

LEGISLATION GOVERNING SHRIMP AQUACULTURE

LEGAL ISSUES, NATIONAL EXPERIENCES AND OPTIONS

by
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Legislation Governing Shrimp Aquaculture Legal Issues, National Experiences And Options

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The document is still open for public discussion.
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² This paper and other papers prepared under this Consortium Programme may be found at the website of <http://www.enaca.org/shrimp/default.htm>

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Chapter 1 Introduction

1.1 Background

The Food and Agriculture Organization of the United Nations (FAO) *Code of Conduct for Responsible Fisheries* originated at the International Conference on Responsible Fishing, held in May 1992 in Cancun, Mexico, and was adopted during the 28th Session of the FAO Conference on 31 October 1995. The Code is wide in its scope and encompasses almost all aspects of fisheries. Key aspects of aquaculture fall within its Article 9 on "Aquaculture Development". This Article encourages States to "establish, maintain and develop an appropriate legal and administrative framework which facilitates the development of responsible aquaculture". In addition, there are also important provisions in other articles of the Code which have a bearing on aquaculture and its general developmental context. Hence the Code advocates the regulation of chemical inputs in aquaculture where these are hazardous to human health or the environment. More generally, the Code recommends that states should seek to achieve sustainable use of fisheries resources, taking into account the fragility of coastal ecosystems and the finite nature of their natural resources and the needs of coastal communities. Further general advice in support of the implementation of the Code in relation to aquaculture are provided in the *FAO Technical Guidelines for Responsible Fisheries 5 Aquaculture Development* (1997).

The Bangkok FAO Technical Consultation on Policies for Sustainable Shrimp Culture, in 1997, was convened by the FAO Fisheries Department, in support of the implementation of the *Code of Conduct for Responsible Fisheries*, with the purpose of developing guidelines on appropriate legal, institutional, regulatory and economic policies for sustainable shrimp culture. The Consultation produced a consensus that sustainable shrimp culture is a desirable and achievable goal which should be pursued. It recognised that effective government policy and regulations, as well as the co-operation of industry in utilising sound technology, were essential for achieving sustainable shrimp culture. The Consultation recommended a number of specific areas for research and, in particular, it advised that FAO undertake, as follow up action, a technical consultation on the legal and regulatory framework for coastal aquaculture with particular emphasis upon shrimp aquaculture.

1.2 Objectives and Methodology

The purpose of the present report is to pursue the research objectives indicated by the Bangkok Technical Consultation by gathering information about the present state of the law concerning shrimp aquaculture in those developing countries most heavily involved in the activity. The initial objective of the survey, therefore, is to provide a comparative account of legal provisions concerned with shrimp aquaculture which are operative in different countries engaged in the activity. A further objective of the report is to provide commentary upon the national legislation and to offer suggestions as to what measures are appropriate in encouraging good legal and administrative practice in the regulation of shrimp aquaculture.

Particular emphasis is placed upon legal requirements which relate to the environmental impacts of shrimp aquaculture. Such impacts are, broadly, of two kinds. The first relates to the initial impacts of establishing a shrimp farm at a particular location, and the potential adverse effects that this may have upon biodiversity and the potential conflicts that may be

raised with other competing uses of the land and water. The second relates to the continuing environmental impacts, upon environmental and ecological quality, which may arise through the actual operation of a shrimp farm when once it is established at a particular location or, indeed, after the cessation of its activities. Alongside these matters are a diverse range of associated concerns, which relate to the efficiency of the shrimp aquaculture industry and the quality of the products which it produces, and which often reflect underlying environmental concerns.

Preliminary indications were that national legislation had been enacted in some jurisdictions to address key environmental concerns and had made use of a range of regulatory control techniques including the following:

- ~ the use of environmental impact assessment procedures for watershed management, shrimp pond siting, design and operation;
- ~ the implementation of coastal land use zoning techniques, buffer zones and authorisations involving costing of land or wetland;
- ~ the application of mangrove management and conservation techniques;
- ~ the formulation of environmental quality objectives, environmental quality standards and effluent standards;
- ~ the limitation of access and use rights for water and seed (capture of post larvae shrimp) and the imposition of restrictions upon introductions of exotic species;
- ~ the use of pond effluent control techniques involving feed control restrictions, limited use of drugs, antibiotics and other chemicals;
- ~ the use of trade-related techniques such as product certification schemes;
- ~ the establishment of user groups agreements, to avoid use conflicts and to allow for effective area management;
- ~ the development of best management practices through codes of conduct and practice; and
- ~ the application of controls over disease transmission through alert warning systems.

It was recognised that this list is not exhaustive and there may be further approaches that have been adopted to address potential adverse environmental impacts which arise from shrimp aquaculture activities. Nonetheless, a key purpose of the survey was to ascertain the extent to which approaches of this kind have been used in different jurisdictions within the scope of the survey.

1.3 The Questionnaire

An initial task was the formulation of a questionnaire, to enquire about the national uses of the law to address the kinds of environmental adversity arising from shrimp aquaculture noted above. This questionnaire needed to be directed to key fisheries personnel in relevant countries to elicit the detailed information which was sought about national legislation. A copy of the text of the questionnaire that was drafted is incorporated as an Appendix to this report, but some general observations may be offered here as to the format which was adopted.

The key purpose of the questionnaire was to ascertain the present state of national administrative responsibilities and regulatory requirements governing shrimp aquaculture in the countries within the scope of the survey. However, this information needed to be gathered

in a structured form which allowed meaningful comparisons to be drawn between the legislation operative in different countries. For this purpose, headings were used, primarily, to identify the key environmental issues which are likely to be addressed in national legislation. In each case, a “general assumption” was made about the broad issue which particular laws might be seeking to address. However, it was also appreciated that different countries involved in shrimp aquaculture have different environmental and developmental priorities and perceptions as to which issues needed to be most immediately and strictly addressed. Because of this, no particular priority or gravity was assumed between the issues, indeed, a final section invited respondents to identify further issues that have not been raised in the body of the questionnaire. However, some confirmation of the comprehensiveness of the scope of the questionnaire was provided by the fact that no substantially new matters were identified by respondents as ‘other issues’ needing to be considered.

Accordingly, the questionnaire was structured around the following headings.

1. Background
2. Objectives of the Survey
3. Sustainable Development
4. Legislation
5. Institutional Responsibilities
6. Devolution of Controls
7. Acquisition of Land Rights
8. Development Licensing for the Establishment of Shrimp Farms
9. Continuing Controls upon Shrimp Aquaculture Activities
10. Fresh Water Use Licensing
11. Wastewater Discharge Licensing
12. Shrimp Movement Licensing
13. Genetically Modified Organisms
14. Chemical Use Restrictions
15. Food Sources and Utilisation
16. Product Quality Controls
17. The Internationalisation of Standards
18. Guidance and Producers’ Organisations
19. Enforcement
20. Other Issues

In relation to each section, respondents were asked to provide a response as to whether the “general assumption” represents a fair assessment of a key environmental issue needing to be addressed or, alternatively, to provide a restatement of the environmental issue as it was perceived nationally, or a statement that it is not regarded as a significant national concern.

Following the identification of the key environmental issue needing to be addressed, a fairly detailed legal response was sought as to the legal response to the issue in each jurisdiction. This involved identifying the relevant legislation and specific sections or articles which are directly relevant to the issue so that reasonably precise comparisons between different national approaches could be made. Where possible, information was sought as to the availability of the text of national legislation, particularly whether legislation was available in electronic form, or on line, indicating relevant websites.

1.4 Distribution and Responses

The countries within the scope of the survey are those where shrimp aquaculture is at an initial stage of development or those which have experienced rapid growth in the activity in Asia, East Africa and Latin America. Specifically, information was sought on shrimp aquaculture legislation in the following countries.

Asian Countries:

Bangladesh
China
India
Indonesia
Malaysia
Philippines
Sri Lanka
Thailand
Vietnam

East African Countries:

Madagascar
Mozambique
Tanzania

Latin American Countries

Colombia
Ecuador
El Salvador
Guatemala
Honduras
Mexico
Nicaragua
Panama

Although, in many instances FAO had useful national contacts in persons who were well-informed about their national shrimp aquaculture legislation, this was not always the case. Whilst copies of the questionnaire were circulated to likely respondents in March 2000 in many instances responses had not been forthcoming by October 2000 when the main work involved in collating the responses commenced. Copies of the questionnaire were distributed to the FAO Representatives in the countries listed as well as to participants, from countries within the survey, who had attended the Bangkok FAO Technical Consultation on Policies for Sustainable Shrimp Culture in 1997.

Because of the unavailability of some national responses, it was necessary to draw upon other resources to gather the information that was sought. A valuable source in this respect was the

substantial, *Regional Compendium on Aquaculture and Inland Fisheries Legislation – Asian Region* (1996) which had previously been compiled by the FAO Development Law Service. Also useful was the FAO electronic database of national legislation "FAOLEX", which contained a significant amount of relevant legislation which could be accessed in full-text form. Additionally, the library of the FAO Development Law Service held a number of consultants reports on shrimp aquaculture in particular jurisdictions which often provided an account of relevant national legislation and were heavily drawn upon where questionnaire responses were not available or incomplete.

It must be conceded that these 'alternative' sources were not always as authoritative and as up-to-date as a questionnaire response from an informed national fishery official would have been. Nonetheless, it was thought that a more comprehensive final report would be produced by making use of these sources and, if necessary, compiling a questionnaire response on the basis of them, rather than leaving countries out of the survey altogether.

1.5 Limitations of the Survey

The limitations of the survey of shrimp aquaculture legislation that was undertaken need to be firmly emphasised.

First, where questionnaire responses were provided these proved to be of highly variable quality. In some instances, respondents had gone to considerable lengths to provide detailed information about the relevant national legislation and had provided full texts of key enactments and related documents where these were not generally available. This made the task of organising the statements of national law more straightforward and allowed the authors of the report to be confident that the account was reasonably comprehensive, precise and up-to-date. In other instances, the questionnaire responses were so brief that it was not clear what specific legal provisions were being referred to or whether other national measures had been overlooked. In some respects these shortcomings could be met by referring to other sources to ascertain the precise legal provisions that were being referred to, in other instances it was necessary to make an 'educated guess' as to what legislation was relevant.

Second, the problems of supplementing incomplete responses were even more acute where no response was provided. As previously indicated, 'alternative sources' were extremely helpful in many respects, but the use of these sources always carried the danger that they are incomplete or did not represent an up-to-date statement of the present position. Moreover, in examining national legislation without knowledge of its operation in practice there is significant scope for misinterpretation and consequent misconceptions. For example, in relation to the penultimate section of the questionnaire, on enforcement, it was almost impossible to draw meaningful conclusions about enforcement responsibilities and practice in particular jurisdictions from an investigation of the legal texts. Enforcement, generally, proved to be an area where comparable information was difficult to obtain and meaningful conclusions almost impossible to draw.

In summarising these limitations, *whilst every effort has been made to gather the most complete and detailed information available concerning national shrimp aquaculture legislation, no guarantee can be given as to the accuracy of what follows. Practical difficulties in collecting the information have meant that some sources that have been used*

may now be out of date or that interpretations that have been placed on particular laws do not correspond with their national interpretation. In addition, it is recognised that the national legislation which is described may not give a comprehensive account of all the relevant provisions.

The Development Law Service would be pleased to receive information about any inaccuracies that are present and would be pleased to receive copies of legal materials that have been neglected or incorrectly described, where possible in electronic form so that they may be incorporated into the FAOLEX database (<http://www.fao.org/Legal>).

1.6 From Actual Practice to Good Practice

The later sections of the report seek to develop the description of the actual state of regulatory practice in different jurisdictions by offering some evaluative commentary on what kinds of legal response to environmental issues constitute good regulatory practice. The fact that some countries have succeeded in enacting legislation effectively to address many of the environmental concerns arising in relation to shrimp aquaculture is to be applauded. It also raises the question as to why a similar approach might not be adopted in other jurisdictions where regulatory controls appear to be less well advanced. The initial perception is that the actual use of legislation, in many instances, illustrates what might be regarded as good regulatory practice. If so, the task might be regarded as that of drawing out national examples of good practice and presenting these as a lead which other nations should be encouraged to follow.

However, some caution is needed in using the best examples of regulatory practice as a general model to be applied all countries. In particular, account needs to be taken of the overriding imperative of sustainable development, and the requirement that environmental and developmental priorities should be balanced against one another in each national, and perhaps local, context. Because of this, and the different developmental states at which shrimp aquaculture countries are placed, some caution is needed in supposing that ‘good regulatory practice’ means the same thing for all countries.

Because of this reservation, the suggestions for good regulatory and administrative practice that are offered in the final part of the report need to be read with some caution. In many respects they represent desirable regulatory objectives which assume that a sufficiently high level of developmental conditions have been realised. In some instances they may presume a level of development of the fish farming industry which, in reality, is not reflected by actual activities taking place on the ground in particular countries and localities. National regulatory approaches should, for example, appropriately reflect the different degrees of legislative intervention needed to regulate high intensity and low intensity shrimp aquaculture operations and otherwise to address the actual aquaculture practices that are nationally undertaken rather than those which are followed elsewhere. Nonetheless, accepting these reservations, it is hoped that the observations concerning good regulatory practice will serve as useful legal and administrative goals for all shrimp aquaculture countries to be implemented *as soon as developmental conditions allow*.

Chapter 2 General Issues

2.1 Introduction

The purposes of this chapter are, first, to introduce the various general issues that may need to be addressed in national shrimp aquaculture legislation and, second, to offer some comment on the range of possible options for regulation which are available in relation to each issue. The ordering of the issues is the same as that used in the questionnaire and similar ordering is used in the discussion of national legislation provided in the three chapters which follow.

2.2 Sustainable Development

The Concept

The all-encompassing guiding principle in present thinking about the environmental management, at international, national and local levels, and across all sectors of activity, is that of 'sustainable development'. Hence, the realisation of sustainable development in shrimp aquaculture must be the overriding objective to be sought by all particular legal, administrative and policy measures that are introduced in relation to the activity.

The present international legal basis of the principle of sustainable development lies in the United Nations Conference on Environment and Development, held in June 1992, and the *Rio Declaration* must be taken to reflect the current consensus of values and priorities concerning 'sustainable development'. Given the gravity of the *Rio Declaration* it may be helpful to be reminded of some of the key principles that are endorsed. *Principle One* of the *Declaration* states that human beings are at the centre of concerns for sustainable development, and that they are entitled to a healthy and productive life in harmony with nature. *Principle Two* affirms that States have the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage outside their boundaries. *Principle Three* asserts that the right to development must be fulfilled so as equitably to meet developmental and environmental needs of present and future generations. *Principle Four* asserts that in order to achieve sustainable development, environmental protection must constitute an integral part of the development process and cannot be considered in isolation from it. *Principle Five* states that all States and all people must cooperate in eradicating poverty as an indispensable requirement of sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world. *Principle Seven* requires States to co-operate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem and, in view of the different contributions to global environmental degradation, States have common but differentiated responsibilities in this respect. *Principle Eight* asserts that, to achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies. *Principle Eleven* provides that States must enact effective environmental legislation but environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply.

Each of these principles is capable of having profound implications for the national policies and legislation which countries formulate to govern the development and conduct of shrimp aquaculture, as a means towards the higher objective of securing sustainable development. Regrettably, however, the meaning 'sustainable development' is not explicitly defined at any point in the *Rio Declaration* and there are major challenges for national authorities as to how the concept is to be defined, interpreted and applied to particular activities including, in the present context, the regulation of shrimp aquaculture.

Perhaps the most frequently quoted definition of 'sustainable development' is that provided by the Bruntland Commission which characterised 'sustainable development' as,

"development which meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs" (World Commission on Environment and Development, *Our Common Future* (1987) p.43).

However, this broad definition of 'sustainable development' merely serves to draw attention to intricate collection of balances of interests that need to be drawn: between the respective needs for 'environmental protection' and 'development'; between the interests of present generations (intra-generational equity); and between present and future generations (inter-generational equity). The conflicts between these different demands are readily apparent in any sphere where development impacts upon the environment and clearly shrimp aquaculture development falls within that category.

Interpretation and Application

The intricate balancing of costs and benefits required by sustainable development becomes more difficult as the context becomes more specific. Whilst many countries have made relatively good progress in the interpretation of 'sustainable development' as a national policy objective, the reinterpretation of how this should be applied to particular sectoral activities has been more problematic. The challenge is that of interpreting the open-ended concept of sustainable development in a way which is sufficiently location-specific and activity-specific to allow it to guide policy and legislation on how shrimp aquaculture is to be undertaken in particular practical contexts. Specifically, the economic and other benefits of shrimp aquaculture need to be weighed into the balance against a range of environmental and other factors. Development should then proceed only where any resulting environmental and/or social detriment can be justified by reference to the developmental benefits which will be secured.

Given the formidable range of challenges, there is a tendency for national approaches towards sustainable development to be of a more piecemeal character. Diverse national legislation seeks to address the problems of undesirable development, environmental and ecological protection and protection of the interests of individuals and communities. Arguably, each of these are important aspects of sustainable development but represent parts, rather than the whole, of the concept. The overriding challenge, remains that of formulating legislation

related to the broader theme of sustainable development as an overall goal to be pursued.

The difficulty of interpreting and applying sustainable development to shrimp aquaculture in national contexts is a real one, in that there can be no standard formula for sustainable development. Each country, and perhaps each particular area, needs to weigh up the environmental and social costs of shrimp aquaculture against the developmental benefits that will be produced and, not least important, this ought to be done in a way which takes account of the particular needs of countries which are at a different stage of development. To a large degree, the reluctance of most countries to translate a delicate balance of policy issues into any kind of binding legal requirement is understandable. With no criticism of the fundamental idea of sustainable development, much work remains to be done in applying the concept as a direct basis for allocating binding legal rights and duties in shrimp aquaculture and related environmental contexts.

