

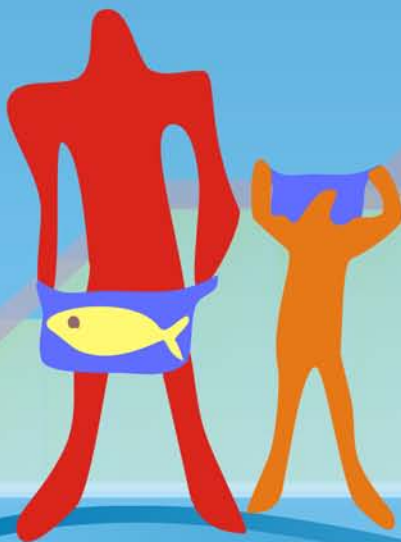


Association of Southeast  
Asian Nations



Southeast Asian Fisheries  
Development Center

# Regional Guidelines for Responsible Fisheries in Southeast Asia



**SUPPLEMENTARY GUIDELINES  
ON CO-MANAGEMENT USING GROUP  
USER RIGHTS, FISHERY STATISTICS,  
INDICATORS AND FISHERIES REFUGIA**

THE FOLLOWING PAGES HAVE BEEN EXTRACTED FROM THE ASEAN-  
SEAFDEC REGIONAL GUIDELINES ON RESPONSIBLE FISHERIES IN  
SOUTHEAST ASIA

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Part D  
REGIONAL GUIDELINES  
ON THE USE OF FISHERIES REFUGIA FOR CAPTURE  
FISHERIES MANAGEMENT IN SOUTHEAST ASIA

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REGIONAL GUIDELINES  
ON THE USE OF FISHERIES REFUGIA  
FOR CAPTURE FISHERIES MANAGEMENT  
IN SOUTHEAST ASIA

## Background

There are very few binding and non-binding international instruments addressing fisheries issues in Southeast Asia perhaps the most significant of which is the FAO Code of Conduct for Responsible Fisheries, to which most Southeast Asian countries are signatory and which provides guidance regarding the minimization of bycatch, the use of environmentally friendly fishing gear, and the creation of institutional arrangements for fisheries management.

International concern for overexploitation of fisheries resources and environmental problems caused by fishing practices, resulted in the 1992 Declaration of Cancun calling upon the Food and Agricultural Organisation of the United Nations (FAO) to develop an International Code of Conduct for Responsible Fishing. At the same time, FAO had identified a need for a guiding mechanism for use in closing the gap between government resolutions at the international level and effective implementation at the national level. In response, the Conference of the FAO adopted the 1995 Code of Conduct for Responsible Fisheries (CCRF). The CCRF is global in scope, consistent with relevant fisheries related instruments, applicable to all fisheries (including aquaculture) and voluntary in nature, being a non-binding international instrument. It provides principles and standards applicable to the conservation, management and development of all fisheries. These include:

- The conservation of aquatic ecosystems,
- Sustainable utilisation,
- The prevention of overfishing and excess fishing capacity,
- The use of the best scientific knowledge,
- The application of the precautionary approach,
- The use of selective and environmentally friendly fishing gear and practices,
- The maintenance of biodiversity and aquatic ecosystems,
- The protection of critical habitats in marine ecosystems,
- The strengthening of flag state control of fishing vessels, and
- Cooperation at sub-regional, regional and global levels.

Since adoption of the CCRF, the FAO has prepared a series of technical guidelines providing direction for the implementation of the code at the regional and national levels. These guidelines cover specific areas of the substantive articles of the Code, including fisheries management, fishing operations, the precautionary approach, the ecosystem approach to fisheries, sustainability indicators, and illegal, unreported and unregulated fishing. The CCRF also prescribes for the establishment of voluntary international plans of action (IPOAs) to deal with specific fisheries issues.

## ASEAN-SEAFDEC Regional Guidelines for Responsible Fisheries in Southeast Asia

Effective implementation of the CCRF in Southeast Asian fisheries may enable the development of sustainable fisheries, although requires that sufficient consideration be given to the unique fisheries and issues that exist within the region. This is especially the case for the multi-species coastal and small-scale fisheries that are of central importance to the livelihoods and food security of most coastal communities, and for which well designed management interventions have the greatest capacity to influence the quality of life of coastal populations in the region.

