy fish, which were also used to make fish sauce. Later the fish were consumed more widely and were also processed into various types of food, which were exported to other countries. As a result the price of anchovy fish was higher than in the past. However, the increasing demand for anchovy fish has caused a rapid decline in the numbers of fish.

In the past anchovy fisheries were located only in the East of Thailand; however, when the demand increased, the anchovy fisheries were extended to the South, such as Songkhla and Pattani. The fishery migration occurred depending on the monsoon season. The fishers will catch anchovy in the South during the southwest monsoon and catch anchovy in the East during the northeast monsoon. Because of this increasing demand, the number of fishing boats changing from trawlnets, for example, also increased. The extension of fisheries from the East to the South of Thailand caused conflict between the fishers who had moved from other places and the fishers working in these local areas, and this was the original cause of the anchovy fishery problems.

The Department of Fisheries tried to find a way to solve this problem of marine resources management. The Department brought this problem to the consideration of the board of the national fishery policy's meeting on four occasions. The meeting held on 28 June 1999 agreed to the 3rd proposal that the Department of Fisheries set up a subcommittee to study anchovy fisheries. The subcommittee, which had Dr Surapol Sudara as president, was comprised of the subcommittees from various organizations, for example, the teachers, the fishers, the representatives from anchovy fishery industry, and the representatives from local fishery communities.

At the 4th meeting of the board of national fishery policy, the project results of the anchovy study conducted by the subcommittee were agreed. The meeting then assigned the project work to the Department of Fisheries to proceed in accordance with nine resolutions, which were mainly about controlling the number of fishing boats, establishing the fishing areas, and controlling the size of the mesh. Establishing the fishing areas was one factor that leads to the study determining fishing zones in Songkhla province, proposed because this province had a serious problem of conflict as well as having a great number of marine fisheries.

Demersal fisheries

Trawlnets and Pushnets are the primary fishing gear that destroys marine resources. The marine animals that are caught in these nets are 50 percent commercial fish, and the other 50 percent are small fry fish, consisting of about 60-70 percent of economically viable young fish. According to a survey conducted 3-4 years ago, there were 5 535 pushnet boats, and 5 163 trawl boats. The project that followed up the situation of marine fisheries found that in 1951, the catch rate, as reported by the survey boat from the Department of Fisheries, was 297 kilograms per hour. However, nowadays, the catch rate is only 27 kilograms per hour. This statistic shows the trend of marine resources had been declining for a long time. The economic loss from the small fry fish caught in pushnets is estimated at more than 2 000 million Baht per year. The economic loss from the small fry fish caught by the trawl boats, which was calculated from the small fishing boats of 14 metres length, is about 90 000 Baht per year per boat.

There are very few regulations to control use of trawlnets and pushnets. The principal regulation is prohibiting of fishing within the 3 000 metres area, while other regulations are not clearly defined.

B. Management of Trawl and Pushnet Fishing Capacity

(Pongpat Boonchuwong)

The development of trawl and pushnet fisheries

Trawl fisheries

Trawlnets have been imported into Thailand since 1952. At that time, Thai fishers lacked experience, also deepwater fish were not consumed widely; thus the fishers gained little or no profit from these imported nets. Then in 1960, the fishers imported trawlnet boats and this trend were developed quickly. The fishers thus successfully gained profit from these imported boats. By 1973 the number of boats had increased rapidly by up to 60 times. In the meantime, effective use of marine resources was reaching the highest level. After that, the crisis period occurred during 1974-1980. The main cause of the crisis was the high investment cost of trawlnet fishery equipment and supplies, of which over 40-50 percent was the gasoline cost. During this crisis the gasoline price increased three times, in 1974, 1978, and 1980. Because the higher price of gasoline was leading to higher overall costs, the number of trawlnet boats declined. The secondary cause of the crisis came from the declaration of exclusive economic zones by the neighbouring countries. This caused a reduction of the fishing area which resulted in some fishers moving back to fish in Thai waters. Some fishers continued to fish illegally in the waters of neighbouring countries. From 1982 until now, the fishers improved the efficiency of small and medium sized boats in order to catch more fish by, for example, increasing engine horsepower and implementing a variety of fishing gear types. Moreover, the fishers with the bigger sized boats could fish far away from the territorial waters, in both legally and illegally.

Pushnet fisheries

Pushnets were developed in 1967 from a marine shrimp net type used in fishing by hand. The fishers had only a few pushnets, but the Department of Fisheries did not register pushnets for the first time until 1970. After that, the effectiveness of pushnet fishery was greatly developed, including size of boats, engine power, and length of net rods. As a result, the fishers could fish far away from the coastal areas, and at a deeper sea level. There are at present a group of pushnet boats that are highly effective in fishing. They are the bigger size of boats, with powerful engines, and longer pushnet rods, and are able to fish outside the 3000 metres limit.

Fishing area for trawlnets and pushnets

The fishing area in Thailand consists of the Gulf of Thailand and the Andaman Sea. The Gulf of Thailand is the main fishing area covering about 304 000 square kilometres. Moreover, there are three shared areas between Thailand and neighbouring countries, which are Thailand-Cambodia, Thailand-Vietnam, and Thailand-Malaysia, covering totally about 55 200 square kilometres.

Quantity of marine animals caught

From 1957 to 1995 the amount of marine animals caught increased rapidly, especially after trawlnets began to be imported from 1960. The marine benthos helped add to the quantity of marine animals. One factor that helps increase the supply of marine animals was fishing outside of Thailand's waters. The increase of fishing productivity came not as a result of fishing in Thailand's waters, but from fishing outside Thailand's waters, where large quantities of fish were caught. Fishing in Thailand's waters returned only very few fish.

Numbers of fishing boats registered for carrying fishing gear

During the period between 1971 and 1997, the year 1983 had the highest number of registered boats. Numbers then declined again but increased again in 1990. Since there was an amnesty law many fishers registered their boats; however, the registered numbers declined again until 1997. For the trawl boats and the push seine boats in the Gulf of Thailand, the statistical trend was similar. The highest number of registered boats was recorded in 1990, as there was an amnesty law that year. In both cases the number of registered boats then declined again.

A statistical analysis of the census data of the trawl and pushnet boats made in 1995 and 2000, shows that the fishers in the Gulf of Thailand used all kind of fishing gear for deepwater fisheries. These were otter trawlnets, paired trawlnets, beam trawlnets, and push seine nets. However from 1995 to 2000 the total number of boats were reduced by an average of 24 percent.

The catch per unit of effort since 1966 has declined rapidly.

Biomass

The research study of the management of marine natural resources made by the World Fish Centre and the Department of Fisheries included a study of the marine biomass in the Gulf of Thailand. The research results showed that the biomass in the Gulf of Thailand tended to decline from 1960 to 1991, especially that of the demersal fish types. When comparing the size of the biomass with numbers of trawl fishing boats, we found that numbers of trawl fishing boats tended to increase as the size of the biomass tended to decline.