The Code of Conduct on Responsible Fisheries

Remarkably, relatively little use seems to have been made of the FAO *Code of Conduct on Responsible Fisheries* as an aid to interpreting the requirements of sustainable development in the context of national shrimp aquaculture. Although the *Code* tends to adopt the terminology of “sustainable use of fisheries resources” or “responsible aquaculture practices”, rather than “sustainable development” as such, in the context of shrimp aquaculture these slight contrasts in wording appear to make little substantial difference. Hence, if the *Code*, at an international level, provides an interpretation of what the sustainable development of aquaculture requires, this might be seen as a useful ‘stepping stone’ to countries that need to reinterpret the imperative in their national contexts. Therefore, in the discussion which follows, the requirements of the *Code* and the associated *Technical Guidelines on Aquaculture Development* are heavily drawn upon where they are relevant to the national regulation of shrimp aquaculture or the policy objectives which shrimp aquaculture legislation needs to address.

The initial principles under Article 9 of the *Code*, concerning responsible development of aquaculture, are of fundamental importance in relation to almost all the issues addressed in this report.

“States should establish, maintain and develop an appropriate legal and administrative framework which facilitates the development of responsible aquaculture” (Article 9.1.1).

“States should produce and regularly update aquaculture development strategies and plans, as required, to ensure that aquaculture development is ecologically sustainable and to allow the rational use of resources shared by aquaculture and other activities” (Article 9.1.3).

2.3 Legislation

Although the need for an appropriate legal and administrative framework for the national regulation of shrimp aquaculture is assumed to be fundamental, there is much scope for interpretation of what is “appropriate” in different national circumstances. Key requirements for a good law, in any context, are that it is transparent in determining who it applies to, what it requires to be done and what consequences follow if this is not done. In addition, the scope

of the law should fairly correspond with the extent of the activity which actually needs to be controlled and the underlying policy objectives which are sought. These general concerns for good laws are equally applicable in the context of shrimp aquaculture where the transparency, extent and impact of legal requirements are vitally important.

Potentially, shrimp aquaculture can become legally mischaracterised as a branch of capture fisheries and inappropriately regulated by a failure to recognise the distinctive nature of the shrimp aquaculture activity. Likewise, it may become legally misclassified as an activity which is inherently harmful to the environment, particularly where due regard is not given to factors such as location and production capacity, or inappropriately regulated because of a failure to evaluate the genuine environmental and social costs and benefits in the contexts of local circumstances and concerns. Alternatively, shrimp aquaculture can be regulated as a range of distinct and fragmented activities, thereby failing to recognise the integrity of these different activities as part of a single process and resulting in shrimp farmers being subject to a bewildering and bureaucratic range of regulatory regimes with distinct, and sometimes, conflicting, objectives. “Appropriate”, it is suggested, means pitching legislation at a level which draws a sensible balance between regulating shrimp aquaculture as a distinctive and unique activity and the need to subsume this activity within broader legislative regimes where more general policy objectives are sought. Food safety, for example, is not a concern which is unique to shrimp products and there may be good reasons to regulate this issue within a more general legislative regime.

From some perspectives it might seem desirable that shrimp aquaculture should be governed by a single code making comprehensive regulatory provision for all the different impacts to which shrimp farm may give rise. However, in practice, there are various factors which militate against comprehensive codification. Alongside the need for certain issues to be the subject of legislation which extends beyond shrimp aquaculture alone, the practical reality is that, for many nations, shrimp aquaculture is a relatively recent innovation which has become established more rapidly than legislation has been able to keep pace with. Hence, there is a tendency for national legislation to lag behind the swift development of shrimp aquaculture practice. Given the need for new legislation in many instances, however, the widest possible consolidation of provisions governing shrimp aquaculture in a single enactment might be seen as a beneficial move in many jurisdictions.

Consolidation of shrimp aquaculture legislation, however, should not mean that all activities should be governed by identical legal provisions. It must be kept in mind that “backyard” shrimp culture is extensively practised by many farmers who operate from small sites and have low production capacities. Small, low intensity, shrimp aquaculture installations are likely to be less environmentally problematic, and many of the issues addressed by legislation are unlikely to arise in these situations. There may, therefore, be good reasons for differing stringency in legal requirements according to the size and production capacity of a shrimp farm. Misconceived efforts to apply universally formulated legal requirements to all shrimp farms may be counterproductive in over-regulating environmentally unproblematic installations and directing scarce enforcement resources away from larger installations where environmental problems are more likely to arise. Hence, proportionality of legislation, as between small and large farms, is an important consideration to be recognised.

Another issue which should not be neglected is the 'transitional' state in which many shrimp farmers find themselves. Particularly where a shrimp farm has been established for a number of years, its initially lawful establishment and operation may have become unlawful through the imposition of subsequent legal requirements or other changes in circumstances. Although legislation should not have retrospective effect, there are many situations where amending the law has meant, or will mean, that new requirements apply and shrimp farmers who have failed to keep up with legal changes find themselves acting unlawfully, perhaps, through ignorance. Hence, there are likely to be situations which fall outside the law because of various kinds of unintentional irregularity, such as where actual activities do not fully comply with licensing requirements of various kinds. Mechanisms for 'regularisation' of circumstances which fall outside the law may need to be provided to take account of these situations, particularly where they arise because of changes in the law or where genuine difficulties have been encountered by shrimp farmers in complying with legal requirements.

Similarly, in relation to new legislation, it will be unrealistic to expect instantaneous compliance with new requirements unless sufficient time has been allowed for changes to be accommodated in practice. For this reason, proposed changes in the law should be widely publicised to allow those affected to consider their practical implications and, particularly, the time which will be needed to secure compliance. The date at which legislation comes into force should incorporate a reasonable period of delay to allow for this. The need for information about the law on shrimp aquaculture to be widely publicised to all those upon whom it will impact is vitally important. Particularly where legal changes are to be introduced, a practical guide to the requirements of the law should be prepared and distributed to individual shrimp farmers or through shrimp aquaculture associations. It is recognised that many shrimp farms are in remote locations and that many farmers may be poorly educated. Nonetheless, changing the law without having an adequate mechanism to draw the changes to the attention of those who are likely to be affected must be a futile activity. More generally, relevant legal education should be regarded as an important component in any technical training which is provided to shrimp farmers. General ignorance of the law should not be allowed to undermine its effectiveness.

2.4 Institutional Responsibilities

The need for States to establish, maintain and develop an appropriate legal and administrative framework for the development of aquaculture (under Article 9.1.1 of the *Code*) carries with it a range of institutional responsibilities. Legislation, arguably, is only as good as its implementation and enforcement, and neglect of these matters will be fatal to the realisation of the policy objectives which regulation seeks to secure.

The nature of shrimp aquaculture is such that a range of overall supervisory functions need to be exercised by government over the general policy and functioning of the industry. Unavoidably, matters of national concern such as the formulation of a comprehensive national policy need to be the responsibility of central government to secure a coherent overall direction for shrimp aquaculture industry. Likewise, for primary legislation at least, the enactment of appropriate laws to govern shrimp aquaculture must rest with the government and the central legislative body. However, this need not preclude the possibility of secondary legislation being enacted at national, regional and local levels. The implementation and enforcement of these laws need to be entrusted to appropriately staffed and resourced bodies

which are empowered and required to take legal action where this is needed. In some instances, the organisation and resourcing of such bodies may rest with central government, in other instances it may be devolved as a matter of local responsibility, or allocated to a body with a recognised technical expertise in the relevant area.

There are also a range of research, training and educational functions which must be efficiently exercised by appropriately constituted bodies which need to be legally empowered and resourced to fulfil their functions effectively. A distinctive feature of shrimp aquaculture is the need for a relatively high level of technical expertise to be possessed by those who must regulate certain aspects of the activity. This is well illustrated by the range of highly technical fields in which regulation must be undertaken such as the need for official bodies to exercise control over national and international shrimp movements, and associated concerns over the spread of disease, and matters of food safety and public health arising in relation to the products of shrimp aquaculture. Besides this, bodies with research, training and educational functions may play an important role in the implementation of rules and regulations. The distribution of institutional responsibilities of these diverse kinds is clearly a matter for governments to determine in the light of national circumstances and priorities, but it is imperative that proper institutional support is somehow be provided and that the geographical and technical demands involved are taken into account when allocation of institution responsibilities is determined.

2.5 Devolution of Controls

Closely associated with the distribution of institutional responsibilities for shrimp aquaculture is the issue of the geographical level at which these responsibilities are best allocated and discharged. A guiding principle in this respect may be that of 'subsidiarity', whereby responsibilities should be allocated as near as possible to those upon whom they impact. That is, for example, that local legislation, locally-based institutions and local allocation of responsibility for enforcement may be more effective than having these matters centrally determined by bodies which are remote from the issues needing to be addressed. On the other hand, it must be recognised that subsidiarity needs to be weighed against the need for certain matters to be addressed in a nationally consistent and centrally administered way. Nevertheless, some degree of balance between matters of central and local responsibility needs to be secured in all but the smallest of countries.

Devolution takes different forms in relation to shrimp aquaculture. In a legislative sense, it is reflected in the extent to which regional or local governments have explicit legislative competences to enact laws governing shrimp aquaculture within their areas, providing that these are consistent with more generally formulated national laws. In other instances, devolution takes an administrative form in enabling the allocation of executive and enforcement powers to bodies established at the regional or local level. These may be matters which are peculiar to the activity of shrimp aquaculture, but more generally they tend to reflect the constitutional arrangements within particular jurisdictions. Hence, within a State which has a more strongly federal basis to its constitution, it might be expected to see a greater degree of devolution in law making powers and the allocation of executive responsibility at regional or local level. Conversely, countries without a federal constitutional basis tend to allocate more legislative and executive responsibilities within central government. Broadly, the regulation and administration of shrimp aquaculture will tend to

follow this pattern in particular jurisdictions. Nonetheless, the central or devolved allocation of powers may be a critical factor in the effectiveness of legislation and administration, and an important balance needs to be drawn between excesses of centralised remoteness and local discretion and fragmentation of control mechanisms.

2.6 Acquisition of Land Rights

In all jurisdictions, commencement of any shrimp aquaculture operation is dependent upon the availability of a suitable area of land with access to an adequate quantity and quality of water. A key legal issue on the acquisition of land rights is the extent to which this land is acquired through a purely private transaction, with one private individual acquiring from another ownership of the land, or a lease or other legal arrangement to allow the land to be used for shrimp aquaculture. By contrast, land acquisition may be facilitated through various kinds of State involvement, either by the temporary or permanent allocation of state land to a prospective shrimp farmer or perhaps through some kind of funding arrangement to assist in the securing of the land for shrimp aquaculture purposes.

The significance of the contrast between purely private land acquisition and land acquisition where there is State involvement, is that State involvement carries the important possibility that permission to use the land for shrimp aquaculture will be made conditional upon particular requirements being met. Conditions governing the use of the land may, for example, be imposed to secure environmental and ecological safeguards or to secure social objectives of various kinds. Conditions of this sort will be influential in determining locations where shrimp aquaculture is to be encouraged or discouraged and perhaps the manner in which it is to be undertaken. In the final resort, State permission to use public land for shrimp aquaculture purposes may be withheld if there is no prospect of appropriate conditions being met. Similarly, the availability of State funding for shrimp aquaculture projects, even where these are to be undertaken on private land, is capable of being strongly influential in determining where such projects are established and the manner in which they operate in practice.

Insofar as limitations upon the acquisition of land rights are a significant control mechanism upon the development and conduct of shrimp aquaculture, these are likely to reflect broader constitutional and political differences in different countries. Each country draws its own boundaries between the private and public domain differently. However, each jurisdiction needs to draw some balance to reconcile the undesirable consequences of unrestrained private aquaculture development against public environmental and other concerns. In some instances, restraints upon inappropriate development arise as a matter of land acquisition, in other instances restraints having similar consequences are provided for through systems of public control over land use and development.

Another important aspect of landholding by shrimp farmers concerns the extent to which the interest in land which is held is capable of serving as a security in relation to the raising of funds for the development of a farm. Hence, where a shrimp farmer seeks to obtain a bank loan, or other financial assistance, the title or interest which is held in land may be a significant factor in determining whether the creditor has any real security for a loan. The extent to which an interest in land may serve this purpose clearly depends upon the legal permanence of the interest which is held by a shrimp farmer, but, in the case of State owned

land in some jurisdictions, it seems unlikely that the interests which are held by shrimp farmers will be sufficient for this purpose.

2.7 Development Licensing for the Establishment of Shrimp Farms

The legal contrast between developing a shrimp farm on private and public land, noted above, will be less significant where a system of development licensing, or planning control, is provided for. “Development licensing” is a convenient general term to identify any system of public land use control which requires the owner of land to secure specific authorisation for the development or change of use of land for particular purposes. This carries the implication that development of private or public land without the necessary permission will result in the imposition of a sanction of some kind in respect of an unauthorised development. Where development licensing is provided for, the establishment of a shrimp farm is likely to need explicit approval regardless of whether it is to be located on private or public land. This allows development licensing to pursue either negative and positive objectives, in that it may be used either to prevent undesirable development as well as to encourage development of particular kinds in areas that are especially suitable.

Moreover, development licensing can be used to allow developments to be undertaken subject to a range of conditions which may be imposed for environmental or other purposes. In respect of this, it is noted that,

“States should establish effective procedures specific to aquaculture to undertake appropriate environmental assessment and monitoring with the aim of minimizing adverse ecological changes and related economic and social consequences resulting from water extraction, land use, discharge of effluents, use of drugs and chemicals, and other aquaculture activities” (Article 9.1.5 of the *Code*).

Development licensing provides a valuable legal mechanism by which adverse environmental and social impacts can be identified prior to a development taking place and conditions imposed to avoid or ameliorate these impacts. In many respects this anticipatory or preventative approach to the adverse effects of shrimp aquaculture has much to commend it. Particularly, where the scale, nature or location of a proposed shrimp aquaculture installation is environmentally or ecologically sensitive, there will be good reasons to require environmental assessment to be undertaken. Moreover, the scope and content of the assessment which is to be undertaken can be responsive to local circumstances and concerns. On this, it is noted that “States should ensure that the livelihoods of local communities, and their access to fishing grounds, are not negatively affected by aquaculture developments” (9.1.4 of the *Code*). Hence, local social and economic impacts may appropriately made the subject of ‘environmental’ assessment and development licensing conditions where concerns of this kind are raised in relation to particular proposals. Conceivably, also development licensing conditions may be used to oblige the developer to require the rehabilitation of land after the cessation of shrimp aquaculture activities.

Development licensing, in conjunction with environmental assessment where appropriate, is, therefore, a very flexible legal tool which may be applied with different degrees of rigour and sophistication depending upon national and local needs. At one extreme, development licensing may require only notification of the relevant authority that a particular kind of

development is to take place. At the other extreme, a development licensing requirement may allow the most comprehensive investigation of all environmental and social impacts to which a project may give rise and, in practice, may amount to an effective prohibition of an activity taking place in an inappropriate zone or location.

Moreover, development licensing and environmental assessment, are admirably consistent with the requirements of sustainable development. They provide an explicit and public forum for considering the potential adverse environmental effects of a proposed shrimp aquaculture development and for assessing these against the economic and developmental benefits that the project will be likely to secure. By these means, the environmental and developmental benefits and detriments of each individual proposal can be fully considered as to character and gravity, and most important, their sustainability.

2.8 Continuing Controls upon Shrimp Aquaculture Activities

Development licensing and environmental assessment serve as mechanisms for evaluating projects imposing controls over the commencement of shrimp aquaculture activities at inappropriate locations. However, they do not usually operate effectively in regulating the various subsequent activities which may take place following the lawful commencement of operations at a shrimp farm. For this purpose, a range of additional licensing requirements may be appropriately imposed to regulate matters such as water use, wastewater discharge, disease control and other matters which may arise as continuing day-to-day concerns in relation to any shrimp aquaculture despite satisfaction of development licensing requirements.

Arguably, these matters of ongoing concern in the operation of shrimp aquaculture activities might be most effectively regulated under a single general operational licence comprehensively governing the day-to-day activities that may be conducted at a particular installation. From regulatory, administrative and control perspectives, there is many advantages to be secured through unification of licensing requirements. Conversely, there are disadvantages of bureaucracy, dislocation of controls and consequent duplication or lack of coverage where licensing responsibilities are distributed between diverse authorities without sufficient communication or coordination between these.

However, it is recognised that a general licence of this kind would need to encompass a wide range of environmental and operational concerns. Perhaps because of the potential complexities that would arise, there is some understandable reluctance to establish general licensing systems to impose comprehensive continuing controls upon shrimp farms. Where regulatory intervention is thought necessary, the preference seems to be to regulate issues such as water use, disease control etc. as matters falling under distinct licensing schemes established for each particular purpose. The proliferation of licensing requirements which may apply to a particular shrimp farm might be seen as the source of unnecessary complexity, but since it would be necessary for a general licence to address essentially the same concerns it is not clear whether a system of general licences would be any less complex in practice.

2.9 Fresh Water Use Licensing

Although the supply of an adequate quantity of water, of sufficient quality, is essential for any shrimp aquaculture installation, the meeting of this need is also capable of giving rise to

conflicts with other water users who seek to use the same water for other purposes such as agriculture, industry or drinking water supply purposes.