In this connection, the Southeast Asian Fisheries Development Center (SEAFDEC), in collaboration with the Association of the Southeast Asian Nations (ASEAN), has been promoting the regionalisation of the CCRF. A valuable outcome of this process is a 4-set package of Regional Guidelines for Responsible Fisheries in Southeast Asia (RGRFSA), which is comprised of four publications: (1) Responsible Fishing Operations; (2) Responsible Aquaculture; (3) Responsible Fisheries Management; and (4) Responsible Post-harvest Practices and Trade. The objectives of the RGRFSA are to:

1. Clarify the requirements of the Code of Conduct for Responsible Fisheries (CCRF),
2. Identify and prioritise the required actions,
3. Identify the issues that require special consideration in the regional context,
4. Facilitate the formulation of regional policies to enable the implementation of the CCRF in the member countries of the Association of Southeast Asian Nations (ASEAN), and to
5. Facilitate the formulation and implementation by the ASEAN Member Countries of national codes of practice for responsible fisheries management.

The SEAFDEC Member Countries are Brunei Darussalam, Cambodia, Indonesia, Japan, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. Due to the diverse range of fishery settings observed in these countries, the Regional Guidelines are not intended to provide step-by-step guidance to countries in developing fisheries management, rather they have been prepared provide inspiration and policy support to countries in their efforts to develop sustainable fisheries.

This package is currently being expanded by SEAFDEC to provide regional guidelines for small-scale and rights-based fisheries, fisheries statistics, and use of indicators in fisheries management. A valuable outcome of the on-going collaboration between the UNEP/GEF SCS Project and SEAFDEC is that following the Sixth Meeting of the Regional Working for the Fisheries Component convened in Sabah, Malaysia, from 5th – 8th September 2005, SEAFDEC invited the RWG-F to prepare guidelines on the use of the fisheries refugia concept being developed by the fisheries component for sustainable capture fisheries in the ASEAN region. These guidelines will be published in conjunction with the new SEAFDEC guidelines.

Based on inputs from the RWG-F, the PCU has recently prepared draft guidelines on the use of the refugia concept (Annex 1). The draft guidelines prepared by SEAFDEC on indicators and co-management were reviewed to provide insight into the style and appropriate content of these guidelines, however there is some flexibility in the content that may be included.

The Regional Scientific and Technical Committee is requested to:

- Review, comment upon and endorse, the work of the RWG-F to date on a Regional System of Fisheries Refugia;
- Provide guidance regarding the future development of the system; and,
- Advise on the optimum manner in which the South China Sea Project can promote further development of the adoption of a system of fisheries refugia in the region.

## Introduction

1. The FAO Code of Conduct for Responsible Fisheries (CCRF) highlights the need to explore the use of alternative and innovative management approaches in order to achieve sustainable fisheries.

2. Alternative and innovative approaches to fisheries management, especially those focusing on fishery and ecosystem linkages, have recently received high-level international recognition. During the 2001 Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem, participants approved the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem. The Reykjavik Declaration states that in an effort to reinforce responsible and sustainable fisheries in the marine ecosystems, “we will individually and collectively work on incorporating ecosystem considerations into that management to that aim”.

3. The World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa, 2002, considered the Reykjavik Declaration in adopting a political declaration and plan of implementation in relation to capture fisheries. In the WSSD Declaration, the Heads of State agreed to “develop and facilitate the use of diverse approaches and tools, including the ecosystem approach, the elimination of destructive practices...the integration of marine and coastal areas into key sectors”.

4. At the regional level, the ‘Plan of Action’ adopted at the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium: “Fish for the People”, organised from 19 to 24 November 2001 in Bangkok, Thailand, emphasises the importance of the use of alternative management to support fisheries management in the ASEAN region.

5. The ASEAN-SEAFDEC “Plan of Action” is also supported by the ASEAN-SEAFDEC “Regional Guidelines for Responsible Fisheries in Southeast Asia” which indicate that alternative management approaches should be promoted to augment classical fisheries management models within national management frameworks.

6. These Regional Guidelines on the Use of Fisheries Refugia for Sustainable Capture Fisheries in Southeast Asia have been developed to assist ASEAN member countries in the implementation of the Code of Conduct for Responsible Fisheries (CCRF) as well as the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region.

7. The concept of fisheries refugia as promoted in these guidelines has been developed by the Fisheries Component of the UNEP/GEF Project Entitled “Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand” (UNEP/GEF SCS Project) in collaboration with the Southeast Asian Fisheries Development Center (SEAFDEC) for the development of a regional system of fisheries refugia.

8. These Guidelines build upon the Regional Guidelines for Responsible Fisheries in Southeast Asia with emphasis on item 7.6.4 ADD. 1 on Responsible Fishing, which states that in terms of taking appropriate action to ensure that fishing gear, methods and practices that are not consistent with responsible fishing are phased out and replaced with more acceptable alternatives:

“(8) States should consider area or seasonal closure to protect critical stages of life cycle of fisheries resources.”