Maximum sustainable yield (MSY)

The review of the MSY using the two models compared to the actual catch rate at present, and in 1995, found that the MSY in the Gulf of Thailand, using the Gordon - Schaefer Model, was about 993 000 tonnes. However, the actual catch was about 800 000 tonnes. The optimum fishing labour input should be 34 million hours; however, the actual fishing labour used was 56 million hours. As a result, if we would like to reduce fishing labour to the optimal rate, we have to reduce fishing labour by about 40 percent. On the other hand, if we focus on the economic point of returning the highest profit, we have to reduce fishing labour inputs to only 28 million hours. Thus, we have to reduce fishing labour to 50 percent in order to get the highest profit gain. Using the Fox Model, we get quite a similar result, just a bit different in

specific figures. We could summarize that, if we would like to reach the maximum sustainable yield, we should reduce fishing labour to 40 percent; and if we would like to get the highest profit gain, we should reduce fishing labour to 50 percent.

Control of the numbers of fishing boats

The amnesty law was intended to bring all fishing boats into the same system so as to prevent a fourfold increase in boat numbers. Since there were many responsible organizations involved, problems occurred during the implementation; as a result, the project was not successfully carried out.

Eliminating fishing gear

Pushnet and trawlnet boats are forced to fish 3 000 metres off the coastline.

Ban of fishing in some areas and some seasons

Ministry of Agriculture and Cooperatives has issued a number of notifications, including closures both in the Gulf of Thailand and in the Andaman Sea, and a prohibition of fishing in some provincial areas.

Pushnets and trawlnets are the main fishing tools and have caused serious damage to the demersal resource, especially small fry fish.

Summary Study on Economic, Social, and Institutional Aspects of the Transition to Responsible Fisheries – A Case of the Thai demersal fisheries in the Gulf Thailand

Rationale and background

1) The 1995 Code of Conduct for Responsible Fishing.
2) The 1999 International Plan of Action for the Management of Fishing Capacity.

Theoretical framework and need for the study

1) Fisheries in Thailand are open access fisheries. This causes an overfishing problem.
2) The investment cost for fishing capacity, such as fishing boats and other fishing gears is quite high, compared to the rate of fishing activities, which is quite low. Even if the fishers gain some profit; the effective use of resources use is still low.
3) The fishers use resources above the maximum sustainable yield (MSY) and the CPUE has declined. Moreover, size of the marine resources catch was smaller.
4) The rental associated with the resources used was reduced, which indicates inefficiency.
5) The conflict between the fishers regarding the fishing gear being used was continually increasing.
6) Production inputs, especially gasoline, were continuously offered as support to the fishers. We could say that the effectiveness of production capacity was quite low as the fishers only benefited as a result of getting gasoline cheaply.

Research methodology

1) Bioeconomic model: Objective of using this model was to estimate optimal size, number of boats, and the resource rental and then calculate approximately the budget cost to reduce number of fishing boats.
2) An analysis of socio-economic condition of the fisher's families: The objective of this analysis was to study occupations and the transition processes of a career change. In addition, the project aimed to organize career changes from fishing to other occupations, and to provide choices for career selection.
3) An analysis of change in fishery and cost management: The objective was how to control fishing capacity and fishing labour through use of a central organization, or by decentralization of the administration to local organizations, and how to manage fishing rights schemes (resources quota or product, and/or rights within a fishing area).

Transition benefits

1) Cost saving from reducing fishing capacity and fishing labour.
2) Catch rate is higher or remaining at the high level constantly.
3) Reduction of conflicts between the fishers.

Transition costs:

1) Investment of buyback for the boats that are surplus to fishing capacity.
2) Economic incentives for changing careers by moving from the fishing to other careers.
3) Cost of fishing management, such as research cost and cost for management control.

Research results

1) Fishing capacity of marine benthos fishery by pushnet and trawlnet in the Gulf of Thailand was surplus to the requirements by 25-50 percent
2) Present value of pushnets and trawlnets in the Gulf of Thailand is about 9 600 million Baht (1997). About 80 percent of this value comes from the medium and big sized boats.
3) If there were a reduction in pushnets and trawlnets of about 50 percent, the returns will be increased from 3 016 million Baht to 5 239 million Baht.
4) If there were a reduction in pushnets and trawlnets of about 25 percent, the maximum cost of resource rental and the maximum return will be 5 900 million Baht. The present value of demersal fishery will be increased to about 9 000 million Baht.
5) According to an analysis of socio-economic conditions which came from surveying about 300 population samples who used pushnets and trawl, we found that the capability in changing fishery careers was high; however, the government should provide support and give opportunities to these people.
6) One factor that motivated the fishers to change their careers is low profit from fishing. This is because of the damage to natural resources, unstable income from fishing, and the hard and dangerous nature of the work.

7) The fishers who have fewer assets and have the more menial jobs in fishing, have limited access to information regarding choices of new careers. It is not easy for them to quit fishing.

8) To reduce trawl boat numbers by 25 percent, the government has to pay compensation cost to the boat owners and the boat crews of about 5 000 million Baht in the first year. However, the government will get money from the fishery licence fee, as the new rate will be applied to all the remaining fishing boats.

9) The people who will gain benefits from the overall process are the fishers who quit fishing and get compensation and have the choice of receiving benefits on a voluntary basis. On the other hand, the fishers who decided to continue their fishing careers will gain more profits from fishing more effectively.

10) Reduction of fishing boat numbers or fishing capacity helps preserve natural resources from destruction.

11) The compensation given to the boat owners is an investment in productive capacity in other work sectors.

Recommendations

1) According to the above concepts, we should purchase from the fishers their old fishing boats, mainly the inactive or almost inactive vessels, and the old boats with a high cost of maintenance or old engines. These boat categories should be purchased as a first priority.

2) Reinvestment in boats and the numbers re–entering the fishing industry must be controlled.

3) The capital and seepage effect must be controlled.

4) The financing programme to grant loans to both the fishers who decided to quit their fishing careers and the fishers who decided to continue working in the fishery field should be established.

Procedure for possibility of fishing capacity reduction

1) Decommissioned boats should be prevented from returning to the fisheries either by destroying them of using them to build artificial reefs.

2) The fishing licence fee has to be in line with the actual rental or profit, in order to use this money for natural resource management.

3) Use of fishing rights management, such as a personal quota system and rights to fish in particular fishing areas should be introduced.

4) A budget for a boat buyback scheme should be established with clear conditions to prevent return of boats into the fisheries.

5) Incentives for moving into other careers should be created by supporting a low interest rate loan in order to increase opportunities for the fishers.

6) Create motivation for alternative careers and for moving residence to other locations.

C. Reduction and Management of Fishing Capacity in the Gulf of Thailand: A Case Study of Anchovy Fishery in Songkhla Province

(Pairochana Saikliang)

A case study of zoning was conducted in Songkhla area on the anchovy fishery. The rule was that the fishing boats of different sizes had to conform strictly to the criteria that had been established. Fishing boats of less than 14 metres length were permitted to catch fish within the defined area and were under the control of the subcommittee.