The use as water abstraction licensing scheme is a desirable means of reconciling competing claims upon water arise. Licensing allows different claims to water use to be considered through a procedure whereby licence applications are openly considered and scarce water uses allocated according to respective needs. Such licences may be made subject to various conditions and, specifically, the imposition of a limit upon the amount of water which may be withdrawn under a particular licence. As with other licensing schemes, effective operation will require monitoring to ensure that abstraction limits are not exceeded, and will need to provide for penalties for those abstracting without a licence or in contravention of licence conditions.

However, in practice, the need for an abstraction licensing system for water use depends entirely on the levels of demand which are placed upon water supplies. Arguably, in the rural locations where shrimp aquaculture is most likely to be undertaken, water supplies are plentiful and competing demands are less, hence, there is a lesser need for a formal means to reconcile competing demands. In addition, it is possible that some countries may deal with water use concerns as an aspect of initial development licensing, such that shrimp farms will not be allowed to be established at locations where water supplies are inadequate to meet the needs of all users. However, where there is a problem of competing demands which is not otherwise met, a specific mechanism to licence water use must be a desirable feature for the continuing regulation of shrimp aquaculture operations.

2.10 Wastewater Discharge Licensing

A major continuing concern arising from the operation of shrimp farms lies in their capacity to produce large amounts of waste products of various kinds which, if not properly managed, are capable of having seriously detrimental effects upon environmental quality. Accordingly, in relation to aquaculture development, the Code emphasises,

“States should require that the disposal of wastes such as offal, sludge, dead or diseased fish, excess veterinary drugs and other hazardous chemical inputs does not constitute a hazard to human health and the environment” (Article 9.4.6).

Clearly, waste water is capable of being environmentally problematic due to its high sediment content and the presence of various chemicals which are used in shrimp aquaculture activities. Impacts upon the receiving aquatic environment, and hazards to human health, are matters of immediate concern. Also, the discharge of poor quality effluent from a shrimp farm may have a damaging impact upon other shrimp farms in the locality since there is the possibility that contamination or disease may be spread where effluent is capable of being transmitted between farms which share a common watercourse or a common aquatic area.

There are two distinct regulatory approaches to the control of unsatisfactory effluent being discharged from shrimp farms. The first is the imposition of a discharge licensing scheme which allows parameters to be set for maximum quantities of contaminants that may be present in waste water from shrimp farms, with an associated sanction where these parameters are exceeded. The second involves the prohibition or restriction of use of particular chemicals

which are known to have a damaging effect upon the quality of receiving waters and ecosystems. The product control approach is considered below (see 2.15 below) but, it may be noted here that, it represents an alternative legal strategy for realising essentially the same end point of preventing unacceptable adverse impacts upon environmental quality.

Waste water discharge licensing shares many features with other licensing schemes that may be applied to shrimp aquaculture in that it provides an explicit mechanism for evaluating environmental impacts and maintaining these within acceptable levels. This is achieved through conditions being imposed upon dischargers and the existence of a sanction where a discharge is made without a licence or in contravention of licence conditions. Like other licensing schemes, discharge licensing allows for a relatively high degree of location-specificity in that licence conditions may take account of the particular characteristics of the place where a discharge is made. Hence, if it is an area of particular ecological sensitivity, where high standards for the quality of receiving waters need to be maintained, or there is a particular hazard involved in the transmission of effluent into waters that are used for a particular purpose such as water supply, these factors can be taken into account and appropriately stringent conditions imposed upon the discharge.

However, the observations made about water abstraction licensing may be reiterated. The need for waste water discharge licensing is greatly dependent upon a range of local circumstances and the intensity of the shrimp aquaculture activity which is involved. Small low intensity operations situated remotely from other water users and making little use of chemicals will exert such insignificant pressure upon the quality of the aquatic environment that the imposition of licensing requirements upon discharges may be though unnecessary. A simpler alternative might be a requirement that shrimp farms install sludge containment lagoons, or sediment ponds, to prevent significant sediment discharges into receiving waters. Conversely, large high intensity shrimp farms will generate a significant effluent load which will need to be regulated, particularly where it is discharged into waters which are of ecological importance or used for other purposes which will suffer detriment due to contamination.

Where a system of waste water discharge licensing is necessary, it is unlikely that they will be formulated uniquely for shrimp aquaculture. The licensing mechanism which is needed is essentially the same as that which is likely to be used to impose corresponding controls upon discharges from a wide range of different kinds of industrial installation. Hence, waste water discharges from shrimp farms are, in most instances, likely to be regulated under the same general system of environmental quality legislation that applies to industrial premises. Clearly, there are differences between the kind of waste water which is likely to be discharged from a shrimp farm and effluent that is discharged from, for example, a major chemical factory, but the legal framework which is needed is not so fundamentally different as to require distinct systems of regulatory control to be established.

It may also be noted that the licensing of effluent discharges from industrial and other premises has beneficial effects upon shrimp aquaculture in that it provides a means of protection of shrimp farms from the hazard of pollution. Clearly, shrimp farms are extremely vulnerable to poor water quality and pollution is capable of having devastating effects upon shrimp stocks and raise serious concerns about the contamination of a food product. The appropriate regulatory response to this problem is the strict enforcement of discharge

licensing requirements in relation to industrial effluent to ensure that such discharges do not have adverse impacts upon shrimp farms.

2.11 Shrimp Movement Licensing

The movement of live shrimp may give rise to a wide range of environmental, ecological and disease control impacts. In the first place, the collecting of shrimp stock from the wild for cultivation in shrimp farms may have detrimental impacts on native stocks and ecosystems. Introduction of non-native species carries a risk of escape into the wild and consequent harm to local ecosystems through adverse genetic impacts upon native stocks or through invasive habitat competition. Movement of shrimp stocks between farms, carries with it the considerable threat of disease transmission which is capable of having devastating economic consequences both for particular farms and for the shrimp aquaculture industry as a whole.

The range of concerns arising from shrimp movements are extensively addressed in the *Code* which, amongst other measures, advocates that States should:

- evaluate the effects of aquaculture development on genetic diversity and ecosystem integrity (Article 9.1.2);

- ensure responsible choice of species, siting and management of aquaculture activities which could affect transboundary aquatic ecosystems (Article 9.2.2);

- consult with neighbouring States, as appropriate, before introducing non-indigenous species into transboundary aquatic ecosystems (Article 9.2.3);

- conserve genetic diversity and maintain integrity of aquatic communities and ecosystems by appropriate management;

- undertake efforts to minimize the harmful effects of introducing non-native species or genetically altered stocks used for aquaculture including culture-based fisheries into waters, especially where there is a significant potential for the spread of such non-native species or genetically altered stocks into waters under the jurisdiction of other States as well as waters under the jurisdiction of the State of origin;

- promote steps to minimize adverse genetic, disease and other effects of escaped farmed fish on wild stocks (Article 9.3.1);

- cooperate in the elaboration, adoption and implementation of international codes of practice and procedures for introductions and transfers of aquatic organisms (Article 9.3.2);

- encourage adoption of appropriate practices in the genetic improvement of broodstocks, the introduction of non-native species, and in the production, sale and transport of eggs, larvae or fry, broodstock or other live materials, in order to minimize risks of disease transfer and other adverse effects on wild and cultured stocks;

- facilitate the preparation and implementation of appropriate national codes of practice and procedures to this effect (Article 9.3.3); and

- promote the use of appropriate procedures for the selection of broodstock and the production of eggs, larvae and fry (Article 9.3.4).

The Food and Agriculture Organization and the Network of Aquaculture Centres in Asia-Pacific have also produced the *Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals* (the "Technical Guidelines") and their associated implementation plan, the *Beijing Consensus and Implementation Strategy*. These Guidelines were developed by representatives from 21 Asian Governments, scientists and experts on aquatic animal health, as well as by representatives from several national, regional

and international agencies and organisations. The Guidelines aim at assisting "countries to undertake movement of live aquatic animals in a way that minimises the disease risks associated with pathogen transfer and disease spread, both within and across boundaries. This will enhance protection of the aquatic environment as well as the interests of aquaculture and capture fisheries. It is also a mechanism to facilitate trade in aquatic species and to avoid unjustifiable trade barriers based on aquatic animal health issues" (*FAO Fisheries Technical Paper 402*, 2000).

To a large extent, these diverse imperatives and initiatives on movement of aquatic species seem to envisage management, research, educational, diplomatic and cooperative kinds of action in their furtherance or realisation of their objectives. Beyond this, however, it is difficult to see how many of the objectives are capable of being met without an adequate legal response. Inevitably, this must take the form of prohibitions or restrictions upon certain categories of shrimp movements which will need to be made the subject of criminal offences. General prohibitions or restrictions upon movement will, however, need to be subject to a facility for allowing particular movements to be individually licensed where, after expert veterinary and ecological investigation, sufficient safeguards can be provided against the potential hazards that have been noted.

Initially, therefore, the imposition of a shrimp movement licensing regime will allow unacceptably hazardous movements to be prevented and other movements to be individually evaluated before authorisation is given. The purpose of this is to prevent adverse ecological and disease impacts by making certain categories of movement unlawful.

Where a movement is licensed, however, a second potential benefit of movement licensing is that it can be used to require all significant movements to be recorded and information communicated to the relevant authority as a licence condition. The monitoring of movements is important because it allows diseased stock which have been the subject of recent movements to be traced to other locations that may be infected. This enables swift action to be taken to contain the spread of the disease by imposing quarantine or slaughter requirements upon infected stocks. Officials will clearly need to be appropriately empowered to take whatever action is appropriate in a particular case, but without these powers there will be serious difficulties in preventing or reducing the major hazard which disease represents to the shrimp aquaculture industry.

However, the general need for shrimp movement licensing needs also to reflect that nature of the practical activities which are to be licensed in different national circumstances. Where shrimp aquaculture is less extensively conducted and movements of stock less commonplace, the prohibitions upon movements and the licensing scheme that is adopted may be less stringent than where shrimp movements are frequent and over long distances. Nonetheless, the gravity of the threat of disease outbreaks must mean that the need for effective preventative controls and the power to take action to contain disease outbreaks must be a matter of concern to all nations except where shrimp aquaculture is only conducted as a low intensity and low stock density operation. Similarly, the concerns about the ecological impact of importation of non-native species are so great that some legislative provision for the control of such imports is likely to be needed in all jurisdictions.

2.12 Genetically Modified Organisms

Although a relatively novel issue, and one of far greater compass than shrimp aquaculture alone, the implications of genetically modified agricultural and aquaculture products has become a matter of considerable international controversy raising, profound environmental, ecological and developmental concerns. Although genetically modified shrimp products might be controlled under general shrimp movement legislation, where it exists, there is a widespread feeling that the control of genetic modification needs to be more directly and strictly addressed given the degree of ecological hazard that is involved.

It may also be noted that genetic engineering has broad ecological implications and gives rise to widespread concerns across almost all aspects of food production. Because of this, arguably, the use of genetically modified organisms in shrimp aquaculture should be though a system of national legal controls which have general application to all kinds of genetically modified organisms. If so, general prohibitions upon the use of genetically modified organisms, subject to licensing procedures that allows expert scrutiny of particular applications for use of such organisms, might provide a better means of assessing the full range of implications. Legislation which fully reflected the breadth of concerns would seem to be more appropriate than regulation within the sphere of shrimp aquaculture alone.

For the future, the regulation of genetically modified organisms will need to be considered in the context of the Cartagena Protocol on Biosafety to the Convention on Biological Diversity (2000) which was adopted by 130 States and enters into force when ratified by 50 States. The Biosafety Protocol aims at protecting biodiversity and consumers from any adverse impacts that could arise from transboundary movements of living modified organism and products therefrom. The Protocol implements the objective of the Convention of Biological Diversity and incorporates, for the first time, the precautionary principle for trade restrictions on goods containing living modified organisms. Rules based on the principle of Advanced Informed Agreement are imposed on exporting and importing countries. The Protocol also regulates the exchange of information between the exporting and the importing country and establishes which information on living modified organisms is confidential and which is not. Furthermore, the Protocol provides for the introduction of risk assessments to be undertake jointly by importing and exporting countries. It is understood that the documentation related to living modified organisms will be reviewed in 2002.

2.13 Chemical Use Restrictions

The potentially problematic aspects of chemical misuse in shrimp aquaculture are recognised in the *Code* which provides that, States should promote effective farm and fish health management practices favouring hygienic measures and vaccines. Safe, effective and minimal use of therapeutants, hormones and drugs, antibiotics and other disease control chemicals should be ensured (Article 9.4.4) and States should regulate the use of chemical inputs in aquaculture which are hazardous to human health and the environment (Article 9.4.5).

Although, as has been noted (see 2.10 above), it is possible to regulate the use of chemicals in shrimp aquaculture through imposition of a system of waste water discharge licensing scheme, it is recognised that this may not always be the most effective way of addressing the more specific problem of chemical misuse. A preferable alternative to the control of chemical

contamination may involve direct restrictions being imposed upon the use of certain chemicals in shrimp culture activities. To some extent, restrictions upon chemical use may be indirectly achieved by the imposition of legal limits upon the levels of chemical residues that are allowable in shrimp aquaculture products. However, a more direct mechanism for protecting the quality of waters in which shrimp aquaculture is conducted, or into which shrimp aquaculture effluent is discharged and the local aquatic environment, is through the imposition of prohibitions or restrictions upon the use of specific chemicals which are recognised to be harmful to the environment, and perhaps also those chemicals which are justifiably restricted as a precaution against possible harm to the receiving environment.

It is to be noted that this is an area of some technicality. Determining which chemicals should be the subject of control is a matter on which expert opinion, and perhaps an international consensus of such opinions, need to be taken into account. Moreover, even where a particular chemical is acknowledged to be hazardous, a spectrum of legal responses are possible. In the extreme, it is possible to impose total prohibition upon the possession of a particular chemical for use in shrimp aquaculture by creating appropriate criminal offence extending perhaps to the importing, distribution or sale of the chemical for shrimp aquaculture purposes. For less hazardous chemicals, it is possible to enact less severe control measures by making use subject to licensing requirements, veterinary prescription requirements or the adherence to requirements governing application of the substance, such as a code of practice governing chemical use. In each instance, the legal response needs to reflect the degree of hazard to the environment, ecosystems and human health that is generated by the particular substance involved. An expert determination of the degree of hazard involved is, therefore, crucial in determining the appropriate level of legal stringency which needs to be imposed.

2.14 Food Sources and Utilisation

In all but the least intensive kinds of shrimp aquaculture it is necessary to provide feed for shrimp. If fully utilised, artificial feed should not give rise to environmental problems, but where feed is applied excessively and wastage arises there is potential for contamination of the receiving waters into which waste food passes. Although the problem of sediment from waste food is capable of being addressed through the use of waste water discharge consent licensing (see 2.10 above), it may be more directly controlled by the imposition of restrictions upon the kinds and amounts of food that may be used in shrimp aquaculture. There are also environmental concerns about the source of materials that are used in shrimp food and that food sources should not adversely impact upon the environment.

Recognising these concerns, the *Code* advocates that States should promote efforts which improve selection and use of appropriate feeds, feed additives and fertilizers, including manures (Article 9.4.3). However, the use of the word “promote”, rather than “regulate” or any other stronger imperative, indicates that the concern about appropriate use of feed in shrimp aquaculture may be better addressed by non-mandatory measures rather than the imposition of legislation governing appropriate feeds and the proper use.

Indeed, it is arguable that adverse impacts from food wastage are self-regulating in that it will be uneconomic for shrimp farmers to use more feed than is necessary for the crop of shrimp that is being farmed. In low intensity fish aquaculture the problem is least likely to arise because levels of feeding will be low or artificial feed not used at all. The appropriate

regulatory approach will clearly depend upon the kind of shrimp aquaculture activities that are being undertaken in a particular jurisdiction and the extent of the adverse environmental impacts to which this gives rise. Where the problem is found to be serious a regulatory approach may be appropriate, but otherwise an educational approach, such as the establishment of a code of guidance, is likely to be more successful.

2.15 Product Quality Controls

Shrimp, as a food product, needs to be regulated under public health law to ensure that any potential hazard to the health of consumers is avoided. Concerns about public health are prominent in the *Code* which advocates that,

States should ensure the food safety of aquaculture products and promote efforts which maintain product quality and improve their value through particular care before and during harvesting and on-site processing and in storage and transport of the products (Article 9.4.7);

States should adopt appropriate measures to ensure the right of consumers to safe, wholesome and unadulterated fish and fishery products (Article 11.1.1); and

States should establish and maintain effective national safety and quality assurance systems to protect consumer health and prevent commercial fraud (Article 11.1.2).

Public health requirements may be partially addressed by measures of the kind that have previously considered, such as the prohibition or restriction of certain chemicals in shrimp aquaculture where these are capable of being transmitted to consumers or the imposition of requirements as to the residue content of harmful substances in the final product. Alongside these matters, a range of controls are needed to govern the harvesting, distribution and sale of shrimp products to ensure that these reach consumers in good condition.

Again, public health is a technical and specialised area of regulation which extends well beyond shrimp products in its compass. Food safety issues need to be addressed within a code of national law which extends to food products of all kinds, so that common principles can be formulated and consistent implementation and enforcement mechanisms applied. Not least important in this respect is the need for enforcement to be undertaken by an inspectorate with the necessary technical expertise and capacity to identify food safety issues in practice throughout the food chain from production, through processing, distribution and marketing, to the eventual consumer. Clearly, the issues involved are far wider than shrimp products alone and it is desirable that food safety concerns should be regulated within a comprehensive system of food safety controls.