The Guidelines also build upon item 7.6.9 of the Regional Guidelines on Wastes, Discards, and Ghost Fishing, which states that in terms of taking appropriate action to minimise waste, discards, catch by lost or abandoned gear, catch of non-target species, both fish and non-fish species, and negative impacts on associated or dependent species, in particular endangered species:

“(2) States should strongly implement management measures such as closed areas and seasons in critical habitats (e.g. coral reefs, seagrass beds, mangrove areas, etc.) which are important for sustaining fish stocks.”

9. Importantly, these guidelines focus on encouraging ASEAN member countries to embrace the use of fisheries refugia in fisheries management as a means of building the resilience of fish populations to the effects of over-fishing, which is especially relevant regionally in terms of food security.

## Regional Fisheries

10. Fisheries make significant contributions to regional economies, particularly those of countries bordering the Gulf of Thailand and the South China Sea. However, since the majority of fisheries are small-scale in nature, and land fish in a large number of small decentralised landing places for distribution through complex marketing networks at the community level, estimates of the value of capture fisheries production are largely underestimated and do not adequately value the small-scale fishing sector.



11. Most regional countries are in the top 20 capture fishery producing countries in the world, with some experience annual increases in production of up to 5 percent. Pelagic fishes dominate landings by volume and value, as demersal fisheries have been largely over-exploited. However, it is well accepted that regional fisheries statistics rarely reflect production information for small-scale coastal fisheries and do not adequately reflect the high level participation of coastal communities in fishing, or the importance of artisanal and subsistence fishing to coastal communities.

12. Declining fish availability, coupled with over-capacity and the dependence of the small-scale sector on coastal fisheries for income generation has led to the adoption of destructive fishing practices such as blast fishing to maintain short-term incomes and food production. Similarly, based on present consumption patterns and population growth rates, pressure on coastal fisheries is steadily increasing. Despite nutritional requirements and current population growth rates, regional countries are generally net exporters of fishery products. This trade pattern is continuing since the need to generate foreign exchange to buy capital inputs for industrialisation generally continues to be a higher priority than food security.

13. Fisheries trends suggest that production from capture fisheries will wane in coming years unless fishing effort (and related over-capacity) is reduced. The obvious problem in the reduction of fishing capacity is that regional fisheries are mostly small-scale in nature with the majority of participants (and their families) highly dependent on fish catches for income, food and well-being.

14. Regional initiatives in the development of sustainable fisheries, including the decentralisation of fisheries management, the use of rights-based approaches to small-scale fisheries management, and the improved use of statistics and indicators, will need to consider alternative fisheries management tools. The example expounded in these guidelines is based on the use of area-based or zoning approaches to fisheries management that aim at maintaining the habitats upon which fish stocks depend, as well as minimising the effects of fishing on stocks of important species in areas and at times critical to their life-cycle.

#### Emerging Themes for Regional Fisheries Management

15. Key themes emerging from the fisheries component of the UNEP/GEF SCS Project relate to the critical role that coastal and marine habitats of the Gulf of Thailand and play in sustaining regional fisheries, many of which are transboundary in nature, and the low level coordination between fisheries and habitat management in the region. It is now well recognised that coral reef, seagrass, mangrove, and wetland habitats contribute significantly to the productivity of regional fisheries, and act as refuges for the majority of fished species during critical phases of their lifecycle.

16. In this connection, the UNEP/GEF SCS Project has initiated activities, in collaboration with SEAFDEC, to enhance the use of spatial approaches to fisheries management that, focus on fishery and habitat linkages.

17. This initiative is considered important regionally because of the potential regional fisheries benefits associated with effective fisheries and habitat management at the local level. It is likely that the role of such approaches to fisheries management will become more important in the region, especially in light of the continuing importance of fisheries to food security, nutritional security, and maintenance of livelihoods.

18. Such approaches may also assist in curbing the effects of trends in regional fisheries relating to over-capacity and over-exploitation, the use of destructive fishing gear and practices, habitat destruction and pollution, and illegal fishing.

#### Fisheries Refugia and Fisheries Management in the ASEAN Region

19. These Guidelines recognise that most common approaches to fisheries management in the ASEAN region have not effectively integrated spatial considerations into fisheries management frameworks. The success or failure of fisheries management has largely been determined by the ability of the management system to control fishing effort so as not to exceed predetermined catch limits that are based on biological and, to a lesser extent, economic attributes of fisheries.

20. Fisheries management worldwide has largely been constrained by an inability to address the complexity inherent in fisheries systems. Fisheries systems involve the interrelationships of such dynamics as environmental variability, multi-species interactions and unpredictable effects of fishing on fish stocks. Such complexity not only influences the effectiveness of policy intervention, but also the accuracy of indicators used to assess the effectiveness of policy intervention. This is especially the case in Southeast Asia, given the diversity of cultural settings, unique fisheries structure, and the complex tropical ecosystems of the region.