Evolution of anchovy fishing in the Gulf of Thailand

The anchovy fishery before 1977

Before 1977, the fishers caught fish only in the daytime using set nets, press nets, and surrounding nets (but no purse seines) as their main fishing gear.

The anchovy fishery since 1977 to the present

After 1977, the fishers started to use the electricity generator with purse seines and other kinds of fishing gear, such as echo sounders and sonars. These tools were mainly used for the purse seine fisheries during 1978 and 1980. In the meantime the surrounding net (without purse seine), was also used for night-time fishing. The number of fishing boats increased from 14 boats in 1977 to 1 250 boats in 1985. The marine fishing census in 1985 found that there were only 62 boats purse seine boats. There were some fishing boats that used the attracting lights for anchovy fishing; these were squid-fishing boats with lights, modified to fish anchovy in some seasons. After a further 10 years, the number of fishing boats increased to 2 233 boats. This total consisted of 1 589 squid-fishing boats using cast nets, which were the modified boats able to catch anchovy in some seasons, 98 river-bank press net boats. In addition, the number of boats using falling nets, lift nets, and anchovy purse seine nets increased to 190 boats, because the squid-fishing boats with lights modified their fishing technique and fishing gear in order to catch anchovy fish. The number of anchovy purse seine boats also increased to 356 boats.

In 2000, the number of fishing boats that registered their anchovy fishing gear increased to 3166 boats made up of 778 boats using anchovy purse seine nets, 105 boats using anchovy lift nets, 403 boats using anchovy surrounding nets, and 1 880 boats using squid falling nets. These boats' fishing gear was mainly used to catch squid but in some seasons was modified to catch anchovy or to catch both anchovy and squid in the same night. In 2001, numbers of fishing boats that registered their fishing gear declined a bit. There was anchovy fishing gear on 2 904 boats, anchovy purse seines on 713 boats, anchovy lift nets on 84 boats, anchovy surrounding nets on 280 boats, and squid surrounding net on 1 824 boats; however, the actual numbers were higher than the registered numbers.

Situation of fisheries resources and the anchovy fishery in the Gulf of Thailand

Anchovy resources

Anchovy is a small size fish staying near the surface of the water. In Thai waters, there are 11 types of anchovy fish. In the Gulf of Thailand there are 10 types. The anchovy fish that is found the most is Encrasicholina heteroloba, at 86.8 percent. The main fishing area for anchovy fish before 1977 was in the end part of the Gulf of Thailand. The set net was mainly used to catch anchovy fish. Since 1997 the fishing area was extended to other areas. The fishers used surrounding purse seines both in daytime and at night, using attracting light in the eastern part of the Gulf of Thailand. Next, the fishing grounds for anchovy moved to southern part of the Gulf of Thailand and was extended to south of Songkhla province. The fishing gear used was the lift net, the surrounding net, and the anchovy lift net.

About 15 315 metric tonnes of anchovy were caught in 1971, and this increased to 50 000 metric tonnes in 1973. The main fishing area of that period was the inner part of the Gulf of Thailand and the main fishing gear was the set net. Anchovy caught in the eastern part of the Gulf of Thailand made up 20 percent of the catch; however, when the fishers used attracting lights, the anchovy caught in this part increased to 50 percent in 1979. The main fishing gear used then was the anchovy purse seine. Then, during 1980 and 1986, the anchovy caught in the eastern part of the Gulf of Thailand varied between about 8 722 – 94 774 metric tonnes, an average of 74.97 percent. Meanwhile, the anchovy caught in the inner part of the Gulf of Thailand was about 3 671 – 9 148 metric tonnes, an average of 20.90 percent. As we can see, use of the passive fishing gear type (the set net), in the inner part of the Gulf of Thailand, was reduced. The catching rate in the western upper part of the Gulf of Thailand was increased from 2 187 metric tonnes in 1987 to 60 541 metric tonnes in 1998 or 50 percent of the total catch. The anchovy caught in the western lower part of the Gulf of Thailand was increased from 1,338 metric tonnes in 1988 to 2 354 metric tonnes in 1995, an average of 2 percent of the catch. After that, the anchovy caught increased about 4.42 percent to 7.16 percent of the total catch. In 2001, the anchovy caught in the eastern part of the Gulf of Thailand, was 44.02 percent of the total anchovy catch, in the inner part it was 2.16 percent of the catch, in the west upper part 46.08 percent, and in the western lower part, 7.16 percent of the catch.

Anchovy fishery

The fishing gear used for anchovy catching in the beginning were the set net, surrounding net without purse seine, and day anchovy purse seine. The fishing was done at a sea depth of less than 20 metres. In 1977 there was a development in surrounding nets, converting to lighted anchovy purse seines, and the fishing area was extended. As this gear was prohibited by the fishing law, the fishers adapted their fishing method to the anchovy lift net in the first stage, and then changed to lighted anchovy surrounding net, which is used nowadays.

In the inner part of the Gulf of Thailand, the fishers used set nets. They used purse nets, day anchovy purse nets, lighted anchovy purse nets, lighted anchovy lift nets, and lighted anchovy surrounding nets in the East part of Gulf of Thailand. They used day anchovy purse nets, lighted anchovy purse nets, and lighted anchovy surrounding nets in the western upper part of the Gulf of Thailand. Fishers mainly used lighted anchovy surrounding nets in the western lower part of the Gulf of Thailand.

The numbers of fishing boats were in line with the quantity of the fish caught, which were increasing in the first stage; then the numbers declined due to the oil crisis, and then again the numbers increased. Besides, the lighted squid net, used with attracting lights, created a beneficial effect for the anchovy fishery. The registration of this fishing gear in the first stage, since 1980, was that a fishing boat would have one fishing licence for one fishing gear; however, in practice, the fishing boat could change or adjust the fishing gear to catch anchovy fish. Until 1997, registration of the fishing gear was separated in different laws. The numbers of squid surrounding nets were a bit reduced and were increased later. In the meantime, the Department of Fisheries tried to classify the anchovy fishing gear as a separate law, and asked the fishers to register accordingly. The classified types of anchovy fishing gear were: the surrounding net that generally was used in the main fishing areas which were in the east of Gulf of Thailand, covering Trad and Rayong, and the upper part of the Gulf of Thailand, covering Prachuap Khirikhan, Chumphon, and Surat Thani, and Songkhla: and the Anchovy lift net, which is still used in fishing in the eastern part of the Gulf of Thailand, especially in Cholburi province.

Maximum sustainable yield (MSY) and optimal number of fishing labourers

One reason for the rapidly increasing number of anchovy fishing boats was the use of attracting lights with purse seines, because the fishers copied this fishing technique to their chosen fishing method. The indication that we can see was the quick increase in days worked in fishing anchovy, from 14 000 days in 1982 to 70 000 days in 1990. As we can see, numbers of fishing boats or fishing tools increased more than 80 percent; however, the amount of fish caught was only 61.2 percent. These numbers reveal the extent of the anchovy resources problem. As the fishers moved their fishing locations outside or far away from the coastal area, this movement was a starting indicator showing that we were having problem for anchovy resource in the Gulf of Thailand, in the same way as for other natural resources.