Recognising that a large part of shrimp production will be consumed outside the country of origin, the public health dimension extends beyond purely national concerns. Mechanisms must be put in place to ensure that the product reaches its final destination in a condition which conforms to the public health requirements of the importing country. In particular, the need for national legislation to meet European Community Seafood Directive or the United States Seafood Regulation (see below) will be of critical importance where shrimp products are to be exported to countries where these apply. This issue is further considered under the following section as an aspect of internationalisation of shrimp aquaculture legislation.

2.16 The Internationalisation of Standards

There are various respects in which national shrimp aquaculture law may seek to implement or reflect a broader international consensus as to the development and conduct of shrimp aquaculture. Indeed, many Articles within the *Code* envisage States enacting national legislation which give effect to the principles stated within it. Whilst it is recognised that the *Code* is largely “voluntary”, though encompassing certain agreed norms of international law, there are good environmental and operational reasons why States who have endorsed the *Code* should seek to enact appropriate provisions into national law which give effect to those requirements which require a legal response.

However, the pressing practical concern for many developing countries is that shrimp production is a source of vital income from exports. Where securing this income is dependent upon meeting legal requirements which enable exports to take place, there is a strong economic pressure to ensure that all such requirements are met. Hence, where export is made conditional upon national legislation being enacted to meet requirements for export there is a critical economic need for the required national legislation to be enacted and enforced.

Various issues with an international trade dimension are incorporated in the *Code*. Hence,

States should set minimum standards for safety and quality assurance and make sure that these standards are effectively applied throughout the industry. They should promote the implementation of quality standards agreed within the context of the FAO/WHO Codex Alimentarius Commission and other relevant organisations or arrangements (Article 11.1.3);

States should cooperate to achieve harmonization, or mutual recognition, or both, of national sanitary measures and certification programmes as appropriate and explore possibilities for the establishment of mutually recognized control and certification agencies (Article 11.1.4);

International trade in fish and fishery products should not compromise the sustainable development of fisheries and responsible utilization of living aquatic resources (Article 11.2.2);

States should cooperate to promote adherence to, and effective implementation of relevant international standards for trade in fish and fishery products and living aquatic resource conservation. (Article 11.2.11); and

States should harmonize as far as possible the standards applicable to international trade in fish and fishery products in accordance with relevant internationally recognized provisions (Article 11.3.6).

Whilst these, like the *Code* as a whole, are understood to be *voluntary* undertakings, they have acquired a more compelling character where they have become the subject of legislation with an international impact upon shrimp exporting countries. Perhaps the greatest international influence on national legislation concerning shrimp aquaculture in practice arises because of the need to implement food safety requirements based upon hazard analysis critical control points (HACCP). The objective of HACCP is to minimise the risk of food-safety hazards through a preventative system that monitors points in the food production chain where there is greatest scope for potential hazards and ensures that seafood reaches the consumer after it has been caught, processed, transported and marketed in a manner that minimises the risk to the consumer.

The legal basis for HACCP arises under European Community Directive 91/493/EEC concerning conditions for the placing on the market of fishery products (the "Seafood Directive"), and related Community legislation, and also the United States Seafood HACCP Regulation (*Federal Register* 18 December 1995 (Volume 60, Number 242) Rules and Regulations, p.65095). Broadly, these two measures have similar food safety implications for countries that wish to export shrimp and other fishery produce to the European Community, the United States and various other fish importing countries where the legislation is applied.

The European Community requirements involve securing compliance with Directive 91/493/EEC concerning conditions for the placing on the market of fishery products, and related Community legislation, whereby fishery products are marketed in the Community, whatever their place of origin. Essentially, the purpose of the Directive is to secure that fishery products imported for marketing in the Community from outside countries must be treated in an equivalent way to fishery products originating within the Community. This requires exporting countries to carry out their "own checks" to identify critical points in their fish processing establishments and to monitor and sample these and keep appropriate records (see Commission Decision 94/356/EC on the detailed application of the "own checks" requirement). The Directive provides for a Community procedure for the inspection of third countries in respect of the conditions of production and the placing upon the market of fishery products in order to ensure that "own checks" are being conducted and to apply a system of import controls based upon requirements equivalent to those applicable to fishery products originating within the Community. In order to confirm that conditions of production, storage and dispatch of fishery products meet Community requirements (as detailed under Annex to the Seafood Directive), inspections may be carried out by experts from the European Commission and the Member States of the Community. Clearly, the objective for countries that intend to export shrimp produce to the European Community, is to satisfy all these requirements and to have this recognised by entry of the country into lists of third countries from which fishery products are authorised (under Commission Decision 97/296/EC regarding lists of third countries from which fishery imports are authorised).

The United States' equivalent of the European Community Seafood Directive is the United States Seafood HACCP Regulation which came into force in December 1997. Essentially, this requires every producer of seafood, where an identifiable food safety hazard is reasonably likely to exist, to put in place a HACCP plan which is consistent with the United States Seafood Regulation. The failure of a country to have, and to implement, such a plan will have the consequence that imported seafood from that country will be classified as "adulterated" and the United States Food and Drug Agency will deny entry of the product into the United States. Similar, consequences are likely in relation to other fishery product importing countries, such as Japan, which have adopted HACCP requirements in relation to imported fish. Further requirements are that the HACCP plan adopted by a processor must have been developed by a person who has received training in the application of HACCP principles to the extent deemed adequate by the United States Food and Drug Agency, and the trained person must regularly reassess, modify and review the relevant HACCP plan and its implementation. Finally, the importer of fishery products into the United States must be able to verify, to the satisfaction of the United States Food and Drug Agency, that the seafood, for which entry clearance is sought, has been processed in accordance with an effective HACCP

plan and failure to show this will result in the seafood being deemed to be "adulterated" and denied entry.

Although the detailed content of the "own checks" and HACCP requirements is quite extensive, in identifying the sanitary conditions that must be followed in seafood processing and other operations, it is not necessary to go into the detail of these. The key legal point is that a failure to meet these requirements is capable of having a serious consequences in respect of its impact upon exports of shrimp and other fishery products. Because of this, it is a practical necessary for all countries, seeking to export to countries where "own checks" or HACCP requirements apply, to ensure that national legislation and practice follow the requirements imposed by importing countries. Because of this, a large number of countries within the scope of the survey have noted that national legislation had been enacted to ensure compliance with these requirements.

2.17 Guidance and Producers' Organisations

Although the terms "guidelines" and "code of practice" are widely used, in relation to a wide spectrum of measures which are designed to influence the conduct of shrimp aquaculture, they are expressions which often conceal a high degree of ambiguity. It is, therefore, important to clarify the status and character of guidance and to distinguish this from the status of a legal requirement. Most fundamentally, a legal requirement is mandatory in nature, so that the failure to adhere to it has the consequence that this failure is, potentially, the subject of whatever legal consequences follow from the breach. Usually, breach of a legal requirement justifies a criminal prosecution which, if successful, will give rise to a penalty such as a fine and perhaps a further legal duty upon the offender to rectify the situation which has arisen in breach of the criminal law. However, where a matter is only provided for in guidance, the consequences of failing to adhere to that requirement is less clear. In most respects, guidance addresses matters which are not the subject of legal requirements and for which no specific legal penalty is provided. In such instances, there a range of possible consequences which depend upon the status of the particular guidelines or code of practice which has been breached and the body which has established it.

In some instances adherence to guidelines and codes of practice may be supported by various non-mandatory mechanisms to encourage compliance. Education and training may be used to instil in those to whom the guidance is addressed an appreciation that compliance is in the best interests of those individuals and the industry of which they form a part. Economic and other kinds of incentive may also be used to provide important financial incentives for compliance. Shrimp aquaculture associations may give their weight to the need for compliance with guidance by the imposition of internal pressures, such as making compliance a condition of membership of the association and receiving any commercial or other benefits which membership entails. In each instance, however, the distinction must be emphasised that guidance is not normally supported by any formal legal sanction of the kind that is available where legislative requirements are involved.

The lack of formal legal sanctions to support guidelines or codes of practice should not be regarded as a problem. Indeed, the economic pressures to adhere to guidance might be seen by many shrimp farmers as a more compelling reason for compliance than the possibility of a criminal penalty which might accompany breach of a legislative requirement. Guidance

clearly has a valuable function, but it is a function that is important to distinguish from that provided by formal legal requirements.

Guidelines and codes of practice should also be distinguished according to whom they are addressed. For example, the FAO *Code of Conduct on Responsible Fisheries*, insofar as it is specifically concerned with aquaculture, is largely concerned with the responsibilities of States in relation to the activities that take place within their jurisdiction and the international implications of these activities. Other codes of practice concerned with aquaculture, particularly those established by national governmental bodies or producers organisations, are primarily addressed to the individual participants in shrimp aquaculture and other aquaculture activities. The content of any particular set of guidance is, most critically, determined by the addressees of the guidance.

Although it has been noted that adherence to guidance may be enhanced where a shrimp producers' association uses its influence over its members to encourage compliance, there are several additional respects in which associations of this kind may valuably contribute to the development and conduct of shrimp aquaculture. In principle, shrimp producers may group together into an association for a range of different purposes: to represent their common interests to government, to share in the task of marketing or distributing their produce or to share in the provision of research and training for those involved in the sector. Most pertinently here, producers' organisations may exert a powerful influence over their members in enhancing the quality of their products and improving the environmental performance of the industry.

The potentially important role of shrimp producers' association is recognised in the *Code* which advocates that, States should promote responsible aquaculture practices in support of rural communities, producer organizations and fish farmers (Article 9.4.1). What form this "promotion" of producers' associations should take is, however, left unspecified. Potentially, producers' organisations might be supported by government funding or the subsidised or free provision of training or education resources to them. At the very least, a representative producers' organisation should have a recognised status at any forum where shrimp aquaculture policy and legislation is the subject of deliberation and the views of the organisation given appropriate weight in any final decisions that are reached.

2.18 Enforcement

Perhaps most important, though often the weakest link in the regulatory chain, is the mechanisms which are provided for law enforcement. Clearly, well drafted and appropriate legislation will be of no practical value if it is not implemented on the ground. Equally, it has been noted that law enforcement, in a relatively technical and specialised area such as shrimp aquaculture, depends upon the existence of a sufficient number of trained staff with sufficient expertise in the activities that they are bound to regulate.

In many respects, the effectiveness of enforcement comes down to a question of resources and cost. However, the costs of proper law enforcement must be seen against a alternative cost of failing to enforce legislation adequately. Not uncommonly, the success of a national shrimp aquaculture industry is heavily dependent upon bringing a relatively small number of errant shrimp farmers into line. The misuse of chemicals in shrimp aquaculture, for example, may

involve potentially catastrophic losses for the industry as a whole, since it only needs one farmer to allow shrimp products with excessive level of chemical residues to be passed into the distribution chain for the entire national industry to be commercially blighted. Similar observations may be made about the need to enforce disease control measures, and the impacts upon the whole industry of a small number of farmers who fail to adhere to environmental requirements. The costs of enforcement, therefore, must be balanced against the costs of failure to enforce regulatory requirements.

Alternatively, conformity with good practice for shrimp aquaculture may be secured in various different ways. The enactment of regulations against unacceptable shrimp aquaculture practices carries the implication that contravention of regulations will give rise to a sanction of some kind being imposed against the offender. However, there may be situations where policy objectives are most effectively secured by offering of incentives of various kinds to farmers whose conduct is in conformity with regulatory requirements. It is evident that fiscal, or other kinds of economic advantages, being offered to shrimp farmers may carry advantages in certain situations, though incentive-based conformity may operate most effectively where sanctions for non-compliance are also provided for. As a general principle, a less coercive approach is preferable to a more coercive approach, where they are equally effective in achieving the level of compliance that is desired. Hence, the dangers of over-regulation need to be weighed into the balance and the scope for alternative mechanisms for securing compliance exploited to the full.

Chapter 3 National Legislation of Asian Countries

3.1 Sustainable Development

Generally good progress has been made with the interpretation and implementation of the concept of sustainable development in a number of Asian countries. In **Thailand** where a new Constitution of 1997 encompasses fundamental policy issues regarding natural resources and environmental management and requires the pursuit of sustainable development. In addition, the 8th National Economic and Social Development Plan (1997 –2001) addresses the overall pursuit of sustainable development and the policies which this entails for sustainable shrimp aquaculture. This is also reflected in the emerging 9th National Economic and Social Development Plan (2002-2006) which reaffirms the need for sustainable development and encourages shrimp aquaculture practices which are in accordance with the *Code of Practice for Sustainable Shrimp Aquaculture*. At the implementation level, various government-implementing agencies also formulate their action plans in accordance with sustainable development concepts. This has been reflected in the National Enhancement and Preservation of Environmental Quality Act 1992 in which aspects of sustainable development have been incorporated.

Significant progress in respect of sustainable development has been also made by the **Philippines**, where a national programme for sustainable development has been presented in *A National Agenda for Sustainable Development*. Integral to this is a legislative agenda encompassing enactment of a new Fisheries Code Act 1998 which seeks to secure sustainable development of fishery resources in national waters. The 1998 Act provides for the formulation of a Code of Practice for Aquaculture which will outline general principles for the sustainability of the industry. Consultation with interested parties is presently being undertaken with respect to the content of the Code. Shrimp farming is placed within the overall framework for the sustainability of the aquaculture industry.

Sustainable development has been generally influential in **India** where the Government, through the Ministry of Agriculture, has issued *Guidelines for Sustainable Development of Brackish Water Aquaculture* 1995. These *Guidelines* note the international experience in other countries where intensive shrimp farming has led to environmental degradation threatening the long-term sustainability of the farming itself. The *Guidelines* stress the need for measures for sustainable aquaculture, to reduce and eliminate adverse impacts of aquaculture on the environment and to develop it as an eco-friendly activity.

In other instances, the need for sustainable development has been acknowledged as a matter of principle but not translated into particular measures. Hence **Sri Lanka**'s Fisheries and Aquatic Resources Act 1996 provides for conservation and development of fisheries and aquatic resources and seeks to ensure sustainable development of the aquaculture industry as a whole. However, the Act has no specific provisions directly concerning shrimp farming.

The thinking behind sustainable development is that environmental and developmental needs must be explicitly balanced against one another to arrive at optimum solutions which respect the needs of present and future generations. Elements of this line of thought, may be seen in the legislation of other countries where sustainable development is not explicitly referred to but similar concerns are, implicitly, being addressed.

In **China**, for example, priorities concerning aquaculture lie with the need to increase food production, but some indications are also given of the need for a balance between developmental and environmental issues. Hence, the Regulation for Propagation and Protection of Aquatic Resources 1979 was formulated for the propagation and protection of aquatic resources, for fishery development and to meet the needs of socialist modernisation. Legislation is planned to regulate the scale and density of aquaculture installations and to establish environmental assessment requirements, but it appears that there is no presently national reinterpretation of 'sustainable development' in the specific context of shrimp farming. Likewise, in **Vietnam**, where no national interpretation of sustainable development in an aquaculture context exists, legislation is provided for in relation to relevant environmental concerns. Hence, organisations and individuals have the responsibility to protect all varieties and species of wild plants and animals, maintain biodiversity and protect forests, seas and all ecosystems (Environmental Protection Law 1993).

In other countries legal and policy developments which might be seen as conducive to sustainable development seem to be taking place, but often with uncertainty as to how particular measures relate to the overall objectives and strategies that sustainable development involves. Thus in **Indonesia** it is indicated that legislation has been enacted on environmental impact assessment and fisheries business and that action is being taken on implementing the *FAO Code of Practice for Responsible Fisheries*, though it is not clear what this action entails. In **Bangladesh**, sustainable development has not been interpreted nationally in the specific context of shrimp farming and it is recognised that there is a general lack of consensus as to how it should be applied in practice.

3.2. Legislation

The general picture in the Asian countries surveyed is that shrimp farming is regulated under a wide range of legislation but is subject to very few provisions that are specific to the control of the activity. Hence, general fishery legislation and environmental and ecological quality legislation tend to be of prominent importance under most national systems of control. However, these are supplemented by legislation covering a diverse range of matters including controls on land use planning, industrial activities and economic incentives, agricultural measures and public health controls of various kinds.

The range of national legal measures that may be applicable are well illustrated by **Thailand**, where key enactments concerning shrimp aquaculture are the Fisheries Act 1947, as amended, and the Enhancement and Preservation of the National Environmental Quality Act 1992, along with Ministerial Orders and subsidiary legislation under these enactments. The Fisheries Act 1947, as amended, provides the principal mechanism for the regulation of capture fisheries and also provides for the regulation of "cultivation ponds" used to culture aquatic animals as prescribed by Ministerial Regulation. Ultimately the Minister of Agriculture is responsible for the execution of the Act and for that purpose has the power to appoint competent officials and issue Ministerial Regulations fixing rates of fishery taxes and fees and determining other activities concerned with the carrying out of the Act. However, in addition to the central regulatory measures concerning fisheries and environmental protection, a diverse range of other regulatory requirements may be relevant to shrimp farming. Hence, regulations are provided for relating to national policies and plans under the Economic and

Social Development Planning Act 1974; regulations on the use of land are provided for under the Land Law 1954, the Industrial Act 1992, the Land Reform Act 1975, the Land Development Act 1977, the Land Utilisation for Agriculture Act 1914 and the City Planning Act 1992; regulation of water quality control is provided for under the Public Health Act 1941, the Industrial Act 1942, the Feed Quality Control Act 1979 and the Building Act; regulation concerning particular aspects of shrimp farming is provided for under the Feed Quality Control Act 1979 and the Drugs Act 1967; and regulation on the utilisation of natural resources is provided for under the Fishery Act 1947, the Forestry Act 1941, the National Reserved Forest Act 1964 and the National Park Act 1961.