21. Considering that many of the data used in the assessment of fisheries resources and fisheries management measures in the ASEAN region contain errors, and that many common assessment models grossly simplify fisheries systems, it is inevitable that fisheries management will continue to take place in situations where there is irreducible uncertainty due to the massive and difficult information problems associated with describing and understanding most fisheries. This is especially true in the Gulf of Thailand and the South China Sea, where fisheries management must balance the interests of multiple jurisdictions, coastal community dependence on fisheries for food security, the problem of overfishing, destructive fishing practices, and the inherently complex nature of the tropical multi-species fisheries in the region.

22. The concept of fisheries refugia espoused in these Guidelines is based upon the emerging body of evidence that the existence of natural refugia is a basic element explaining the resilience of commercial fish stocks to exploitation. Commercial fisheries in the ASEAN region are subject to high levels of fishing effort, such that stocks of most commercially important species are considered fully fished or overexploited. Maintenance of natural refugia, or creation of refugia in cases where natural refugia no longer exist, should be important priorities for the management of fisheries in the

ASEAN region, and may act as effective buffers against uncertainty and recruitment failure, of which the latter is especially important in terms of food security.

23. Natural Refugia play a central role in the sustainability of fisheries. The existence of large-scale natural refuges for populations of fished species contributes to the resilience of communities of commercially fished species to the effects of high fishing effort levels.

24. The concept of natural refugia is well developed in the fields of terrestrial ecology and wildlife management. For instance, the use of spatial controls that recognise the potential “source-sink” nature of hunted systems and protecting natural refugia, is often effective in avoiding wildlife over-exploitation when biological data and enforcement capabilities to regulate harvests are limited, and may provide more reliable evaluations of sustainability, provide information on the dynamics of hunted systems, and help local communities and policy-makers conserve key areas that act as game reserves.

25. In the context of fisheries, natural refugia arise from the interaction of the spatial dynamics of the population, oceanographic features, fish behaviour, and fishing effort dynamics. Three broad types of refugia are readily discernable:

- A large population with seasonal or spawning migrations between fishing grounds and spawning refugia,
- A large population with some local sub-populations located in fishing grounds and others in refugia. Sub-populations located in unexploited areas provide larval subsidies to the exploited populations, and
- In situ behavioural refugia (behaviour determines the seasonal unavailability of part of the stock in the fishing ground).

26. Fisheries refugia can complement conventional fisheries management measures, such as effort or gear restrictions, and should be a priority consideration in the ASEAN region in situations where fisheries are subject to intense and/or unmanageable fishing pressure. They may also be used to separate potentially conflicting uses of coastal and marine habitats and their limited resources. However, the effectiveness of fisheries refugia will largely depend on the selection and appropriate use of fisheries management measures within the refugia area, and at the most general level, the process of establishing fisheries refugia must consider the:

- Life-cycle of the species for which refugia are being developed,
- Type(s) of refugia scenarios(s) that relate to the species for which refugia are being developed,
- Location of natural refugia and appropriate sites for the establishment of [artificial] refugia, and
- National and regional level competencies in the use of fisheries management measures and spatial approaches to resource management and planning.

## Regional Common Understanding of Fisheries Refugia

27. Fisheries Refugia in the ASEAN context are defined as:

“Spatially and geographically defined, marine or coastal areas in which specific management measures are applied to sustain important species [fisheries resources] during critical stages of their lifecycle, for their sustainable use.”

28. Fisheries Refugia should:

- NOT be “no take zones”,
- Have the objective of sustainable use for the benefit of present and future generations,
- Provide for some areas within refugia to be permanently closed due to their critical importance [essential contribution] to the life cycle of a species or group of species,
- Focus on areas of critical importance in the life cycle of fished species, including spawning, and nursery grounds, or areas of habitat required for the maintenance of broodstock,
- Have different characteristics according to their purposes and the species or species groups for which they are established and within which different management measures will apply,
- Be sub-dividable to reflect the differing importance of sub-areas to the species or species groups for which they are established. Management plans for the refugia should reflect different fisheries management measures for the sub-divisions.

29. Management measures that may be applied within fisheries refugia may be drawn from the following [non-exhaustive] list:

- Exclusion of a fishing method (e.g. light luring purse seine fishing),
- Restricted gears (e.g. mesh size),
- Prohibited gears (e.g. push nets, demersal trawls),
- Vessel size/engine capacity,
- Seasonal closures during critical periods,
- Seasonal restrictions (e.g. use of specific gear that may trap larvae),
- Limited access and use of rights-based approaches in small-scale fisheries.