Many sources evaluating the maximum sustainable yield of anchovy stock in the Gulf of Thailand indicated that the MSY was about 101 000 to 120 000 metric tonnes. The anchovy fishery has reached the maximum rate of fishing; as a result, we should reduce fishing labour from 25 to 30 percent, which will keep the MSY at about 100 000 metric tonnes.

Problems of anchovy fishing in Thailand

Apart from a rapidly increasing anchovy catch by fishers using new fishing techniques, another issue was that the consumption of anchovy was changing. In the past anchovy was used in grade A fish sauce manufacturing. Thus, price of anchovy fish depended on demand of these factories as to how much fish was required for their fish sauce.

Since 1980, anchovy were used for more added value products such as boiled fish, dried fish, and ready-to-eat dried fish, which were produced in greater quantity. As there was high market demand for anchovy, the demand for fresh anchovy was accordingly high. As a result, the price for anchovy increased from 3 to 4 Baht per kilogram to 8 Baht per kilogram or even as high as 20 Baht per kilogram for some time, depending on the size of the fish. This high price was the main motivation for the fishers to develop their fishing gear and techniques to catch anchovy in order to meet the market requirements.

Actions carried out on anchovy fishery

1) A notification of the Ministry of Agriculture and Cooperatives issued on 13 January 1976 – banning of all types and all sizes of fishing tools for fishing in the area of 3000 metres from Koh Tao Island, Surat Thani province.
2) A Notification of the Ministry of Agriculture and Cooperatives issued on 5 November 1981 - setting the mesh size that is used with an electricity generator to fish squid using attracting lights; the squid surrounding net should have a mesh size of 3.8 centimetres; it is unlawful to reduce the mesh size further.
3) A Notification of Ministry of Agriculture and Cooperatives issued on 14 February 1983 - setting a mesh size of 2.5 centimetres for use with an electricity generator; however, this regulation was not put into effect.
4) A Notification of the Ministry of Agriculture and Cooperatives issued on 24 January 1985 – banning of all types and all sizes of purse seine used with an electricity generator to fish in some fishing areas in Trad province in 1985.
5) A Notification of the Ministry of Agriculture and Cooperatives issued on 14 November 1991 - banning the use of purse seines with the mesh size less than 2.5 centimetres to catch fish at night.
6) A Notification of the Ministry of Agriculture and Cooperatives issued on 15 March 1996 - setting a mesh size used with an electricity generator to catch fish. The good result of this regulation is that it creates an exception on lift net and anchovy

lift/surrounding nets using light since this notification allows use of these nets in fishing boats of less than 16 metres length.

Regulation of anchovy fishing at present

1) A Notification of the Ministry of Agriculture and Cooperatives issued on 24 September 1999 - banning the use of some fishing gear in the spawning period and the period when the fish are young in Prachuap Khirikhan, Chumphon, and Surat Thani.
2) A Notification of the Ministry of Agriculture and Cooperatives issued on 1 February 2000 – setting the programme for the fishers who used anchovy nets to register and apply for fishing licences.
3) A Notification of the Ministry of Agriculture and Cooperatives issued on 1 February 2000 - requiring the use of one type of fishing gear for a specific type of catching.
4) A Notification of the Ministry of Agriculture and Cooperatives issued on 1 February 2000 - control of anchovy mesh nets.
5) A Notification of the Ministry of Agriculture and Cooperatives issued on 10 February 2000 - banning the of use of some fishing gear to do some types of fishing in the spawning period and the period when the fish are young in Prachuap Khirikhan, Chumphon, and Surat Thani, according to the fixed period (edition 2)
6) A Notification of the Ministry of Agriculture and Cooperatives issued on 6 October 2000 – establishing control of mesh sizes used with an electricity generator to catch fish (edition 2)
7) A Notification of the Ministry of Agriculture and Cooperatives issued on 23 March 2001 – banning of lift nets and anchovy falling nets used with an electricity generator to catch anchovy in 2001.

Results of controlling of the anchovy fishing area in Songkhla

Anchovy fishing before the control of fishing area

During 1997-1998, before the notification about zoning areas was announced, the distribution of fishing boats depended on abundance of anchovy resources and the monsoon period (May-October). Thus, there were many fishing boats in the area that had abundant resources. It should be noted that at the beginning and the end of the monsoon period, that is May to October, there was a large quantity of powder fish, especially sardine which comprised 25 percent of the fish available; about 1 000 kilograms of anchovy was caught per night. About 300-400 kilograms per night was caught in the coastal area or close to the coastal area, while more was caught outside the coastal area. This statistic shows that anchovy fish could be found both in the coastal area and outside the coastal area.

Anchovy fishing after the announcement of fishing area control

The problem that arose with the extension of the fishing area from the East to the South, was that a conflict arose between the fishers moving in, and the local fishers, and became the root cause of the problem in the anchovy fishery. The seriousness of the conflict continually increased until 1996, when a resolution from the board of national fishery policy agreed to set up Songkhla as an example area for a case study of anchovy fishery using a zoning system with the following details:

1) Area 1, within 5 nautical miles, would be used for local fishery.
2) Area 2, within 5 – 12 nautical miles, would be used for falling nets and anchovy lift nets, with the boat size of not more than 14 metres in length.

3) Area 3, within 12 –15 nautical miles, would be used as a Buffer zone.

4) Area 4, within or more than 15 nautical miles, would be used for falling net and anchovy lift nets, with the boat size of not more than 16 metres in length.

Result of Songkhla Zoning Area Project, as an example anchovy fishery management

In the first year 200 boats joined the programme. This increased to about 300 boats and continued to increase. In addition to the setting of fishing zones, the number of fishing boats should be limited to an exact number. The result of this study revealed that if the project can clearly fix numbers of fishing boats for the period of 2 – 3 years, the catch amount could be clearly defined accordingly. However, even if numbers of boats were later increased, there was an indicator showing some degree of control. This is especially important in the coastal area which had a catch rate of about 381 kilograms per boat per day in 2001, declined to 308 kilograms per boat per day in 2003. Outside 15 nautical miles, the catch rate was increased from 1 054 kilograms per boat per day in 2002 to 1 062 kilograms per boat per day in 2003. There were 170 boats with a length of less than 14 metres using anchovy falling nets in 2001, and 250 such boats in 2003. This data showed that an increasing number of the anchovy fishing boats in the 5 – 12 nautical miles zone caused damage to natural resources in the costal area. The number of anchovy fishing boats in the project area should not exceed 170 – 180 boats; however, numbers of fishing boats fishing outside the 15 sea miles may increase. Another indicator was that before the setting up of zoning in 1997 and 1998, catch rate in the 5 – 10 nautical miles zone was 480 kilograms per boat per day. Then the study in 2001-2003 showed that there were 170 anchovy fishing boats. The catch rate was reduced from 380 kilograms per boat per day to 340 kilograms per boat per day, and to only 300 kilograms per boat per day when the numbers of boats increased to 250 boats. According to the fishing outside 15 nautical miles, using the study conducted in 1997 and 1998 showed that in the 15 – 20 nautical miles zone, the catch rate was 700 kilograms per boat per day. In addition, the study conducted in 2002 and 2003, showed the catch rate of 1000 kilograms per boat per day. According to the research studies, if we did not set up the zoning programme, most of the anchovy fishers will fish in the coastal area since they can save the cost of fuel. As there will be a lot of fishing boats fishing in the coastal area, the marine resources will be reduced rapidly. In the meantime, since 2000, some groups of fishing boats, especially the big size boats, were pushed to fish outside the coastal area. As a result, the fishing labour was distributed to other fishing areas. This ensured fairness to both small size and big size fisheries. The first stage is setting zones and managing fishing labour by removal to other areas. In the end, this practice will reduce the number of fishing boats in the future and will also address the situation of natural resources in the future as well.