In the **Philippines**, it is understood that national regulations relating specifically to shrimp farming are to be promulgated soon but, for the present, shrimp culture is subject to legal requirements provided for under the Philippine Fisheries Code Act 1998 which contains provisions relating to coastal and inland aquaculture but not shrimp farming. Similarly, in **India** an Aquaculture Bill is presently before Parliament which will introduce specialised provisions for aquaculture, including restrictions upon shrimp farming in the coastal zone, but until the enactment of this Bill shrimp farming continues to be governed by a range of more general legislation concerning fisheries and other matters.

In common with a number of other jurisdictions, **India** provides another good illustration of the approach of having legislation which may be relevant to shrimp farming, spread between a number of key statutes. Various laws and regulations may be relevant to shrimp culture including the Fisheries Act 1978, the Environment (Protection) Act 1986, the Water (Prevention and Control of Pollution) Act 1974, the Wild Life Protection Act 1972 and the Forest Conservation Act 1980. Essentially, the law relating to fisheries, environmental protection, water resources and wildlife protection, all of which are of central importance to shrimp farming, are to be found in different acts which must be read in conjunction with one another to gain a full picture of the relevant law.

A similar dispersal of provisions on shrimp farming is to be found in the legislation operative in other jurisdictions such as **China** where regulation is through a combination of the Fisheries Law 1986, the Regulation for the Propagation and Protection of Aquatic Resources 1979, under more general environmental legislation, including the Law on the Environment, and also under regulation of water pollution control and marine environmental protection law. Likewise, in **Vietnam** central provisions are the Land Law 1993, the Aquatic Resources Ordinance 1989, and the Law on Environmental Protection 1993, but there is also likely to be additional legislation on other matters which are relevant.

The tendency to regulate shrimp farming through a combination of fisheries, environmental and ecological protection laws does not always provide a complete system of measures and various other areas of law may also be of considerable importance. Land use restrictions are commonly provided for through land development licensing requirements of various kinds. In **Indonesia**, for example, aquaculture development in each province is regulated through local government regulations on spatial planning. Amongst other requirements, where a new aquaculture enterprise utilises an area greater than 50Ha, consultation and co-operation must be arranged with the local population (Agriculture Ministerial Degree 1995 on Guidelines of the Nucleus Estate and Small Holder System of Fisheries Business and Transmigration Decree 1998 on Development of Fisheries Pattern Transmigration). In **Bangladesh**, shrimp

farming is subject to the general law relating to land use but, because it is categorised as non-industrial, it does not fall under certain environmental quality controls. In **Malaysia** a similar spread of relevant legislation exists with land use issues provided for under the National Land Code 1974.

3.3 Institutional Responsibilities

A general pattern for the distribution of administrative responsibilities involves the allocation of overall responsibility for policy and legislation concerning shrimp farming with central government. An illustration of this is to be found in **Malaysia** where policy matters concerning agriculture generally are provided for in the *National Agricultural Policy* (1992-2010). This outlines a broad policy framework and indicates that aquaculture is to be encouraged and supported with adequate incentives, infrastructure and programmes. However, the policy is not formulated with specific reference to aquaculture alone and applies in only general terms in respect of shrimp farming. Institutional responsibility for implementation of aquaculture policy is divided between the Federal Government and state authorities, and it is noted, a range of divisions of government may become involved: Federal and States Departments of Fisheries; State and District Land Offices; the Federal Department of the Environment and the Federal Ministry of Health (in relation to food quality).

In **Malaysia** specific measures are provided for to enhance the development of aquaculture under the Promotion of Investments Act 1986 which allows the Minister of International Trade and Industry to publish a list of activities or products to be promoted. Presently this list includes the breeding, culturing and processing of aquatic products. With the agreement of the Minister of Finance, the Minister may grant a 'pioneer status' certificate to a company wishing to engage in a promoted activity. Companies with pioneer status are entitled to an investment tax allowance from five years from the date production begins which exempts them from income tax on 70% of the corporate income, initially, for a five year period. In practice, it is understood to be unusual for applicants involved in aquaculture activities to be refused pioneer status.

In other jurisdictions the overall policy and regulatory responsibility is similarly located in central government with different degrees of responsibility for technical and local concerns being allocated to specialist and local bodies. In the **Philippines** national government has the responsibility for the formulation and adoption of policy which is implemented through legislative and non-legislative mechanisms. It also has responsibility for enforcement in relation to shrimp farms established on public lands. In respect of shrimp farms on private lands, supervision falls to local government which has the responsibility of enforcing national policies and legislation. The Bureau of Animal husbandry, attached to the Department of Agriculture, has the specialised responsibility for the importation, registration and use of aquaculture feeds, biological products and chemicals.

A central role in the administration of aquaculture in **Thailand** is played by the Department of Fisheries and the execution of responsibilities entrusted to competent fishery officials under the Fisheries Act 1947, as amended. However, district fishery officers have diverse responsibilities including the enforcement of the law relating to capture fisheries, the collection of information relating to diseases, and the provision of education on matters relating to fisheries. The Enhancement and Preservation of National Environmental Quality

Act 1992 provides for the establishment of the National Environment Board and Environmental Fund, and empowers the Board to prescribe environmental quality standards for coastal and freshwaters. It requires the establishment of an Environmental Quality Management Plan and imposes a duty upon all government agencies to take action for the effective implementation of the Plan. Further action plans for environmental quality management are provided for at a local level with the approval of the Board. Protection and management of areas within national parks and wildlife reserves are to be in accordance with the Environmental Quality Management Plan and provision is made for the designation of other areas as environmentally protected areas. For the purposes of environmental quality promotion and conservation, powers exist to specify projects or activities likely to have environmental impact and persons and bodies required to prepare reports on environmental assessment for submission in seeking approval for such projects.

In **China** responsibility for aquaculture is centrally allocated at national level for enactment of laws, regulations and policies. Nationally, scientific institutions draft standards and codes for inspections relating to shrimp disease and pond management. Research institutes on aquatic products take on an important role in surveying and protecting resources and in the development of fishery legislation. They also offer recommendations for the propagation and protection of aquatic resources and provide technical advice on the formulation of implementation rules (Regulations for the Propagation and Protection of Aquatic Resources 1979). China's principal concern has previously been with economic development and it has encouraged the development of shrimp farming for that purpose, though progressively the need to control disease and make shrimp farming more sustainable is being recognised and the need for regulation and guidelines acknowledged. For those purposes, centres for environmental monitoring and disease prevention also exist.

In **Sri Lanka** general policy responsibility for the development of shrimp farming rests with the National Aquaculture Development Authority and Ministry of Fisheries and Aquatic Resources Development. National government regulates aquaculture under Fisheries and Aquatic Resources Act 1996 and under the National Environmental Acts 1980 1988, though North Western Provincial Council has a separate environmental Act. However, a large number of agencies, institutions and specialist bodies are required to co-ordinate and collaborate with regard to aquaculture and coastal matters. Specific roles and responsibilities in relation to aquaculture planning and monitoring are allocated to the National Aquatic Resources Agency; the Land Commissioner; the Department of

Box A1.6: Institutions	
<i>There are more than 20 institutions with an interest in the development of the shrimp industry in Sri Lanka:</i>	
National Level Institutions	
<ol style="list-style-type: none"> 1. Ministry of Fisheries and Aquatic Resources (MFAR) 2. National Aquatic Resources Agency (NARA) 3. Department of Coastal Conservation (CCD) 4. Central Environmental Authority (CEA) 5. Land Commissioner (LC) 6. Department of Irrigation (DI) 7. Department of Wildlife Conservation (WLCD) 8. Department of Forest Conservation (FD) 9. Land Reclamation & Development Board (LRDB) 10. Coconut Cultivation Board (CCB) 11. Board of Investment-Sri Lanka (BOI) 12. Sri Lanka Export Development Board (EDB) 13. Divisional Secretaries of Respective Areas (DS) 	<p>the</p> <p>the</p> <p>the</p>
Provincial Level Institutions	
<ol style="list-style-type: none"> 14. Provincial Ministry of Fisheries (PMF) 15. Provincial Environmental Authority (PEA) 16. Provincial Land Commissioner (PLC) 17. Wayamba Development Authority (WDA) 18. Industrial Services Bureau (ISB) 	
International Agencies	
<ol style="list-style-type: none"> 19. Agro-Enterprises Development Project (Ag-Ent) 20. United States- Asia Environmental Partnership (USAEP) 	

Irrigation; the Central Environmental Authority; the Coast Conservation Department; the Irrigation Department; and the Land Reclamation and Development Board. Institutions with a role in environmental management include the Central Environmental Authority; the Ministry of Fisheries and Aquatic Resources; the Department of Coastal Conservation; the National Aquatic Resources Agency; and the Universities of Sri Lanka which have responsibility for research and education. At provincial level, there are a range of further institutions who have responsibility for aquaculture: the Provincial Ministry of Fisheries; the Provincial Environmental Authority; the Provincial Land Commissioner; the Wayamba Development Authority; and the Industrial Services Bureau. Perhaps most significantly in respect of environmental controls the Central Environment Authority, as the policy-making and co-ordinating agency on the environment, is empowered to (a) issue environmental protection licences, (b) to lay down conditions on which these licences may be issued, (c) to monitor whether these conditions are adhered to, and (d) to renew or revoke the licences. In respect of water resources, the Ministry of Lands and Land Development is responsible for land, irrigation and forestry.

In **India**, specific responsibilities for aquaculture have been allocated to the Aquaculture Authority of India **which** has been established under the Ministry of Agriculture. The Central Institute of Brackishwater Aquaculture provides facilities for research and training and the Central Institute of Fisheries Education and state fisheries colleges offer courses for education and training.

The national government in **Indonesia** is responsible for standardisation on technical matters concerning certification of products, monitoring and examination, though local government is responsible for spatial planning and certification of quality management.

In **Bangladesh** central government is responsible for implementation of policy matters for shrimp farming and is also responsible for infrastructure development and the provision of training through development projects. Although specialised research bodies are provided for, these have no regulatory powers.

The Council of Ministers for **Vietnam** is responsible for the conservation and development of aquatic resources. The Ministry of Fisheries undertakes research and surveys on the exploitation of aquatic resources (1989 Ordinance). The State exercises unified management responsibility for environmental protection and formulates plans and enhances capabilities for environmental protection centrally and at local levels (Environmental Protection Law). Various environmental management responsibilities are allocated to the State including: promulgating and implementing environmental protection legislation; developing and implementing strategies and policies; establishing and managing monitoring systems; appraising environmental impact assessment reports; issuing and revoking certificates of compliance with environmental standards; organising training and research; and developing international relations in the field of environmental protection (Environmental Protection Law). The Ministry of Science, Technology and Environment is responsible to the Government for exercising the function of State management of environmental protection.

3.4 Devolution of Controls

Devolutionary mechanisms for aquaculture are most pronounced in those countries with a federal structure. A good illustration of this is to be seen in **India** where administration is based on a federal structure which allows devolved governments power to enact legislation for the regulation of aquaculture in coastal areas. In accordance with these powers, three governments, for Orissa, Tamil Nadu and Karnataka, have formulated aquaculture legislation but these enactments have not been implemented pending the final outcome of Supreme Court litigation concerning intensive shrimp aquaculture (discussed below).

The Tamil Nadu Aquaculture Regulation 1995 applies to all coastal aquaculture units and institutes a general authorisation system for the establishment of such units. It prohibits the location of aquaculture units in specified certain prohibited areas including wetlands, breeding grounds, sanctuaries, mangrove areas and areas committed to community conservation or production forestry. For the promotion of environmentally friendly sustainable aquaculture activities, the Regulation introduces a zoning system and prohibits the diversion of certain drainage channels without a consent. Farms must also be equipped with an effluent settlement pond and use chemicals and drugs in a limited manner so that the resulting effluent is under the level of detection at the point of discharge. A licence for shrimp farming under the Regulation is valid for 5 years and renewable, however it can be suspended in the event of breach of any of the conditions to which it is subject and penalties are provided for in respect of contravention. A remarkable feature of the Tamil Nadu Regulation is the establishment of an eco-restoration fund. This is supported by payments made by fish farmers to be used for the purposes of correcting imbalances to the environment caused by aquaculture. In the event of cessation of aquaculture activities, for any reason, eco-restoration works may be carried out at an aquaculture unit and repayment of 75% of any payment may to the fund will be allowed to the farmer. Alternatively, the Director of the Eco-Restoration Fund may fund works from deposits paid in relation to a farm.

The distinction between competences of the Federal and State Governments is also of importance in **Malaysia** where Federal Government has jurisdiction in respect of trade and food control, waters (except where these are wholly within a state) and health including poisons and dangerous drugs. States have jurisdiction over land, agriculture and forestry and river fishing. Various matters are the subject of concurrent jurisdiction including the protection of wildlife, veterinary services, town and country planning, public health and drainage. Broadly, aquaculture conducted in maritime and most estuarial waters is the responsibility of Federal government whereas aquaculture conducted in rivers and other inland waters is the responsibility of state governments. Most states have exercised powers under Fisheries Act 1985 (s.38) to enact rules relating to fisheries but presently these contain few provisions of direct relevance to aquaculture.

Thailand has enacted the Tambol Administrative Organization Act 1994 which empowers local communities, at sub-district level, to manage and conserve natural resources and the environment in their localities. These powers enable local communities to regulate any activities in their areas including aquaculture activities. The Tambol Administrative Organization comprises the sub-district headman, the headmen of all villages, the sub-district doctor and two elected members from every village in each sub-district.

In other jurisdictions a balance of regulatory powers allocated to central and devolved government does not appear to be allowed for but a degree of administrative devolution is

envisaged. Thus in **Vietnam**, the Council of Ministers approves strategies and plans for conservation and management of natural resources at all levels. People's Committees of provinces, cities and special zones are responsible for the formulation of strategies and plans for conservation and development of aquatic resources within their own administrative areas. People's Committees of districts formulate strategies and plans for protection and development of aquatic resources for enterprises and organisations located within their districts (1989 Ordinance).

Similarly in **China**, although regulatory devolution is not generally provided for, in the provinces peoples governments have responsibility for fishery production in economic development plans involving measures to enhance utilisation of water areas and regulations imposing location requirements providing these are consistent with national laws. Responsibility is allocated at regional or local level for the implementation of regulations.

In the **Philippines**, devolutionary powers extend to local government but only in relation to private shrimp farms. However, participation of local communities and user-groups is possible through co-management bodies known as Fisheries and Aquaculture Resource Management Councils, under the Fisheries Code 1998, but only in respect of making recommendations with regard to policy formulation.

At the local level, in Sri Lanka the 13th amendment to the Constitution, has placed environmental protection on the concurrent list and the provincial list of legislative competences. The effect of this is that provincial councils have extensive legislative powers in respect of matters within the provincial list and may legislate on matters within the concurrent list only in consultation with the Parliament. In consequence, provincial councils have wide legislative and executive powers in relation to public lands, the environment, irrigation and agriculture so far as these are matters within their exclusive list. However, the listing on the provincial list confines the powers of the provincial councils to the sphere of environmental protection "to the extent permitted by law". It is notable in this regard that, the National Environment Acts 1980 and 1988 do not mention the provincial councils since these Acts predate the 13th Amendment.

Whilst, **Bangladesh** reported no devolution of controls it is not clear whether this related to formal regulatory powers alone or whether it had mechanisms for the local administration of shrimp farming controls.

3.5 Acquisition of Land Rights

The acquisition of land for establishment of a shrimp farm will clearly be dependent upon the general system of land ownership and land holding in each national jurisdiction. Here the contrast between those countries which allow private ownership of land and those which subject the holding of land to overall state control is a central concern. Equally, distinctions may be drawn between the regulation of public and private landholding within a single jurisdiction. Illustrations of both kinds of approach are to be found in the Asian countries surveyed but, whether land is held in private or public ownership, a key issue in this study is the extent to which the acquisition of land rights for shrimp farming involves environmental and other public duties upon the land holder.

The contrast between public and private involvement in land acquisition for shrimp farming is well illustrated by the **Philippines** where acquisition of land for establishment of a shrimp farm is essentially a matter of a prospective shrimp farmer acquiring the necessary private rights. Where the land is public land, however, such rights may be acquired under a 25-year fishpond lease by agreement with the Bureau of Fisheries and Aquatic Resources. Co-operatives and associations are given a preferential status in respect of leases for government fishponds (Fisheries Code). For the future, it is envisaged that Government support will be conditional on compliance with environmental conditions and will be subject to a system of incentives and disincentives to encourage compliance with environmental standards and to promote sustainable management practices (Fisheries Code). Although there is no specific programme for making public funds available for shrimp farming land acquisition, an Aquaculture Investment Fund makes loans to those engaged in aquaculture. Hence, the use of public land for shrimp farming may be strongly influenced by the status of the applicant as a cooperative or association and its willingness to comply with environmental conditions and this may have further implications in relation to securing state funding.

In **Malaysia** the regime governing shrimp farming development on private land is quite stringent in that the establishment of a shrimp farm on private land will be dependent upon the zoning category of the land. Hence, an aquaculture facility may only be established on private land if the land is zoned for agricultural use. If the land is not zoned for agriculture it will be necessary for the prospective shrimp farmer to apply to the State Authority for a determination by the State Executive Council as to whether the land may be converted to use for aquaculture. A few states have formally 'gazetted' areas identified for aquaculture. Site selection is often heavily influenced by the availability of state land and the absence of other conflicting land uses such as polluting industries and the Land Acquisition Act 1960 has been used compulsorily to acquire land for aquaculture development in appropriate locations.