30. There is a general commonality of understanding that fisheries refugia relate to specific areas of significance to the life-cycle of particular species. Fisheries refugia may be defined in space and time, and serve to protect spawning aggregations, nursery grounds, and migratory routes.

## Fisheries Problems, Goals and Objectives, and Challenges

31. The promotion and use of the fisheries refugia concept in the ASEAN region is aimed at improving the use of spatial approaches to fisheries management for the sustainable use of fisheries. The specific fisheries management problems in the ASEAN region that fisheries refugia will assist in resolving include the:

- Capture of juveniles – an action focused on reducing the risk of growth over-fishing due to young recruits to the fishery being caught before they grow to an optimal market size, or a size at first capture less than that required to maximise yield (or value) per recruit,
- Capture of spawning stock in spawning areas at the time of spawning – an action focused on reducing the risk of recruitment over-fishing due to adult stock being reduced to the extent that recruits are insufficient to maintain commercial fish stocks,
- Use of inappropriate fishing gears and practices,
- Poor management of fish habitats, particularly spawning and nursery areas, and
- Conflicts among resource users – such as those between small-scale and large-scale fisheries.

32. Whilst recognising that the overall goal associated with the use of fisheries refugia is to improve the use of spatial approaches to fisheries management for sustainable use of fish stocks and maintenance of habitats, objectives relating to fisheries refugia should be developed in close consultation with stakeholders. In defining such objectives, ASEAN member countries should consider objective-related indicators for use in evaluating the performance of fisheries refugia. Specific objectives may be drawn from the following [non-exhaustive] list and should be defined in terms of temporal and spatial scales:

- Safeguarding of spawning and nursery areas and commercial species within these areas at critical stages of their life cycles,
- Enhancement of fisheries resources and their habitats,
- Prevention of habitat degradation and commercial-extinction of important fishery species,
- Improved co-ordination between fisheries and environment agencies and organisations,
- Improved use of zoning in fisheries management,
- Improved incorporation of species-specific life history characteristics in fisheries management systems,
- Improved understanding amongst stakeholders, including fisher folk, scientists, policy-makers and fisheries managers of ecosystem and fishery linkages, and
- Promotion of the role of refugia in enhancing the resilience of fisheries systems.

33. The use of fisheries refugia as a fisheries management tool is a relatively new concept in the ASEAN region. ASEAN member countries should anticipate a number of challenges in the establishment of refugia, and ensure that these challenges be assessed in the context of national scientific, legal, political and administrative contexts. The general types of anticipated challenges are:

- The problem of overcapacity,
- Resistance from fisher folk and fishing communities,
- Lack of scientific information and experience in the use of spatial approaches to fisheries management,
- Difficulties and costs associated with research, specifically the need for specialised vessels/sampling equipment in collecting information regarding the life cycle of commercially important species,
- Low-level collaboration between the responsible national level agency and local government,
- Encroachment during periods in which fishers are excluded,
- Enforcement of management measures and regulations prohibiting the use of illegal or destructive fishing gear, in order to prevent the unnecessary capture of juveniles and degradation of fisheries habitats.

#### Priority Fisheries Refugia Types: Spawning and Juvenile Refugia

34. In relation to fisheries, the two main life history events for fished species are reproduction and recruitment. Often, these events involve movement between areas, and some species, often pelagic fishes, migrate to particular spawning areas. Many species also utilise specific coastal habitats such as coral reefs, seagrass, mangroves, and wetlands as nursery and feeding areas. In terms of the effects of fishing, most populations of fished species are particularly vulnerable to the impacts of high levels of fishing effort in areas where and at times when, there are high abundances of (a) stock in spawning condition, or (b) juveniles and pre-recruits.

35. The impacts of fishing on spawning stock and juveniles/pre-recruits are intensified in instances where small-scale fishers and commercial fishers share the same stock, leading to disputes of the relative impacts of each group. An example is where juveniles and pre-recruits are caught in inshore areas by small-scale fisheries, and commercial fishers catch adults of the same species offshore. In this instance, high levels of fishing effort in inshore waters may drive growth over-fishing, while the same circumstances in offshore areas may cause recruitment over-fishing<sup>1</sup> of the same stock<sup>2</sup> (Figure 1). The use of juvenile refugia to protect fish during the juvenile and pre-recruit phases of their life-cycle can assist in the prevention of growth over-fishing. Whereas spawning refugia, may assist in the prevention of recruitment over-fishing.