Presentation III: Case study of Vessel Buy Programme (VBP)

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The fishing industry today is making excessive production over the support level of natural resources. For the sake of macro growth, economic policy encourages such over fishing, leaving the natural resources exploited and deteriorating.

Today's fishing technology outgrows the natural resources all over the world. Overall value in the industry is very high.

A Vessel Buy Programme is a way to cut the fishing production capacity, in which the number of vessels is a key factor.

Objectives of VBP

- To provide economic assistance to individual fishers and regions.

5) To decrease exploitation of marine life and cut ineffective fishery production.

Factors affecting VBP

Factors taken into consideration in vessel buy programme are as follows:

- Cost of individual assets and social costs.
- Decrease of the effectiveness in utilizing the production costs of fishing.
- Effectiveness of catch and production procedures.
- Difficulties in setting indicators of effective performance of VBP in decreasing number of vessels.
- Handling of bought vessels, for example, if they should be exported as used goods.
- Financial return to vessel owners.
- Technological advancement.
- Disinformation that probably leads to making wrong decisions or immoral practice against social ethics, for example, negligence to pay back loans.
- What exactly is to be bought back, vessels or licences.
- Changes in labour use in the fishing industry and their appropriateness.
- Whether benefits are well allocated and fair practice.
- Effect of decreased fishery production on non-economic indicators.
- Whether the vessels not bought back in the programme make asset values higher than the capital cost in building the vessels.
- Whether the benefits incurred covers the cost of quality control and research.

Criteria in evaluating VBP

Preservation of marine life resources

VBP will decrease death tolls of marine life. A system is required to control and monitor the suppression of fishery production.

Conflict eased

To buy back vessels will lessen number of those in the business and reduce competitiveness among fellow fishers. This will also help ease the traffic at the docks and ports.

Benefits and expenses incurred

The benefits and expenses depend on factors such as what kind of vessels to buy. To buy large vessels that catch for industrial purposes will render more significant benefits than to buy small local boats that fish near the coast, because operational costs to control small boats are higher. If there are less large vessels, it will also be more possible to maintain and preserve the natural resources at sea while sharing the waters with local small fishing boats.

Management cost

Management costs include, conducting surveys, planning, public hearings, revising, implementing, controlling, monitoring and evaluating plans and activities. Most of the cost is not incurred from the VBP except that of controlling and monitoring. To lessen number of vessels will cut the cost of management as above.

Better use of capital and produce and better processing

In the past, the season to catch halibut was restricted in North America. A large number of vessels flocked in to catch as many fish as possible causing many accidents and high death tolls at sea. Plenty of fish were frozen for all-year supply whereas fresh fish was available only in the season of catch.

When new management was introduced, the fish were caught as per demands of consumers and were of better quality. This cuts the cost in processing the produce and can successfully control the production.

Flexibility of fishers and management team of natural resources

Vessel Buy Programme is a way to control the use of resources yet has limited effect on production control. This depends on whether the cost of changing is the sole responsibility of the licensee fishers or shared by the public. Another way to limit quota is to subcontract the fishing season.

Countries that use Vessel Buy Programme (VBP)

Surface fish catch in Canada

The VBP was a strategy to manage the surface fish catch in the Atlantic, using Canadian $1.9 billion and lasting five years. Another $ 60 million was spent in a determination

programme of vessels to suppress production in fishery, and pushing the men to other professions. The target was to permanently decrease by 50 percent the surface fish catch.

About $ 29.3 million was spent in buying back vessels along the Newfoundland coast, making this the highest budget spent in the project. This round of buy decreased the fishery capacity by 10 percent. In the fourth round of buyback, vessels with drag nets were decreased by 35-40 percent, while leaving the problems unresolved. Success depends on how well relevant measures are enforced.

Denmark buying back vessels with drag nets

During 1987-1991, the VBP cut 667 vessels out, making a 22 percent decrease in the gross tonnage. Thirteen per cent, or 7 of the bought vessels, were of over 100 gross tonnes. Mainly, the vessels in a poor condition were bought back leaving those with higher effectiveness in use.

VBP was subject to a 50 percent tax deduction; so those in heavy debt saw no incentives in the programme. Therefore, the programme failed to cut the production capacity in fishery.

VBP in the Netherlands

Three kinds of vessels were bought back. They were: 1) Vessels with drag nets and large freezing containers that catch surface fish; 2) Those with drag nets that catch sea floor fish; and, 3) Those with flat and double drag nets.

Types 2 and 3 were able to switch the tools and considered as near coastline vessels. The Netherlands used engine size as the indicator of the fishery production capacity.

During 1987-1993, the engine size of near coastline vessels was cut by 20 percent but did not help decrease the entire catch because the rest of the vessels at sea maintained the engine horse power. On the contrary, the entire engine size was increased and the duration of catch was prolonged at double the rate. Seven vessels with freezing containers and drag nets were sold to developing countries and replaced by even larger vessels at home. The buy back programme encouraged determination of old vessels but, at the same time, pushed for an increase of vessel capacity which was a negative result of the programme.

Catch by purse nets in Norway

The catch in Norway is done mostly on the surface. The government sponsored the VBP with an approximate 230 million NKr budget. Expected return was about 40 million NKr per year.

The total capacity of 1977 was cut 8.22 percent when 67 vessels were bought back and terminated. The benefit from the programme outweighed the operational cost as a result of methods in estimating total revenue and other benefits from cutting costs. An increased profit gained by the rest of the vessels in use covered the expenses in the VBP. The vessels worked to the maximum quota yet did not spoil the natural resources at sea. The programme was proven to help distribute economic benefits from taxpayers to the owners whose vessels were bought back.

Fishery in USA

A federal fund was established to diminish the loss and deterioration of marine natural resources, and provide economic benefits to fishers and localities. For the past ten years, a

budget of over $ 200 million has been spent in solving problems in the fishery industry as follows.

- The VBP succeeded in decreasing the catch of fish on the sea floor of the Bering Sea. The natural resources were restored and the reproduction rate went up 25 percent. Communities were involved in managing the fishery profession and the natural resources.

- The VBP and relevant measures to control vessels helped preserve crab population at Geyser Bay.

- In early 1990s, there was over investment in fishery and it was vital to decrease the production capacity of the fish species living on the seabed in New England.