In **Bangladesh** land acquisition is normally a matter of private rights but acquisition of, government-owned, Khash, land needs government support and requires payment of rent. The present procedure for leasing out non-agricultural Khash lands to private individuals is quite lengthy and cumbersome. Although the final decision has to come from the Land Ministry, four-tier Local Governments are due to take over local development programs and activities in the near future, and the authority in charge of leasing non-agricultural Khash land for aquaculture will be the local government district authority. This may help expedite development of potential shrimp farming areas. Although there is no system of zoning of land for different kinds of use, a general prohibition is imposed upon shrimp farming activities being established in forest or mangrove areas.

Fisheries in **Thailand** are regulated under the Fisheries Act 1947, as amended, and are placed in four categories: preservation fisheries; leaseable fisheries; reserved fisheries; and public fisheries. No person may fish or cultivate aquatic animals in the preservation fisheries unless permission has been obtained from the Director-General for Fisheries. Leaseable fisheries are fisheries in which an exclusive right to fish or to cultivate aquatic animals may be granted to a person by means of tendering. No person other than a licensee may fish for, or cultivate, aquatic animals in a leaseable fishery and the licensee must comply with any conditions imposed by the Director-General. Similarly, reserved fisheries are fisheries in which a person has been permitted to fish for, or cultivate, aquatic animals, and no person other than the licensee may fish for aquatic animals other than the licensee. The licensee must comply with any

conditions imposed by the Director-General. The 1947 Act provides that no person may dig or build a cultivation pond in land which is the public or State domain unless permission has been obtained from the competent official. Where permission is obtained the licensee must comply with the conditions prescribed in the permit. Thereafter fishing in cultivation ponds requires no permission and is exempted from fishery tax under the Act. Promotional measures are provided for to under the Enhancement and Preservation of National Environmental Quality Act 1992 to enable support to be given in respect of the installation of on-site facilities for the treatment of wastewater. These measures are available to support action taken by the possessor of a point source of pollution who is under no legal duty to install an on-site facility for pollution but opts to do so.

The essentially private law basis for acquiring land for shrimp farming appears to be more strongly influential in some jurisdictions. Hence in **India** acquisition of land rights to establish an aquaculture installation is normally a matter of private law. However, this has been controversial in practice due to shrimp farms obstructing common rights of access to the sea or to water sources. In **Indonesia** land must be individually acquired, but support may be given by Government though it is not apparent to what extent this is dependent on environmental considerations. Similarly, in **Sri Lanka** acquisition of land rights is a matter of private law and is generally not supported by public funds. However, support may be given by government subject to the applicant obtaining an environmental protection licence and an aquaculture management licence though doubts are raised as to the efficiency of this mechanism.

In **China**, private rights will need to be acquired for the establishment of a shrimp farm but local government is generally supportive of shrimp farming developments for the purpose of developing the local economy. Under the Fisheries Law 1986 planning and utilisation of water and tidal areas is required. People's governments, at or above county level, may assign state owned water and tidal areas which are designated for aquaculture to units under collective ownership. Providing that the applicants are appropriate qualified, aquaculture licences will confirm their rights to use water and tidal areas for aquaculture.

A stronger public law emphasis to the acquisition of land for shrimp farming is to be found in **Vietnam**. Here, the Land Law 1993 provides that "Land is the property of the people and is subject to administration by the State". Hence the State may allocate land to economic and social organisations and individuals by way of lease or on a longer term basis. The responsibility for management of land is allocated at various levels from the National Assembly down the people's committees which exist at the provincial, district and village level. These bodies may allocate land for aquaculture purposes where land which is classified as agricultural land. Such land is allocated for a limited period of time, which is usually 20 years for aquaculture, though there is provision for renewal if the person to whom land is allocated still needs it and has complied with legal requirements in respect of the landholding.

In **Vietnam** the State encourages land holders to invest labour and resources in the land to increase its value and utilisation, to intensify farming and to reclaim land from the sea, amongst other things, for the purposes of aquaculture (Land Law). Normally, landholders are under an obligation to pay a land utilisation tax which is determined by the productivity of the land as determined by a land classification system. However, households and individuals engaged in, and whose earnings come mainly from, aquaculture may be allocated land free of

charge. Land tenure is not unconditional during the period of allocation and failure to adhere to land holding obligations may lead to the recovery of the land by the State. So, for example, if land is left unused for 12 months without authorisation it will revert back to the State. Similarly, land is used for a purpose other than that for which it was allocated it will return to the State.

The allocation of land for aquaculture in **Vietnam** is specifically provided for insofar as land may be allocated to several households or individuals or to an economic organisation. The allocation of lakes and marshlands for aquaculture is determined by the people's committee for the provincial district but, where these are located within areas of different provincial districts, their use is to be determined by the people's committee for the province. In respect of water areas located within the areas of different provinces, the organisation of aquaculture and the protection, production and exploitation of aquatic products is to be provided for by the Government. Further conditions relating to aquaculture land allocation require that the use of waters must be in accordance with environmental protection, must not obstruct communication and transportation, and must be in accordance with technical criteria specified by relevant departments (Land Law). The State Council Ordinance on the Conservation and Management of Aquatic Resources of 1989 emphasises the importance of immediate and long-term conservation and management but does not provide explicit measures relating to aquaculture or shrimp farming.

3.6 Development Licensing for Shrimp Farms

In jurisdictions where private land ownership does not exist, controls upon the development of land for shrimp farming are imposed as obligations upon the holding of land by particular individuals or bodies. However, where private land is at issue, it is commonly thought desirable for restrictions to be imposed upon the rights of a private owners to develop land where this is necessary for the protection of public interests such as environmental and ecological protection. Hence, the concern in this section is with the extent to which private property rights to develop land for shrimp farming purposes are curtailed by public mechanisms for development control.

A relatively sophisticated general system of development licensing is established in **Malaysia**, where the National Land Code 1965 and the Town and Country Planning Act 1986 impose a requirement to obtain planning permission for most kinds of development. However, the 1986 Act is of limited application because aquaculture is classified as an 'agricultural' activity of a kind which is generally exempt from regulation. Under the National Land Code 1965, the State may grant temporary occupation licences or to grant longer leases of public land which is to be used for aquaculture in relation to State land, including land which is the bed of a river or the foreshore and bed of the sea. However, these powers are seldom used to require rehabilitation of abandoned pond aquaculture sites after the expiry of licences or leases.

In respect of aquaculture in maritime waters, a permit must be obtained to establish a marine culture system (as well as a licence to operate the system). Aquaculture activities are prohibited in specified areas including national parks, fisheries protected areas, and marine reserves under the Fisheries Act. The Fisheries Act allows the Director General of Fisheries to issue a licence in respect of a marine culture system "subject to such conditions as he

thinks fit to impose” and it is an offence to construct or establish a marine culture system without the necessary written permission and the licence may be cancelled or suspended for the purpose of “proper management of any particular fishery”. The Fisheries Act also states that licences for marine culture systems will not be granted where this would cause any obstruction to navigation or any impediment to the natural flow of water in fisheries waters.

Land-based aquaculture projects in **Malaysia** involving the clearing of mangrove swamp forests of 50 hectares or more are identified under the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987 as “prescribed activities” (under Environmental Quality Act 1974). This makes such activities subject to environmental impact assessment procedures established by the Department of the Environment. Possibly also, very large aquaculture developments might require environmental impact assessment because of some other impact such the change of agriculture use of an area of 500 Ha or more or where they involve the drainage of a wetland or wildlife habitat of more than 100 Ha. Environmental impact assessment reports must be prepared in accordance with guidelines prepared by the Department of the Environment which provide for public participation at various stages. The Detailed Assessment Report must indicate the nature and impact of the project on the surrounding areas and communities and this information is publicised and made available to the general public.

The State of Sawara has its own Natural Resources and Environment (Prescribed Activities) Order 1994 which provides for additional activities to be “prescribed activities” requiring environmental impact assessment and including the creation of lakes, ponds or reservoirs for the rearing of prawns, where the area exceeds 50 Ha.

Fairly detailed development licensing requirements are also provided for in the **Philippines** where aquaculture projects and activities are subject to environmental impact assessment. Both private and public fishpond operators are required to prepare a detailed or initial statement indicating the consequences of the activity on the physical, biological and socio-economic environment and the appropriate preventative, mitigating and enhancement measures. It also needs to be shown that the project has social acceptability from the community. The Department of the Environment and Natural Resources issues environmental compliance certificates and certify that the proposed activity will not cause a significant adverse environmental impact and will operate subject to an approved environmental management plan. The granting of an environmental compliance certificate is a prerequisite to a fishpond lease being granted in public land, particularly where a new fishpond is to be constructed. In relation to private land an environmental compliance certificate is a prerequisite to the granting of a permit being granted by the appropriate local government unit. Detailed criteria are set out for the issuing of an environmental compliance certificate distinguishing between environmentally critical projects, including fishery projects, and projects located in environmentally critical areas. Proponents of environmentally critical projects are obliged to establish an environmental monitoring fund to monitor compliance with the terms and conditions of the environmental compliance certificate. No requirements are imposed for restoration of land to its former state on cessation of shrimp farming activities, but unused areas may revert to the jurisdiction of Department of the Environment and Natural Resources which may undertake restoration. In respect of illegal fishponds, restoration requirements may be imposed as a sanction in relation to crimes concerned with conversion of mangroves into fishponds.

In **Sri Lanka** a licence is required to establish a shrimp farm at a particular location. Application for a licence is made to the Ministry of Fisheries and Aquatic Resources, however the project approving agency will vary depending on ecological significance of location. Criteria applied for determining shrimp farming applications may require preliminary environmental screening, initial environmental examination and environmental impact assessment, depending on the size of the project. Potential developers have to submit an application with an initial environmental examination to Ministry of Fisheries and Aquatic Resources. The latter will forward the application to its project approving agency called *Inter-Ministerial Scoping Committee* to examine the proposed project. The Committee is composed of representatives from the Ministry of Fisheries and Aquatic Resources, the National Aquatic Resources Agency, the Central Environment Authority, the Coast Conservation Department, Provincial Ministry of Fisheries and Department of Irrigation. As appropriate, representatives of the Coconut development Authority and the Land Reclamation department are invited to attend the meeting. The Scoping Committee may recommend the allocation of state land, and approval of the committee is crucial for obtaining financial assistance.

An initial environmental examination provides sufficient information to assess most small-scale projects in less environmentally sensitive areas. The initial environmental examination provides details on the specific location, investment, soil quality, water quality, pond plans, water requirements, water discharge, basic sociological and environmental aspects. The initial environmental examination provides sufficient information to assess most of the small-scale projects in less environmentally sensitive areas. If the project involves 5 ha of land or a greater area, or appears to be located in an environmentally sensitive location, such as a mangroves area, an environmental impact assessment required and official terms of reference are provided. Projects are usually approved with a set of general conditions and mitigation requirements, which may include requirements for effluent treatment, as well as conditions specific to the project. Once a development project has been approved, an environmental protection licence is required for the use of lakes, rivers, streams and coastal areas (including mangroves) for aquaculture. The environmental protection licence is an annual renewable licence which may incorporate land restoration requirements. Also a zonal clearance requirement may apply requiring authorisation from Natural Aquatic Resources Research Agency and a review of the project may be undertaken by a Scoping Committee consisting of representatives of relevant government bodies.

An Order under **Sri Lanka's** National Environmental Act 1980 determines projects and undertakings for which approval is required according the National Environmental Act 1980. In particular, it contains (a) a list of projects and undertakings located wholly or partly outside the coastal zone; (b) a list of projects and undertakings located in the specified areas; (c) a list of special protected areas according to the legislation in force.

In **Thailand**, the Department of Fisheries policies, plans and measures concerning shrimp culture, include a registration requirement for shrimp farms which provided for under Regulations (of 1991) under the Fisheries Act 1947. These Regulations require that fishermen, fish traders and processors must register, so that shrimp farmers operating installations of more that 8 hectares and shrimp hatchery operators must be registered. This allows data concerning shrimp production to be effectively gathered and used in future

planning for the culture, production and marketing of the commodity. It may be noted, however, that the penalty of a shrimp farmer failing to comply with the registration requirements is quite small and may not provide an effective incentive to secure registration by all shrimp farmers. A requirement for environmental assessment may be provided for in relation to certain kinds of major development project, under the Enhancement and Preservation of the National Environmental Quality Act 1992. However, it is understood that aquaculture is not presently amongst the range of projects for which environmental assessment is required though it may become so in the future.

In **Vietnam** the Land Law requires that the use of coastal land for aquaculture is to be in conformity with land use zoning and planning approved by the competent State body. It must contribute to the protection of the ecosystem and the environment and must not obstruct national security, defence or ocean transportation. Land holding carries specified obligations to use land strictly in accordance with its allocated purpose, to comply with regulations relating to environmental protection and to respect the legal interests of holders of adjacent land. Organisations and individuals that have permission to utilise waters for rearing aquatic species must establish plans of operation and apply measures to safeguard and develop aquatic resources (1989 Ordinance). The use and exploitation of nature reserves and natural landscapes is subject to permission by the sectoral management authority concerned, and the State management agency for environmental protection, and must be registered with the local People's Committees entrusted with the administrative management of conservation sites (Environmental Protection Law). The exploitation of land for aquaculture must comply with land use plans, land improvement measures and ensure ecological balance. Organisations or individuals when constructing or renovating "production areas" must submit environmental impact assessment reports to the State management agency for environmental protection for appraisal. The results of appraisal of such reports constitutes a basis for competent authorities to approve the projects or authorise their implementation. The detailed format for environmental impact assessment reports is indicated by specific regulations issued by the Government. Further details on environmental impact assessment requirements are provided in Government Decree of 1994 providing guidance for implementation of the Environmental Protection Law. The Decree establishes a threshold of 200 Ha for aquaculture farms requiring environmental impact assessment.

In other jurisdictions that need for location licences and environmental assessment are differently provided for. Hence, in **Indonesia** a licence is required for the development of a shrimp farm, through application being made to the Local Fisheries Service. **Indonesia** uses the "Analysis Mengennai Dampak Lingkungan Method" (AMDAL) for assessing aquaculture development projects. This is an integrated review process designed to co-ordinate the planning and review of proposed development activities, particularly their ecological, socio-economic and cultural components as a complement to the technical and economic feasibility. Permits and licence conditions provide the means by which environmental mitigation and monitoring requirements developed in the AMDAL process can be made legally enforceable in the event of non-compliance. There are four main types of permit: Investment Permits; Location Permits; Activity Permits; and Nuisance Permits. The use of water effluent and air emission standards is critical to the effectiveness of the AMDAL process.

In **Bangladesh** provision is being made for compulsory registration of shrimp farms with the Department of Fisheries. Restrictions are imposed upon the establishment of shrimp farms in

forest and mangrove areas and conflicts are acknowledged to exist between shrimp farming and paddy farming, but it is not clear what mechanisms exist for the resolution of such disputes. No provision is made for environmental assessment.

In **China**, laws concerning the enhancement of aquaculture, including shrimp farming, are being formulated which will require applicants to apply to departments of fisheries for licences for aquaculture facilities and licences will be granted on approval by local government at or above county level. Development licensing appears to be generally provided for and imposes requirements that relevant standards should be complied with and the staff should be suitably qualified. However, it appears that no mechanisms are provided for to prevent shrimp farms being established in inappropriate locations or areas that are of importance for ecological reasons and no strategic mechanisms exist for resolving conflicts of interest in relation to aquaculture proposals. Environmental assessment is not provided for, since more weight is given to the economic benefits to be secured, but legislative measures are being considered which would allow for the strengthening of inspection procedures. No requirements exist in relation to the restoration of shrimp farming sites on the cessation of activities.

Perhaps the most stringent regime concerning development restrictions upon aquaculture is to be found in **India**. Under the Coastal Zone Notification Regulation 1991 controls are applicable to coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters which are influenced by tidal action. The intertidal area along with a 500m zone from the high tide line is identified as a zone where development is restricted or prohibited, though exemptions are granted for permitted activities which require waterfront or seafront access. Amongst permitted activities, hatcheries were included but aquaculture was omitted, and it was, therefore, necessary to determine the status of aquaculture under the Regulation by legal proceedings.

Proceedings were brought before the Indian Supreme Court in the case of *Jagannathan v. Union of India and Others* (judgement 11 December 1996) to determine the matter. After recounting a catalogue of adverse environmental consequences arising from intensive shrimp culture in various parts of **India** and elsewhere, it was decided that coastal shrimp culture was prohibited by the Coastal Zone Notification Regulation and it was unlawful for ponds to be constructed within the coastal regulation zone. Moreover, under the ruling all shrimp culture ponds operating within this zone were required to be demolished by a specified date, and persons who had suffered as a result of shrimp aquaculture were to be entitled to compensation from operators of shrimp farms. However, the direction of the Court did not apply to traditional and improved-traditional types of aquaculture practised as they had been for many years. Low intensity systems of aquaculture were allowed to operate as previously subject to the authorisation of the appropriate authority.

With regard to the appropriate authority, the Indian Supreme Court ruled that the Government should constitute an authority with responsibility for aquaculture, in accordance with the Environment (Protection) Act 1986. This new authority, the Aquaculture Authority of India, should be invested with powers to ensure the protection of the ecologically fragile coastal areas and, specifically, to deal with the situations created by expansion of intensive shrimp culture. The Aquaculture Authority of India was, therefore, established and empowered to

grant licences based upon Guidelines which were issued in 1999 in relation to traditional low intensity shrimp farming (discussed below).