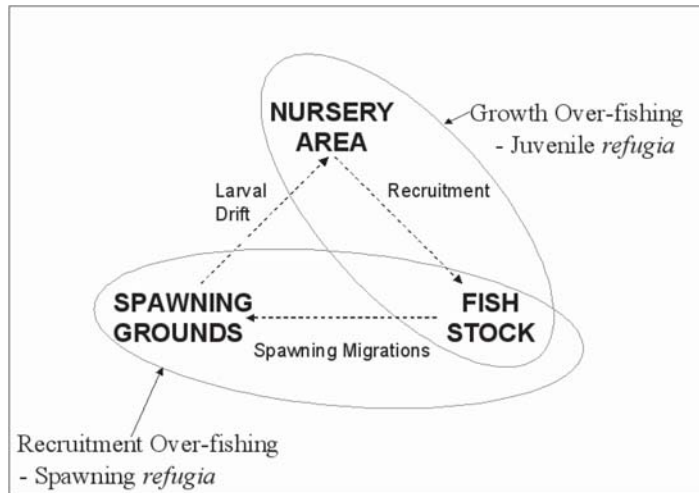


Figure 1 Generalised life-history triangle for fished species, highlighting the problems of growth and recruitment over-fishing.

36. Landings from commercial fisheries in the region are dominated by small pelagic species. The problem of recruitment over-fishing is considered to be most relevant to these species and the identification of spawning refugia should be prioritised for important pelagic species. Spawning refugia may also be effective tools for the management of recruitment over-fishing problems in the context of commercial invertebrate species.

37. There is a scarcity of spawning area information relating to demersal species in the Gulf of Thailand. However, in terms of the decline in the availability of the majority of these species, the problem of growth over-fishing prevails and the use of juvenile refugia should be a priority for demersal fisheries management in the region. It is apparent there may be most benefit in establishing juvenile refugia in the context of inshore habitat management. The design of appropriate fisheries refugia in association with initiatives in inshore habitat management may assist in reversing the growth over-fishing problem common to many of the region's coastal demersal fish species.

38. It is recognised that, detailed data are not available concerning the life-cycles and movements of many fish stocks. Nevertheless development of a system of refugia should proceed, during the course of which the lack of data will become apparent, enabling identification of future areas for fisheries research. In this connection, the important role that SEAFDEC plays in regional fisheries research should be fostered, especially in relation to its capacity to conduct larval and juvenile fish sampling throughout the region.

<sup>1</sup> Growth over-fishing is caused by levels of fishing beyond that required to maximise yield per recruit, and typical involves a size at first capture in the fishery that involves an unsustainably high percentage of juveniles and pre-recruits being captured.

<sup>2</sup> Recruitment over-fishing is caused by a level of fishing in which the adult stock is reduced to the extent that recruits produced are insufficient to maintain the population.

## Establishing Fisheries Refugia

39. States should consider a two-track approach to the identification of fisheries refugia. The first track involves a review of known spawning areas for pelagic and invertebrate species, with the aim of evaluating these sites as candidate spawning refugia. Information regarding the spatial dynamics of pelagic fish and invertebrate populations, oceanographic features, fish behaviour, and fishing effort dynamics should be used to determine the optimum locations and sizes of spawning refugia. The second track is the evaluation of inshore areas as potential juvenile/pre-recruit refugia for significant demersal species. These juvenile refugia should be aimed at reducing the impact of growth over-fishing and may be identified using information regarding the catch and size composition of small-scale and commercial fisheries operating in or adjacent to sites.

40. Possible directions for establishing and implementing fisheries refugia are suggested by the legislative, policy and administrative options and approaches taken by regional countries for coastal and marine planning, including for instance the designation of areas closed to fishing and other zoning measures. It is likely that there will be inter-country differences in the primary planning objectives, and the design and implementation (i.e. legislative, policy and administrative approaches) of spatial approaches to natural resource and environmental management. These differences will need to be identified and reflected in any regional assessment of the design and effectiveness of a system of fisheries refugia.

41. It is likely that the countries will reflect differences in:

- Their strategic policy and planning objectives, including the:
  - \* type of planning (e.g. protection v. multiple use);
  - \* area of planning (e.g. administrative boundaries v. geo-ecological (coastal zone));
  - \* designated management agencies (e.g. environment v. resource agency).
- Establishment and administration of spatial management approaches, including:
  - \* the spatial planning process (e.g. administrative steps involved);
  - \* identification of sites;
  - \* selection and prioritisation of sites;
  - \* socio-economic assessment of the impacts of management measures;
  - \* consultation, community participation.