- In Northwestern Pacific, licences to catch salmon were widely subcontracted without accurate records on market prices.

- Lobsters in Texas, USA, has specifications for lobsters imported from Canada. Any sizes smaller than specified standards would be rejected. However, all the sizes imported from Canada were accepted by Japan. This caused conflicts and arguments among the countries.

Analyses on seabed fish in New England, salmon in Washington and pollock in Bering Sea say that success in decreasing fishery production in the long term depends on whether new entrants or re-entrants to the profession are suppressed, and if the rest in the business increase investments.

Results and concerns of VBPs

- Planners should be aware that unexpected consequences are possible in the long run.
- VBP will provide for natural resources preservation and benefit the remaining vessels only when supported by effective control of the vessels in use.
- Can work well with a management system that maintains major concerns on rights management, for example that of transferable individual quota, zoning licences and relevant rights of the localities.
- Mostly works in a way to solve problems already arising, rather than to prevent issues, especially the matter of over catching.
- VBP affects ownership and responsibilities over the disposal of bought vessels; vessels should be demolished to avoid extra burden in fishery management.
- VBP is not applicable to reducing poverty because the programme generates no jobs or income.

VBP when conducted with no concern for rights

- Has insignificant effect when targets of buy are legally registered vessels.
- Fails to decrease catch capacity in the end, though it seems to succeed in the beginning.
- Fails to decrease input to the target because it is still possible that the rest of vessels develop their capacity of catch to compensate for the bought back vessels.
- Encourages advancement of capacity of the rest.
- Naturally pushes for an increase of input in many forms that triggers a technological advancement of the vessels. Inflation also causes an economic drawback.

VBP when conducted alongside rights-concerned management focusing on controlling output

- The output is to be controlled to fairly allocate benefits among parties concerned; VBP should bear a major concern for fair benefit sharing.
- VBP helps promotes natural resources preservation and economic benefits of the fleet.

VBP when conducted alongside rights-concerned management focusing on controlling input

- The input is to be controlled to fairly allocate benefits among parties concerned.
- VBP possibly promotes natural resources preservation if the rest of vessels in use are managed effectively.
- VBP may affect good governance and enforcement of organizational regulations.
- VBP requires continuous involvement of communities to effect law enforcement and ensure public obedience.
- Input stuffing or transfer of rights and subcontract of licensed catch time that conflicts with another may result in the following.
- Technological advancement for catch activity.
- Inflation that results in economic drawback.
- Lessened use of rights. Refer to information on rights to buy back vessels and relevant laws.
- Number of vessels and area of specified waters indicate wealth in the profession but that may cause unequal profit sharing.
- Natural resources preservation and better economy.
- Success of the 48-day halibut catch restriction by the management project of halibut in the Pacific Ocean.
- Ensured continuous practice of good governance, community involvement and effective enforcement of the law.

Presentation IV: Individual Transfer Quota System

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Quota system is based on total revenue of fishing business and number of days at sea. In the past, it was prohibited to transfer quota, but today a transfer is possible between different kinds of fish regardless of quantity of fish, but considering number of days at sea instead. This accounts for the kinds of fish living on the sea bottom.

Operation by community means to assign quota to a community rather than to individuals. This practice needs good management. In the USA, cooperatives make the system work. It is not for government officials to take the role of controller and supervisor. The working practice is to set the random period of fishing at 6 weeks. However, Thailand has the problem of a limited budget making it impossible to enforce the random period.

Case study of management of halibut in the Pacific Ocean

Halibut is a large sea bottom feeder Pacific species weighing up to 200 kgs and living up to 40 years. The majority of fish found range between 8 to 15 years old, and weigh 4.5-45 kgs. Their habitat is at 100 m. sea depth. Fishing equipment is tackle and bait.

Background and market information

Halibut in the Pacific Ocean had been virtually extinct since the beginning of inter-trading with Eastern America in the late 19th century. A control measurement was later announced by way of market control. In 1920, frozen halibut, among other fish, was over-consumed, causing excessive halibut fishing. The failure to reduce overfishing was partly due to a low awareness of the importance of promoting fish stock preservation.

Initial stage of fishery resources preservation during 1923-1980

Ten per cent of the Canadian fisheries industry fished halibut in the USA's Alaskan marine territory, causing conflicts between the two countries in 1923. They co-founded the International Pacific Halibut Commission in 1970 to control halibut fishing. This failed to control the competitiveness in the industry, causing even more fishing.

Records of halibut fishing control between 1928-1960 say a target was set to maintain a long-term biological mass of halibut. Studies by Gordon in 1954 and James Crutchfield and Arnold Zellner in 2003 followed the model for the biological mass preservation of halibut fish. However its objectives failed, as the model caused a deficit in the return on investment.

Investment should result in the balance of accounting. The money should be spent in a way to preserve natural resources and create maximum return on investment. For best economic results, there should be no excessive deployment of resources – as, for example, by putting crew on non-stop duty during the 48 hours allowed for halibut fishing

The 48-hours restriction made it more competitive to fish the largest volume of halibut. Thus employers put more crewmembers on duty and reduced the time in releasing the fish from the hook and attaching new bait. This resulted in an increase of the fish death toll by leaving the less valuable or smaller fish in the sea instead of drawing the rods on board for proper

procedures. This resulted in a waste of natural resources, immoral practice in the profession, and labour shortages.

The fish were sold either fresh or frozen. Fresh fish should be sold at good price, higher than the frozen ones, simply because of their freshness; and consumption of fresh fish should discourage an excessive fishing business to produce a large stock of frozen fish. Frozen fish should be priced lower, as this form of product does not promote the preservation of natural resources.

During 1980-1995, Canada announced an Individual Quota Programme and Individual Transfer Quota (ITQ). This proved a success in 1991, and hence became a model for many other countries.

In the USA in 1990, the Alaskan fishers had a low production because of the enforcement of the national strategic management (plan) during 1980-1995. In 1995, the Individual Fishing Quota, IFQ, was introduced and again was successful, making it a model for many other countries.

Advantages of IFQ

- Enables the preservation natural resources.
- Creates safety of life and property at sea.
- Fresher fish and a higher sales price with minimal waste.
- Increases in the price of fishing boats.
- Decreases in illegal fishery and demand for crew, and an increase in capital investment.
- Increases in government tax revenues, meaning higher pensions for retired fishers.

Questions and answers from participants in the seminar

- *Halibut fishing in the Pacific Ocean is allowed only for 48 hours a year. How would the fishers make a living during the rest of the year then?*

  Dr Gates:

  In the past, when halibut fishing was unlimited, the fish came near to extinction. There must be some kind of measurement set to prevent excessive fishing and ensure good production quotas. First, a fishing season was set but it failed to reduce the over fishing. Then the 48 hours a year restriction was introduced and it turned out successfully. Thailand should learn from that example and adapt it to meet the present situation.

- *Does the restriction conflict with the law at all?*

  Dr Gates:
  It depends on the enforcement of the law. The consideration is based on quota. Since in use, the restriction has seen no violations.