However the Indian Supreme Court decision of 1996 on the illegality of intensive shrimp farming within the coastal regulation zone is recognised to have momentous commercial and developmental implications which remain controversial since it is understood that the decision is the subject of a review. A Bill concerning Aquaculture was put before the Indian Parliament in 1997 and it has been suggested that the effect of this would be to moderate or overturn the effect of the Supreme Court decision. Specifically, the Aquaculture Authority Bill provides for constitutional and procedural matters relating to the Aquaculture Authority and provides for powers and functions of the Authority. The powers and functions would allow the Authority to make regulations for the operation of aquaculture farms, to exercise licensing powers over such farms and to order the removal of any farms causing pollution. Although a stipulation is included in the Bill that no licence for aquaculture farming should be granted allowing aquaculture to proceed within 200 metres of the high tide line or any area within the coastal regulation zone. This is subject to the proviso that it does not apply to any aquaculture farm in existence at the time of the establishment of the Aquaculture Authority. This suggests a statutory modification of the position determined by the Supreme Court, but this will depend upon the final form in which the Aquaculture Bill is enacted into law.

The Indian Government's *Guidelines for Sustainable Development and Management of Brackish Water Aquaculture* recommend that shrimp culture units of 40Ha. or more should be subject to environmental impact assessment requirements. Such units should also incorporate an environmental monitoring plan and an environmental management plan which covers the following potential impacts: local watercourses; groundwater; drinking water sources; agricultural activity; soil and salinisation; waste water treatment; and green belt development. Smaller farms between 10 Ha and 40 Ha must also provide information on these items.

The Indian Supreme Court's interpretation of the Coastal Zone Notification Regulation 1991 represents a rather extreme position in response to acknowledged environmental, ecological and social concerns arising from intensive shrimp aquaculture development. The comprehensive ban upon intensive shrimp aquaculture, which is the effective result, seems to suppose that *all* intensive aquaculture is to blame for problems that were highlighted in the legal proceedings and that such practices are incapable of being conducted *in any circumstances* without seriously deleterious environmental and other consequences.

3.7 Continuing Controls upon Shrimp Farming Activities

From the information received, it would appear that the use of general continuing controls upon shrimp farming activities are uncommon in the Asian countries surveyed. However, as an exception, **Malaysia** requires that, following the construction of an aquaculture system, the permit holder must apply for licence to operate the system under the Fisheries Act and the Fisheries (Marine Culture System) Regulations. Notwithstanding the reluctance to regulate continuing concerns arising from shrimp farming under a general licence, various examples exist of particular continuing licensing controls, or other restrictions being imposed, where this is necessary for the regulation of specific aspects of shrimp farming activity.

3.8 Fresh Water Use Licensing

Although the use of licensing controls upon freshwater use is uncommon in the Asian countries surveyed, an exceptional instance is to be found in the **Philippines** where abstractions are subject to a permitting system (Water Code). This requires an application to be made to the National Water Resources Council and for this to be subject to public consultation (Presidential Decree). All permits granted are subject to conditions requiring beneficial use and providing that the rights of third persons are not prejudiced by the water abstraction. Suspension or revocation of water abstraction permits is provided for on grounds of non-compliance with water plans. Institution of criminal proceedings and imposition of fines are provided for alongside the mechanisms for enforcement provided for in relation to the Water Code. Enforcement of the water abstraction permitting system is the responsibility of the Water Resources Council.

The relatively sophisticated approach to water abstraction control adopted by the **Philippines** is not followed in other jurisdictions. No abstraction licensing system is reported to exist in **Bangladesh, China, India, Indonesia, Malaysia, Sri Lanka** (though a water use policy is being formulated by the Department of Irrigation) **Thailand** (though this has been considered a draft water resources legislation) or **Vietnam**. It is somewhat difficult to interpret or evaluate this information, since it is possible that water use concerns may be dealt with as an aspect of initial development licensing, such that shrimp farms will not be allowed to be established at locations where water supplies are inadequate to meet the needs of all users. However, where there is a problem of competing demands, a specific mechanism to regulate water use must be a desirable feature for the ongoing control of shrimp farming operations.

3.9 Wastewater Discharge Licensing

Amongst other mechanisms, the use of a licensing system to control the quality of waste water discharged from a shrimp farm is a potentially useful means of addressing water quality and ecological problems in the waters receiving the effluent. Amongst the Asian countries surveyed, a wide range of approaches to this potential environmental problem is evident amongst the national legislative responses, with several countries adopting different kinds of discharge licensing controls and others where shrimp farm wastewater emissions appear to be uncontrolled.

A fairly advanced approach to wastewater discharge licensing is taken in **India** where waste stabilisation ponds are mandatory in farms greater than 5Ha in area. However, in the absence of specific rules concerning shrimp farming, existing rules for the protection of the environment, under the Environment (Protection) Act 1986 (and a notification of 1991) are being followed, though these are of a general nature and not specifically related to shrimp aquaculture. Under the Environment (Protection) Act 1986 effluents discharged from commercial shrimp farms may be within the definitions of 'environmental pollutant', 'environmental pollution' and 'hazardous substance'. The Water (Prevention and Control of Pollution) Act 1974 provides for the prevention and control of water pollution and the maintenance or restoration of the wholesomeness of water. 'Trade Effluent', for these purposes, includes any liquid, gaseous or solid substance which is discharged from any premises used for carrying on any industrial operation or any treatment or disposal operation other than domestic sewage treatment. Hence, a shrimp farmer will be required to obtain an

authorisation from the Pollution Control Board to set up any treatment and disposal system which is likely to discharge sewage or trade effluent into waters or onto land.

In the **Philippines** shrimp farm operators are also compelled to provide facilities to minimise environmental pollution such as settling ponds and failure to do so is a ground for cancellation of a fishpond licence agreement. For private ponds, not covered by licence agreements, the imposition of effluent charges may be incorporated amongst the system of disincentives for sustainable practice to be formulated by Bureau of Fisheries and Aquatic Resources. If discharges cause deleterious effects upon living or non living aquatic resources or poses a potential hazard to human health the operator of the farm may be charged with an offence of aquatic pollution.

Sri Lanka follows the approach taken in several jurisdictions where waste water from shrimp ponds is regulated by more general environmental quality measures. Wastewater discharge licensing is provided for under environmental regulations (National Environmental (Procedure for Approval of Projects) Regulations 1993) which stipulate parameters for permissible levels of pollutants. These are provided for in environment protection licences. The environmental protection licence provides a set of general conditions and mitigation requirements, which include requirements for effluent treatment. Effluent standards for brackish water aquaculture waste waters discharged into inland surface or marine coastal waters have been developed and agreed. Monitoring is carried out by the farmers themselves, as a report in effluent quality is required to renew an environmental protection licence, though the Central Environmental Authority intends to start it's own monitoring in the future. If an shrimp farm fails to comply with the terms of its permit, the Central Environmental Authority will apply for a Court Order to suspend the farm's activities under the National Environmental Act. The activities of the developer may also be suspended until compliance is secured with any directive of the Central Environmental Authority.

In **Indonesia** quality standards have been established for water in shrimp farms and for discharges from farms. The Ministry of Agriculture has prepared regulations applicable to the preparation of Environmental Monitoring Plans of aquaculture. In most cases the monitoring will involve collecting data on key parameters from effluent and affected receiving waters including pH; biochemical oxygen demand; total suspended solids; nutrients (nitrogen total) nitrogen, ammonia, nitrite and nitrate) and phosphorus (ortho-phosphate and total phosphorus) compounds; temperature, dissolved oxygen, salinity/conductivity; and chlorophyll a.

In **Malaysia** the Environmental Quality Act 1974 makes provision for the prevention and control of pollution from industrial sources. However, because the Department of the Environment takes the view that aquaculture effluent is not 'industrial' in character, aquaculture effluent is not subject to the Environmental Quality (Sewage and Industrial Effluents) Regulations 1979. Consequently it is not necessary for aquaculture installations to obtain licences for the discharge of wastewater.

The principal requirements concerning water pollution in **Thailand** are provided for under the Enhancement and Conservation of National Environmental Quality Act 1992. This requires the owner of a point source of pollution to collect data and to report periodically on discharges. Officers acting under the 1992 Act are under a general duty to monitor water

quality and to report on this, and have specific powers to enter premises to obtain information and may issue orders directing that action should be taken. Significantly, however, these powers apply to generally to industrial activities and aquaculture may not be perceived to be a high priority by comparison to those manufacturing industries with a greater potential for pollution of waters. Hence, although statutory effluent standards have been enacted for a range of industrial emissions, no corresponding effluent standards have yet been thought necessary in relation to effluent from aquaculture. The Enhancement and Conservation of National Environmental Quality Act 1992 provides for a Pollution Control Committee which has powers to submit action plans for the prevention or remedy of pollution hazards or contamination to the National Environment Board. Similarly, the Pollution Control Committee may make recommendations, propose incentive measures and advise the Minister on the setting of emission or effluent standards and the performance of other functions relating to pollution control. The Minister may prescribe emission or effluent standards for the control of wastewater discharges from point sources into the environment in order to meet the environmental quality standards set under the Act. Where standards have been provided for in relation to wastewater under other legislation, and these are no less stringent than emission or effluent standards set under the Act, they will continue to apply. In respect of designated pollution control areas, more stringent local standards may be imposed. Specifically, in relation to water pollution from aquaculture installations, a Ministerial power is provided allowing for the specification of types of point sources of pollution that are to be controlled in respect of the discharge of wastewater into the environment in accordance with effluent standards. Where this is done the owner or possessor of the point source has a duty to bring into operation an on-site facility for wastewater treatment as determined by the pollution control official and to monitor the control of wastewater. Pollution control officers are empowered to enter premises to inspect wastewater treatment processes, to issue directions as to actions needing to be taken in relation to the control of wastewater treatment, and to issue written orders requiring penalties to be paid under the Act. Ultimately, a pollution control official may recommend that the official who has the power to control the point source of pollution may close down a facility or suspend or revoke the licence of its owner or operator. A key provision of the Fisheries Act 1947, as amended, is the prohibition that no person may pour, throw away, drain or lay in a fishery a poisonous substance, as determined by Ministerial notification, or do any act that stupefies aquatic animals, or pour or throw away, drain or lay in a fishery any substance in a manner that is dangerous to aquatic animals or causes pollution therein, except for experiments for scientific benefit which have been permitted by competent official. Another provision controlling wastewater discharge which may be relevant is the Navigation in Thai Waters Act amended in 1992, executed by the Harbour Department, which prohibits discharge of chemical substances, petroleum substances, sludge, rock, mud, etc. into any watercourses, lake, reservoir or the marine water.

In **China** no licensing specific controls exist upon the discharge of effluent from shrimp farms. However, general provisions exist for the protection of fishery waters which forbid the discharge into such waters of sewage and other pollutants and wastes that are harmful to aquatic resources (Regulations for the Propagation and Protection of Aquatic Resources 1979).

In **Vietnam** there is no indication that an explicit effluent discharge licensing system exists, but a range of environmental quality provisions may be relevant in controlling potentially polluting emissions from shrimp farms. Hence, all acts causing environmental degradation,

environmental pollution or environmental incidents, are strictly prohibited (Environmental Protection Law) and any activities detrimental to aquatic resources, the environment of species and their conservation and management, are strictly prohibited (1989 Ordinance). Certain activities that are detrimental to aquatic resources are specifically prohibited. These include the releasing or leaking of harmful toxic substances in concentrations greater than are permitted and the clearing of mangrove forests unless special permission has been given by the Chairman of the Council of Ministers (1989 Ordinance). A prohibition is imposed upon the discharge of toxic chemicals, waste animal or vegetable matter, infective bacteria and viruses into water sources. Production and other activities must implement environmental protection measures including appropriate water treatment to ensure compliance with environmental standards to prevent pollution. The Government is bound to formulate environmental standards but may delegate the authority for promulgating and supervising the implementation of such standards (Environmental Protection Law). It is not apparent whether these powers have been exercised specifically in the context of controlling effluent from shrimp farms.

In **Bangladesh** it is understood that wastewater from shrimp farms is not subject to control though the explanation given for this was that farming is of low intensity and artificial feeds not used. No information was made available concerning waste water discharge licensing in **Indonesia**.

3.10 Shrimp Movement Licensing

The potential ecological and disease transmission implications of shrimp movements, especially where international movements are concerned, might be though an especially strong reason for national legislative controls. However, the national responses again illustrate a wide range of variation in terms of stringency, with some nations having quite strict requirements for shrimp collection from the wild, international movements, information requirements and powers in relation to disease control, and others, apparently, having limited or no legislative provisions concerning these matters.

Fairly extensive provision for shrimp movement licensing is found for in the legislation operative in the **Philippines** where there are no restrictions upon taking shrimp or spawn from the wild but gathering is subject to a licensing system imposed by local government. For the future, guidelines for the accreditation of shrimp hatcheries and farms will be promulgated by Bureau of Fisheries and Aquatic Resources to prevent disease transfer and escapes of non-native species into the wild. Registration will be required with local governments, which are to prescribe standards for facilities in consultation with the Bureau. The transportation of fish or fishery products requires an auxiliary invoice from local government. Maintenance and reporting of records is required of shrimp farmers for the purpose of monitoring compliance with standards and reports must indicate any operational problems encountered. Confiscation and slaughter of diseased stocks may be undertaken under broad police powers or in pursuance of procedures initiated by Bureau of Fisheries and Aquatic Resources in relation to government fish ponds or local government procedures in relation to private farms. No compensation is payable for actions taken following the imposition of quarantine or destruction of stocks.

In **Indonesia** a Ministerial Decree requires a licence for the taking of seed or brood stock from the wild. Where this done by a company it should be in cooperation with small scale fishermen. A limit is imposed upon taking of seed or brood stock so that a maximum of 70% of the sustainable potential may be taken. Movement of seed or brood stock must be in accordance with quarantine regulation and accompanied by a certificate of origin. Individual companies involved in catching and distribution of seed and brood stock must submit a report to local government every six months. Quarantine or slaughter of diseases stock is provided for but it is not clear whether compensation is payable where quarantine or slaughter measures are undertaken.

In **Malaysia** a permit from the Director General of Fisheries is needed for the import or export of live fish or for the transport of live fish between specified areas (Fisheries Act). The Director General may also impose conditions relating to the cleanliness of fish, measures to control disease or to prevent the release of non-indigenous species. The importation, sale breeding and keeping of various species of fish is governed by the Fisheries (Prohibition on Imports etc. of Fish) Regulations 1990.

In **Sri Lanka** no restrictions or reporting requirements apply in respect of shrimp collection or movements. The Animal Diseases Act 1992 provides for the control and prevention of contagious diseases in animals; for the control of the import and export of animals, animal products, and veterinary drugs and veterinary biological products, and for matters incidental thereto. Quarantine or slaughter requirements may be imposed under the Animal Disease Act, though no compensation is payable following quarantine or slaughter. The 1992 Act is implemented by the Animal Diseases (Control and Prevention) Regulations 1998.

In **Vietnam**, though the taking of certain scarce stocks may be prohibited, the seed collection of specified aquatic species for the purpose of cultivation is made subject to instructions issued by the Fisheries Ministry. The introduction of new stocks, and the distribution and acclimatisation of new stocks, are to be determined by the Fisheries Ministry. The Ministry and other government offices are responsible for preventative measures against disease (1989 Ordinance). The import and export of biological or chemical products and various species of animals, plants and gene sources is subject to the approval of the sectoral management agency concerned and the State management agency for environmental protection (Environmental Protection Law).

Thailand has a regulation controlling the export of wild tiger prawn spawn, within certain size limits, in order to maintain the supply and the price of wild spawn for local hatcheries. It is also understood that regulations are in operation prohibiting the import of exotic species for cultivation including shrimp species though more precise details of the controls applied were not specified.

In other jurisdictions few provisions apply to the regulation of shrimp movement. Hence in **Bangladesh** no legally enforceable quarantine provisions apply concerning shrimp movement, though after virus outbreaks there was a ban imposed upon the import of certain shrimp fry. Fisheries officers may collect data on shrimp disease outbreaks but no legal provisions apply. In **China** no control provisions exist and no information was provided concerning shrimp movement licensing in **India**.

3.11 Genetically Modified Organisms

The relative novelty of using genetically modified stock in shrimp farming might be an explanation for the complete absence of legislation addressing this issue as a concern arising uniquely in the context of shrimp farming. Understandably, therefore, there are several examples of nations who have opted to legislate for the precautionary control of genetically modified organisms generally, encompassing situations where they are used in shrimp farming. In other instances, it appears that general shrimp movement controls are considered to be adequate to address the potential problems of genetically modified organisms. More remarkably, the survey has indicated a number of jurisdictions in which there appear to be no mechanisms for the control of genetically modified organisms in shrimp farming.

In the **Philippines** the issue of genetically modified organisms has been fairly directly addressed in that the National Committee of Biosafety is authorised to identify and evaluate potential hazards from genetic engineering experiments or introductions, and to recommend measures to minimise risks. Before introductions are allowed, a proposal must be submitted to the Committee for consideration on the basis of the Institutional Biosafety Committee which includes members with scientific or technical knowledge sufficient to evaluate genetically modified organism release proposals.

In **Indonesia** a Ministerial decree adopts a precautionary approach in relation to introductions and issues of biological safety, though the precise regulatory implications of this are not apparent. In **Vietnam** it is thought probable that the controls generally applicable to shrimp movement could be applied to genetically modified organisms, but it appears that no specific provisions concerning genetically modified organisms are provided for. In **China** it is reported that national legislation exists to control the use of genetically modified organisms in aquaculture generally but no details of this have been provided.