42. There are a number of common information requirements that regional countries should consider in the development of fisheries refugia. These relate to the:

- Life-cycle of the species for which refugia are being developed,
- Type(s) of refugia scenario(s) that relate to the species for which refugia are being developed,



- Location of natural refugia and appropriate sites for the establishment of [artificial] refugia,
- National and regional level competencies in the use of fisheries management measures and spatial approaches to resource management and planning that may be applied in establishing and managing refugia,
- Goals, objectives, guiding principles, and expected outcomes for the refugia from both national and regional perspectives,
- Priority refugia types, definition of the actual fisheries problems that the refugia will assist in resolving, the anticipated challenges in the establishment of fisheries refugia, and complementary activities in the region,
- Criteria for refugia identification and selection, and
- The actions required at the national level to establish fisheries refugia, including identification of legislative, policy and administrative requirements and support.

43. States should focus on establishing fisheries refugia with a very clear fisheries agenda and based on the concept of sustainable use. Primary criteria for refugia identification should focus on habitats critical to the life-cycle of commercially important species.

#### Fisheries Refugia and Marine Protected Areas

44. In establishing fisheries refugia, states should recognise that, a no-take Marine Protected Area (MPA) can potentially assist in insuring against over-exploitation and may enhance yields in adjacent fisheries. However, the ecological criteria commonly used for MPA site selection in the region that, include biodiversity, naturalness, uniqueness, and vulnerability criteria, may result in the establishment of MPAs that are ineffective in (a) safeguarding fished species at critical phases of their life-cycle, and (b) may not minimise the impacts of high fishing effort levels at times and places when fish populations are particularly vulnerable to the effects of fishing, such as when they are spawning or utilising inshore areas for feeding and/or for protection from predators.

45. States should recognise the role MPAs play in marine conservation. While the use of fisheries refugia may result in some of the conservation benefits associated with MPAs, they should not be promoted as substitutes for MPAs. However, from the fisheries perspective, the difference between no-take MPAs and sustainable use fisheries refugia should be clearly communicated to government officials and coastal communities in establishing fisheries refugia, as the fishery and critical habitat linkages intrinsic to the fisheries refugia concept may be more easily accepted by stakeholders than MPAs.

#### Complementary Initiatives in Regional Fisheries Management

46. Against the general background of uncertainty and complexity associated with the development of fisheries refugia there is a need to develop robust and workable solutions to involving stakeholders in the establishment and management of refugia.

An emerging appreciation of the diverse traditions and cultures in the region, and the important role of small-scale, coastal and subsistence fisheries has recently provided impetus for the development of new approaches to stakeholder participation in Southeast Asian fisheries management.

47. A key perspective in the region is that over-exploitation problems may be a sign of community failure, in that community values, norms, and knowledge are critically important in guiding sustainable fisheries practices and that the erosion of such community arrangements for the management of fisheries may open the door to “over-fishing”. In this connection, significant efforts are being made in the region to decentralise the responsibility of fisheries management with an aim of establishing co-management approaches to fisheries. States should promote the co-management of fisheries refugia.

48. The notion of rights-based approaches to the management of the region’s small-scale coastal fisheries is also gaining ascendancy. Examples of rights based fisheries management systems are currently being promoted by the Southeast Asian Fisheries Development Center and governments in the region, with a notable case study being the communalisation of fishing rights as developed in the inshore fisheries of Japan, where the use of community based territorial use rights, reinforced by local modes of social regulation, have been successful in preventing over exploitation. The use of use rights and collective choice rights should be promoted in the context of fisheries refugia management.

49. It is also recognised that regional fisheries management must incorporate strategies that aim to foster the dependence of fisheries on coastal and marine habitats. This will require developing mechanisms aimed at minimising fishery impacts on the habitats upon which fisheries depend, and consideration of the regional fishery benefits of effective coastal habitat management. Efforts should be taken to minimise fisheries impacts on fishery refugia habitats.

50. The improved use of statistics and indicators in identifying and managing fisheries refugia should be encouraged. In addition to their use in monitoring and tuning management action, statistics and indicators can be useful in communicating with cross-sectoral agencies and have significant potential for use in community education and awareness programs.

51. Practical uses of indicator systems for fisheries refugia include identifying areas with high abundances of juveniles or spawning stock, and use by fishing communities to assess the performance of policy or regulations. However, a key constraint in the use of indicators in fisheries is the information required to drive them. Often this information is unavailable, pointing to the need for a limited number of fishery-specific indicators with some integrated properties (i.e. indicators reflecting the status of more than one component of the fishery).