SUMMARY OF GROUP DISCUSSIONS

Group I: Trawl and Push Fisheries

Trawl Fisheries

Approaches	Guidelines	Measures	Remarks
1.Control number of boats using trawl	1. Use database of vessels categorized by tools dated December 31, 2003. Fishery Department and organizations involved ensuring that the number of boats in the database is accurate.	1. Register unlicensed boats into the system and they are subject to a fine against the boat size. 2. Enforce rigid penalty on non-licensees with overdue registration period, confiscate the boats and tools, and destroy them. 3. Prohibit building new vessels of all kinds. 4. Licensees who violate regulations and restrictions stated in their licences are subject to termination of the licence and confiscation of the boats. 5. Building new vessels is possible only on approval of the government committee in the province chaired by the Governor or assigned authority, and composed of officials from Department of Waterways Transportation, Provincial Industry Organization, local fishery association, Fishery Department and other parties involved. 6. Revise the system and format of licences to resemble a car licence and require that an extension is made 90 days prior to expiry date. 7. Revise licence fees in respect to types of boats and fishing tools as appropriate.	For the management plan for marine fishery production to get results, responsible organizations must be effective and efficient in putting the plan into practice.
2. Decrease number of vessels.	1. On voluntary basis. 2. Given incentives by the government.	1. Buy back vessels with dragging nets from willing fisher. 2. Set government fund from 1 percent of export value of marine produce and from the budget on building artificial corals to create jobs for localities.	

Approaches	Guidelines	Measures	Remarks
3. Zoning	Specify fishing zones	1. Set a 3,000 metre from the shoreline and restricted area in accordance with relevant regulations and law. 2. Allow the use of flat dragging nets beyond the 3,000 metre line and double dragging nets beyond 6,000 metre line.	
4. Collecting data on quantity of catch for use in estimating marine resources.		1. Suggest that Thailand Fishery Association put local fishery associations in charge of conducting data collection and be responsible for expenses incurred. 2. Motivate fishers to cooperate in giving reliable data for study purposes.	

Pushnet Fisheries

Approaches	Guidelines	Measures	Remarks
1. Control number of boats using pushnets.	1. 1. Use database of vessels categorized by tools dated December 31, 2003. Fishery Department and organizations involved ensuring that the number of boats in the database is accurate.	1. Register unlicensed boats into the system and they are subject to fine against the boat size. 2. Enforce rigid penalty on non-licensees with overdue registration period, confiscate the boats and tools, and demolish them. 3. Prohibit building new vessels of all kinds. 4. Licensees who violate regulations and restrictions stated in the licence are subject to termination of the licence and confiscation of the boats. 5. Building new vessels is possible only on approval of the government committee in the province chaired by the Governor or assigned authority, and composed of officials from Department of Waterways Transportation, Provincial Industry Organization, local fishery association, Fishery Department and other parties involved. 6. Revise the system and format of licences to resemble a car licence and require that an extension is made 90 days prior to expiry date.	For the management plan for marine fishery production to get results, responsible organizations must be effective and efficient in putting the plan into practice.

Approaches	Guidelines	Measures	Remarks
		7. Revise licence fees in respect of types of boats and fishing tools as appropriate.	
2. Decrease number of vessels.	1. On voluntary basis. 2. Given incentives by the government.	1. Buy back vessels with dragging nets from willing fishers. 2. Set government fund from 1 percent of export value of marine produce and budget on building artificial corals to create jobs for localities.	
3. Zoning		1. Allow fishing beyond 3,000 metre line only, except that purse nets catching koey-shrimps are allowed within the 3,000 metre line but must abide by the requirements of Fishery Department on seasons, boat size, pushnet pipes and engine size. 2. Require amendments of pushnets in areas where most applicable to set example for other areas.	Should call for a meeting to settle conflicts about usage of pushnets in Pattani Province.
4. Collecting data on quantity of catch for use in estimating marine resources.		1. Suggest that Thailand Fishery Association put local fishery associations in charge of conducting data collection and be responsible for expenses incurred. 2. Motivate fishers to cooperate in giving reliable data for study purposes.	

Group II: Anchovy Fisheries

Approach	Actions	Responsible units
1. Set up systematic record filing of fishery production.	1. Survey and collect data of marine life components from Ka-Tak fishing boats. 2. Record all data collected from the fishing boats. 3. Require that each fishing boat keeps operational records and background. 4. Promote awareness and understanding of fishers on the requirements above.	1. Fishery Department 2. Fishers and their employers submit the information to the Department. Pilot projects are done in Chumporn and Songkhla Provinces and the format of submitted information is to be revised. The Department officials are stationed on site to assist in the data collection. 3. Fishers 4. Fishery Department and other relevant units concerned.
2. Inspection of number of fishing boats in operation each year.	1. Operators of legal fishing boats who want to relocate to inform the association in which they have membership. The association forwards the list to the fishery association requested who will inform the Provincial Fishery Association in their province. If inapplicable or the requesting operator does not belong to an association he/she will inform the Provincial Fishery Association at their home base. 2. In case of illegal fishery operations, the Fishery Department will require responsible units to enforce rigid measures against the violators. Local committees for fishery will be officially appointed in the future.	1. Fishers, Fishery Associations and Provincial Fishery Office 2. Fishery Department and official local committees for fishery in each area.
3. Approval to issue licence.	1. Licence is to be extended each year. Extension is required 90 days prior to expiry date. Late application for extension is subject to fine and must be accompanied by the official records of the fishing boat. 2. Licence format is to be revised to resemble a driving licence.	1. Fishery Department 2. Fishery Department

Approach	Actions	Responsible units
4. Fishing zoning.	1. Zoning requirements remain as per the Announcement of Ministry of Agriculture and Cooperatives dated 23 March B.E. 2544 and the regulations of responsible provincial committees. 2. Set quota of number of fishing boats in each area on the criteria of academic principles and community participation.	1. Fishery Department 2. Local Committees for fishery in each area.
5. Reduction in number of fishing boats.	1. Maintain the latest number of registered boats for a certain time. Reduce excess fishing by educating targeted group with academic information and enforce measurements to control seasonal fishing and reduce the number of boats on voluntary basis or collect additional fees to discourage new comers, prohibit building new boats and promote buying back. 2. Enforce valid measurements to guarantee controllable management	1. Fishery Department 2.Fishery Department
6. Quality control of licensees and their fishery businesses.	1. Approve principles to control quality of boats and fishing tools and be prepared to consider details and methods of fishing. 2. Ensure that fishing nets meet regulations specifying size of mesh as per the Announcement of Ministry of Agriculture and Cooperatives dated February 1, B.E. 2543	1. Fishery Department 2. Fishery Department

FAO FishCode Reviews

1 Pintz, W.S. Tuna and bottom fishery licence management: Tonga. *FAO/FishCode Review*. No. 1. Rome, FAO. 2003. 35p.

Fish are now the largest single export from the Kingdom of Tonga. However, expansion of the industry faces severe infrastructure constraints, and granting substantial numbers of new longline licences without resolving the constraints could seriously affect all Tongan commercial fisheries.