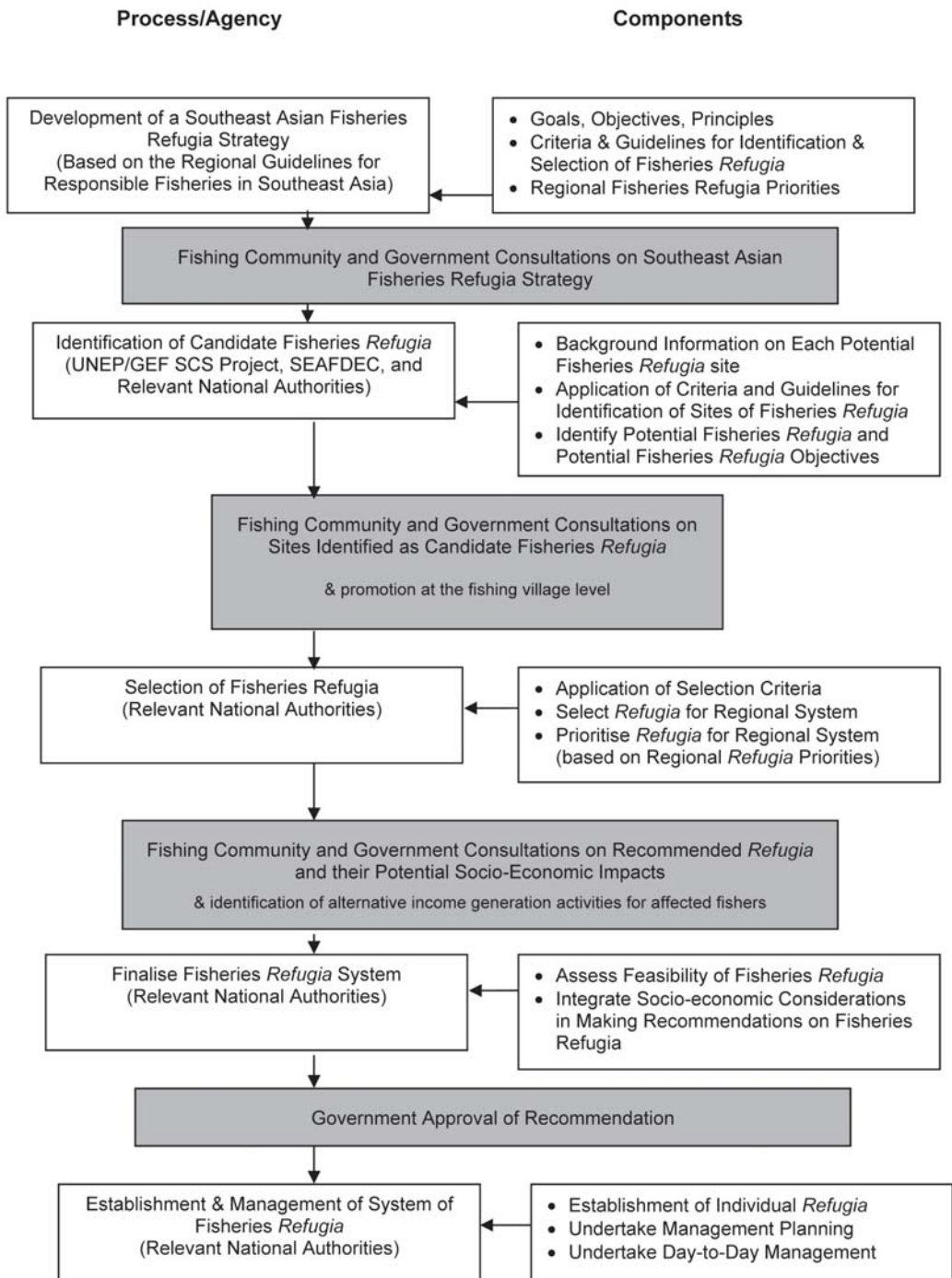


Figure 2 Framework for the development of a regional system of fisheries refugia for sustainable capture fisheries.

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The Southeast Asian Fisheries Development Center (SEAFDEC) is an intergovernmental organization established in December 1967 for the purpose of promoting sustainable fisheries development in the region. Its current Member Countries are Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

Representing the Member Countries is the Council of Directors, the policy-making body of SEAFDEC. The chief administrator of SEAFDEC is the Secretary-General whose office, the Secretariat is based in Bangkok, Thailand.

SEAFDEC undertakes research on appropriate fishery technologies, trains fisheries technicians, and disseminates fisheries information. Four Departments were established to pursue the objectives of the Center:

- The Training Department (TD) in Samutprakan, Thailand, established in 1967 for marine capture fisheries development;
- The Marine Fisheries Research Department (MFRD) in Singapore, established in 1967 for fishery post-harvest technology;
- The Aquaculture Department (AQD) in Iloilo, the Philippines, established in 1973 for aquaculture research and development; and
- The Marine Fishery Resources Development and Management Department (MFRDMD) in Kuala Terrengganu, Malaysia, established in 1992 for the development and management of the marine fishery resources in the exclusive economic zones (EEZs) of SEAFDEC Member Countries.