2 Gillett, R. Aspects of fisheries management in the Maldives. *FAO/FishCode Review.* No. 2. Rome, FAO. 2003. 61p. (*Restricted distribution)*

The inshore marine resources of the Maldives, an atoll environment, are being increasingly exploited for baitfishing, food for local residents, consumption by tourists, exports and non-extractive uses such as dive tourism. This situation must be reconciled with the limited nature of the resources.

3 Die, D.L.; Alió, J.; Ferreira, L.; Marcano, L.; Soomai, S. Assessment of demersal stocks shared by Trinidad and Tobago and Venezuela. *FAO/FishCode Review*. No. 3. Rome, FAO. 2004. 32pp.

The FAO/WECAFC Workshop on assessment of demersal stocks shared by Trinidad and Tobago and Venezuela (2002) initiated an assessment of the shrimp stocks shared by the two countries. The main conclusion of the assessment is that some shrimp stocks are being severely overfished and are suffering as a result.

4 Gillett, R. The marine fisheries of Cambodia. *FAO/FishCode Review.* No. 4. Rome, FAO. 2004. 57p.

Excess fishing effort and associated declines in abundance of target species are the most serious problems facing Cambodia's marine fisheries: resource sustainability will require restrictions on resource access.

5EN FAO/FishCode. Seminar on responsible fisheries management in large rivers and reservoirs of Latin America. *FAO/FishCode Review*. No. 5. Rome, FAO. 2004. 72p. [En]

This report of the Seminar on Responsible Fisheries Management in Large Rivers and Reservoirs in Latin America (2003), attended by experts from member countries of the Commission, observers from other regional bodies and representatives from local fishing communities in El Salvador, presents the principles of responsible fishery management in Latin America as well as a selection of national reports.

5SP FAO/FishCode. Seminario sobre ordenación pesquera responsable en grandes ríos y embalses de América Latina. *FAO/FishCode Revista.* No. 5. Roma, FAO. 2004. 78 p. [Sp]

El Seminario sobre ordenación Pesquera Responsable en Grandes Ríos y Embalses de América Latina (2003) se efectuó en San Salvador en asociación con la novena reunión de la Comisión de Pesca Continental para América Latina (COPESCAL). Participaron expertos de países Miembros de la Comisión ; observadores de otros organismos regionales y representantes de comunidades pesqueras locales de El Salvador. Se presentaron dos documentos sobre los principios de la ordenación pesquera responsable en grandes ríos y embalses en América Latina y una selección de informes nacionales.

6 Swan, J. National Plans to combat illegal, unreported and unregulated fishing: models for coastal and small island developing states. *FAO/FishCode Review.* No. 6. Rome, FAO. 2003. 76p.

These case studies for use in FAO regional and subregional workshops were prepared in accordance with the FAO International Plan of Action to Prevent, Deter and Eliminate IUU Fishing. The "Republic of Galactia" and the "Alpha Islands" are fictitious, but the fisheries profiles presented draw on typical existing circumstances.

7 Kuemlangan, B. Creating legal space for community-based fisheries and customary marine tenure in the Pacific: issues and opportunities. *FAO/FishCode Review.* No. 7. Rome, FAO. 2004. 65p.

The laws of Pacific Island countries generally support traditional fisheries management with only modest efforts to encourage the use of customary marine tenure-based community fisheries management. Government commitment for the role of customary marine tenure in community-based fisheries management, with support from interested stakeholders, will complement efforts for promoting sustainable utilization of fisheries resources and improved livelihoods in the Pacific region.

8 FAO/FishCode. Report of the Workshop on Development of a Management Plan for Tomini Bay Fisheries, Indonesia. *FAO/FishCode Review.* No. 8. Rome, FAO. 2004. 31p.

Tomini Bay fishery resources are still considered to be underexploited, but annual catches have increased dramatically over the past ten years. In the absence of a fisheries management body, The FAO/Government of Indonesia Workshop on the Development of a Management Plan for Tomini Bay Fisheries (2003) provided a starting point for addressing responsible fisheries issues and laying the groundwork for a fisheries management plan.

9 FAO/FishCode. Report of the National Conference on Responsible Fisheries in Viet Nam, Hanoi, Viet Nam, 29–30 September 2003. *FAO/FishCode Review.* No. 9. Rome, FAO. 2004. 94p.

This national conference was organized in the context of increasing problems faced by Vietnamese fishers in maintaining and improving their livelihoods through coastal and offshore fisheries; some coastal fish resources in particular are being heavily over-exploited.

10 Stanley, J. Institutional review of the National Fishing Corporation and the Fisheries Department of Tuvalu. *FAO/FishCode Review.* No. 10. Rome, FAO. 2004. 47p. (*Restricted distribution)*

The economic growth and development of Tuvalu depend on its marine resources and especially its relatively rich tuna resources. Although the primary concern of the government is the sustainable economic development and management of tuna, there is also potential for the development of other marine products, particularly deep bottom fish.

11 García Mesinas, A. Lineamientos para un Código de Ética de Pesca y Acuicultura para El Salvador. *FAO/FishCode Revista.* No. 11. Roma, FAO. 2004. 59p. [Sp] (*Restricted distribution)*

Este documento presenta los resultados de un proyecto llevado a cabo a través del Programa FishCode de la FAO a petición del Gobierno de El Salvador para desarrollar los lineamientos a nivel nacional del Código de Ética de la Pesca y Acuicultura. El trabajo se realizó coordinado a través de la Oficina Regional de América Latina (RLC) y la Representación de FAO de El Salvador.

12 FAO/FishCode. Report of the National Workshop on the Code of Conduct for Responsible Fisheries and its practical application to coastal aquaculture development in Viet Nam. *FAO/FishCode Review.* No. 12. Rome, FAO. 2004. 47p.

The National Workshop on the Code of Conduct for Responsible Fisheries and its Practical Application to Coastal Aquaculture Development in Viet Nam took place in Hué from 3 to 4 October 2003. The Workshop aimed to build awareness among national and provincial stakeholders about the need to develop and implement an Aquaculture Code of Conduct for Viet Nam. Coastal aquaculture in Viet Nam, particularly shrimp culture, has developed rapidly in recent years. Although shrimp farming has brought many benefits to coastal communities, it is associated with high social and environmental risks.

For further information, or to obtain copies, please contact:

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fishCODE

The FAO Programme of Global Partnerships for Implementation of the Code of Conduct for Responsible Fisheries

The National Seminar on the Reduction and Management of Commercial Fishing Capacity in Thailand took place from 11 to 14 May 2004 in Cha-Am, Thailand. Participants included senior officials from the Department of Fisheries and other relevant Government departments, representatives of associations of the commercial fishing industry, leaders of small-scale coastal fishers, national and international resource persons and representatives of bilateral and multilateral agencies.

The marine capture fisheries sector is more capital intensive than is appropriate for Thailand's resource endowment, and there is an urgent need for fishing capacity reduction for improved fisheries management and protection and conservation of fish habitats and other threatened coastal resources. Failure to achieve this will have serious consequences for the most vulnerable people in coastal communities, fish consumers and society at large.

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