Thailand is concerned about the control of genetically modified organisms, but sees the issues as being linked to those concerning the rights of breeders and farmers and the broader protection of intellectual property rights. A recently drafted Fisheries Act contains provisions for the control of genetically modified organisms alongside the other matters of concern.

In other jurisdictions there appears to be no legislation governing the introduction of genetically modified organisms. In **Bangladesh** and **Sri Lanka** no national legislation is in place restricting genetically modified organism use in aquaculture. In relation to **India** and **Malaysia** no information was available concerning the regulation of genetically modified organisms.

3.12 Chemical Use Restrictions

The potential hazards associated with chemical misuse in shrimp farming seems to be widely recognised in that almost all the Asian countries have provisions which addresses this problem, though in most cases this legislation is not formulated exclusively in relation to shrimp farming.

A fairly strict approach to chemical use generally is found in the **Philippines** where the use of any chemical in aquaculture requires prior registration with the Bureau of Animal Industry in

the Department of Agriculture. Following the conduct of any necessary tests, the Bureau may allow importation of the chemical. For the future, A *Code of Practice for Aquaculture* will contain measures to prevent of limit pesticides, medicines and aquaculture biological products from entering the aquatic environment or from accumulating in excessive concentrations in shrimp products.

In **China** legislation exists to prohibit the use of chemicals in aquaculture and the introduction of poisons in fishery activities will be subject to a fine. The Ministry of Agriculture is responsible for chemical monitoring in the major provinces. However, no measures are applied to limit the use of pesticides, medicines and other chemicals used in aquaculture or to prevent excessive residues accumulating in shrimp products. The Ministry of Agriculture is compiling a list of prohibited chemicals for a Fisheries Chemical management Regulation but no special provision is made for shrimp products.

In a number of jurisdictions legal provisions exist for the general regulation of chemical substances which may be more specifically applied in the context of shrimp culture, though it is not always clear how these powers have been used in this context. Hence, in **Malaysia** the use of drugs, antibiotics and pharmaceutical preparations in aquaculture is not directly regulated though requirements under the Food Regulations 1985. This deals with “incidental constituents” including matter such as antibiotic or pesticide residues which may be present in shrimp products and prohibit the sale of fish products which contain more than specified maximum quantities of contaminants or residues concerning the amounts of residues that products may contain. The use of pesticides is regulated under the Pesticides Act and Regulations, though other chemicals used in aquaculture may be regulated under the Poisons Act.

In **Sri Lanka** the Cosmetics and Drugs Act allows for the restriction or prohibition of use of chemicals. The Environmental Authority Act allows the prevention of use of pesticides, medicines and other chemicals, though no indication has provided as to the specific use which has been made of these provisions in the context of shrimp farming. In **Vietnam** the use of chemicals, chemical fertilisers, pesticides and other biological products must comply with the Environmental Protection Law, though it is not clear what precise requirements this entails.

In **Thailand** the Drugs Act 1967, executed by the Ministry of Public Health, and the Hazardous Substances Act 1992, executed by the Ministry of Industry, generally regulate the use of drugs and chemical substances by creating a list substances which are controlled and the quantities of these which may be used in particular applications. These Acts are also applicable to the use of regulated substances in shrimp aquaculture.

Where the misuse of chemicals in shrimp farming is not the subject of legal control but may be the subject of advice by officials. Thus in **Bangladesh** there is, apparently, no legislation concerning chemical use, but field officers encourage farmers not to use chemicals or pesticides. However, the generally extensive culture practice means that relatively little use is made of chemicals. In **Indonesia** chemical use and residue restrictions fall within the Hazard Analysis Critical Control Points (see below on this) though it is not clear whether specific legal powers exist to prohibit or restrict chemical use.

3.13 Food Sources and Utilisation

In only a few of the jurisdictions under consideration is the issue of shrimp feed regulation directly addressed. In **Thailand** the Animal Feed Control Act 1992, executed by the Department of Livestock, regulates the content and quality of feed used for shrimp aquaculture. However, the Act does not allow fisheries officers to control the amount of feed use by shrimp farmers. In **China** the Bureau of Animal Husbandry is reported to be responsible for a regulation concerning fish feed, though no information is provided as to the substantial requirements involved and the enforcement of these. In **Indonesia** there is a general indication that controls upon food sources exist but no information as to what these are. In the **Philippines** it is envisaged that regulation of substances to be used for shrimp food will be provided for in a future Code of Practice for Aquaculture.

In relation to **India, Malaysia, Vietnam** and **Bangladesh**, no information is available concerning the regulation of shrimp food sources and utilisation, though it is noted in respect of **Bangladesh** that very little artificial feed is actually used. It may also be the case that low levels of use in other countries have had the consequence that regulation of shrimp food has not been found necessary or that other controls may serve to address potential environmental problems.

3.14 Product Quality Controls

The close association between quality controls for shrimp products and concerns about food safety and public health cause this area to be fairly comprehensively regulated in the Asian countries. A further dimension to this issue is the need for additional quality control requirements where shrimp is intended for certain export markets, though this aspect of quality control is considered under the next heading.

A relatively well developed national legislative structure for food safety is found in **Malaysia** where the Food Act 1983 is for the purpose of protecting the public against health hazards and fraud in the preparation, sale and use of foods. The 1983 Act allows the Director of Health Services in the Ministry of Health extensive powers to require that premises or appliances used in connection with food are in a clean and sanitary condition. It is an offence under the 1983 Act to prepare or sell food that has in or upon it any substance that is poisonous, harmful or otherwise injurious to health or otherwise unfit for human consumption. The Minister of Health is empowered to appoint 'authorised officers' for the purposes of the Act who are allowed to take food samples for analysis. The Food Regulations 1985, deal with "incidental constituents" including matter such as antibiotic or pesticide residues which may be present in shrimp products and prohibit the sale of fish products which contain more than specified maximum quantities of contaminants or residues.

Similarly, in the **Philippines** it is reported that various national public health controls apply to shrimp farming and shrimp products to ensure consumer safety. An administrative order will soon be enacted prescribe guidelines for accreditation of hatcheries to screen shrimp fry for key diseases. An auxiliary invoice issued by local government is required for the transport of aquatic products to detect the presence of pests and diseases in such products. Additionally, fish products must meet the consumer product quality and safety standards imposed under the Consumer Act 1992 and Fisheries Administrative orders which establish standards for live, fresh, chilled and frozen shrimps and standards for the operation of processing plants and

post-harvest facilities. Procurement of fish and fish products must be from sources approved by the local health authority. The local authority may also issue ordinances to regulate the preparation and sale of food products and to impose measures to prevent the introduction and spread of disease.

In **Thailand** the Food and Drug Control Act 1992, executed by the Ministry of Public Health, controls the quality of food produced including shrimp productions. All coastal provinces have chemical laboratories to inspect and test for residues of drugs and chemical used for shrimp culture.

In **China**, the Ministry of Health is responsible for the implementation of the Law of Food Health Management concerned with public health matters. The Customs Department is responsible for inspection of imported and exported products and the Ministry of Agriculture is responsible for disease control and water quality for shrimp farming.

Information about public health requirements for shrimp products in **India** and **Vietnam** was not provided, but it would be surprising if general provision for these matters was not made under general food safety or public health legislation.

3.15 The Internationalisation of Standards

The important requirements for shrimp products which are to be exported to the European Community and United States (discussed above) have resulted in several countries within the survey adopting national legislation concerning product quality and sanitary matters to ensure access to these export markets. However, not all countries appear to have enacted such legislation. Otherwise, the influence of international initiatives upon national legislation seems to be relatively limited.

An example of national legislation which implements the European Community requirements is to be found in **Sri Lanka** where the Fishery Products (Export) Regulations 1998 are in line with European Community Seafood Directive (91/493/EEC). These national Regulations prescribe rules relative to hygiene and other requirements for fish processing establishments that are allowed to export fish products and for fishing vessels that process fish directly on board. Requirements regarding fishing vessels are set out in Schedule A and in Schedule B sets out general hygiene requirements. The Regulations also contain rules relative to the handling of live fish and aquaculture products intended for export and other markets. Certified establishments are allotted an official number and are subject to inspection and monitoring by competent authorities through appointed inspectors. Provision is also made for a control by the licensee of critical points of production and a sampling programme. Foreign inspectors may be employed to ensure that provisions of these Regulations and those of agreements are respected. The Regulations incorporate Schedules containing conditions for processing of fish on board and in processing facilities, and rules relative to control, sampling and analysis of fish, packaging, storage and transport, identification marks, and measures for the establishment and implementation of a critical control points system.

National legislation giving effect to the European Community Seafood Directive and the United States Seafood Regulation is also to be found in other jurisdictions. Hence, in **Indonesia** it is indicated that Hazard Analysis Critical Control Points requirements provide

regulatory standards for shrimp products, particular where the subject of export. Similarly in the **Philippines**, aquatic products for processing must comply with the Hazard Analysis Critical Control Points requirements when intended for export. Likewise, in **Bangladesh**, during harvest, transportation and processing strict Hazard Analysis Critical Control Points measures are followed with the Quality Control Division of Department of Fisheries ensures public health certification and adherence to requirements for export by securing that post-harvest quality control is maintained at European Community standards following Hazard Analysis Critical Control Points Regulations. **Thailand** reported that coastal provinces have established facilities for laboratory testing for chemical residues in shrimp products in accordance with the Hazard Analysis Critical Control Points requirements.

Outside the implementation of European Community health requirements for fishery products, however, the national impact of international requirements seems to be limited. In **Indonesia** there was a brief indication that legislation on standards on chemicals and drugs are the subject of internationalisation but no further information given. In the **Philippines**, under the Agriculture and Fisheries Modernisation Act 1997, alignment of local standards with international standards is a primary objective to attain global competitiveness. Opportunities were thought to exist for the internationalisation of shrimp farming practices by the implementation of the FAO *Code of Conduct for Responsible Fisheries* in the National Code of Practice for Aquaculture. A response from **Thailand** noted that other international initiatives were implemented including following of international standards as far as these were established by the World Trade Organisation's Agreement on Sanitary and Phytosanitary Measures, Agreements on Process and Production Method, and relevant international standards of the International Standards Organisation and the FAO/WHO Codex Alimentarius.

Otherwise, no indication of national measures directed towards the internationalisation of standards was available in relation to **China, India or Malaysia**. **Sri Lanka** indicated that legislation governing farm management was being framed but it was not clear how this involves internationalisation of standards. **Vietnam** noted regulatory provision for close cooperation with other countries and international organisations concerning the protection of the living environment and migratory fish and other aquatic resources that are a matter of common concern (1989 Ordinance) however, it was not clear what particular measures might arise from such cooperation.

3.16 Guidance and Producers' Organisations

Information about the use of guidance on shrimp farming and the existence and roles of producer's organisations was somewhat patchy, but indicated some progressive thinking by a few nations particularly in respect of the use of guidance.

A good example of the use of guidance is to be found in **India** where the Government issued *Guidelines for Sustainable Development of Brackish Water Aquaculture* in 1995. These Guidelines deal with matters such as the impact brackish water aquaculture systems; impacts arising from mangrove clearance; impact on land resources; feed quality and its management; the impact of shrimp pond wastes; the use of chemicals, fertilisers, pesticides and antibiotics; shrimp disease, production loss and the environment; the introduction of new species; social effects of aquaculture; the creation of buffer zones; the enforcement of Government rules and

legislation; water and soil quality; sources of seed and stocking densities; sediment management; waste production; awareness; and legislation. The Aquaculture Authority of **India** has also brought out *Guidelines on Adopting Improved Technology for Increasing Productivity in Tradition and Improved Traditional Systems of Shrimp Farming* (1999).

In **Sri Lanka** technical guidance for shrimp farmers has been prepared and codes of practice for shrimp farming are being prepared. Previously, *Environmental Guidelines for the Aquaculture Developer* had been issued by the Central Environmental Authority which sought to ensure that adequate consideration was given to the environment in developing aquaculture projects. Amongst other things, the *Guidelines* covered approval requirements for aquaculture projects, site selection considerations such as the avoidance of mangrove and wildlife conservation areas, pond design and operational considerations including the management of effluent and waste, and monitoring requirements. Significantly, the *Guidelines* also required that, in the event of abandonment of a aquaculture installation, the operator would be bound to meet the cost of any restoration requirements imposed by the project approving agency.

In some instances code of guidance are for a specific purpose such as the protection of particular areas. Hence, in **Malaysia** a National Mangrove Committee was established in 1986 under the Ministry of Science and Technology to advise on the conservation of mangrove areas. The Committee formulated guidelines for brackish water aquaculture setting out priorities for site selection and recommendations concerning locations and culture techniques. The guidelines recommended that not more than 20% of the existing mangrove areas should be exploited but this has proved difficult to monitor and enforce. However, in 1996 the Cabinet issued a statement that there should be moratorium on development of mangrove areas and mandated the Ministry of Science and Technology to implement this policy.

It was reported that shrimp farmers in **Thailand** currently practice sustainable shrimp aquaculture pursuant to a *Code of Practice for Sustainable Shrimp Aquaculture*, though no details were provided of the content of this code. In practice, however, it was thought that most of shrimp farmers adopt a 'closed-system' of shrimp culture which encourages self-regulation and minimises environmental impacts by allowing less water to be discharged. A trend was also reported from intensive culture systems to semi-intensive culture systems, because of the tendency for intensive culture system to result in more serious problems of shrimp disease. Less intensive production methods have led to reductions in the use of feed, drug and chemical substances, and involving reductions in the amounts of water discharged. However, the shifts which have taken place towards lower intensity shrimp farming have resulted from farmers adopting these approaches voluntarily rather than through the imposition of any mandatory legal requirement.

In other instances, there is evidence that codes of practice are in the process of being formulated. Hence, in the **Philippines** self-imposed controls will be possible through the promulgation of a fisheries administrative order for the accreditation of shrimp hatcheries and a Code of Practice. There will be no penal sanctions for violations of these and it is envisaged that they will be enforced by a system of incentives and disincentives though no information is provided as to how these will operate.

In other jurisdictions it appears that no codes of practice have been formulated. Thus in **Bangladesh** and **China** no codes have been formulated and no information has been provided as to codes of practice in **Indonesia**.

Amongst the countries surveyed, there was some evidence of shrimp producers organisations being established, but relatively little information was available as to the role of such organisations. In **Sri Lanka**, however, four producers' organisations are formed into a consortium. The roles of organisations involve participating in research, ensuring product standards, improving farming systems and improving environmental performance. Beyond this, however, producers organisations do not have any formal legal role. In **India** the Aquaculture Foundation of India, a non-government organisation for the promotion of aquaculture, produces educational materials as a guide for sustainable shrimp farming. In **Indonesia** producers organisations have a general responsibility for production of good quality products and consumers interests are generally represented through NGOs. In **Bangladesh**, though there are producers organisations, they are not organised to achieve research co-ordination or maintain product standards and are generally opposed to regulation.

By contrast, in **China** there are no producers organisations for shrimp farmers but the **China** Fisheries Circulation and Processing Association exists as a non-governmental organisation which undertakes work concerning processing and marketing and there has been established an advisory group on marine aquaculture which is responsible for giving guidance on technology, training and education, and the co-ordination of production. In **Malaysia** there are presently no private-sector trade associations of other organisation specifically representing the interests of the aquaculture sector. No information has been provided relating to either shrimp farming guidance or the existence of producers' organisations in **Vietnam** or **Thailand**.

3.17 Enforcement

Most Asian countries provided useful information about the various criminal offences and penalties that may arise in relation to shrimp farming activities, and also indicated the formal allocation of responsibilities for enforcement. However, it is somewhat difficult to draw conclusions from this information as to the actual use which is made of the legal powers by the enforcement authorities and the policies and practices which apply in practice to determine when legal proceedings will be pursued. Only in relation to **Indonesia**, where formal responsibility for enforcement of regulatory responsibilities is explicitly provided for, was the candid observation offered that "laws remain inadequately and unevenly enforced resulting in a *de facto* unregulated aquaculture industry". It is only possible to speculate as to whether this represents the practical situation in other countries where the practicalities of enforcement were not commented upon.

In **Malaysia** the Department of Fisheries, within the Ministry of Agriculture, is responsible for the implementation of the Fisheries Act and it has exclusive responsibility for the operation of aquaculture activities in marine waters, though a Director of Fisheries is also appointed by the state authority to have responsibility for those fishery matters allocated at state level. Under the Fisheries Act the failure to observe licensing requirements for aquaculture facilities is a criminal offence enforceable by the Director General of Fisheries

and punishable by specified penalties. In addition an authorised office may seize an unlicensed aquaculture system and this may be subject to forfeiture by order of a court.

In **Vietnam** the Ministry of Fisheries organises state inspection of conservation and management of aquatic resources at a national level particularly in relation to areas where activities are prohibited and in relation to the protection of scarce species (1989 Ordinance). Explicit provision is made for the resolution of disputes concerning research and exploitation, strategies and plans, resource areas and fees. Hence local disputes between organisations and individuals are to be considered by People's Committees for the district, disputes between districts and counties are considered by People's Committees for the provinces and the Ministry of fisheries deal with disputes between the provinces with the possibility of an appeal to the Council of Ministers. Anyone violating regulations on registration, involved in licensing infringements, causing pollution or infringing other regulations under the Ordinance will be fined, according to the nature of their acts, and made subject to administrative or criminal penalties as provided for by law. Causing damage to the environment and related matters, such as the failure to adhere to environmental impact assessment requirements, are dealt with administratively or are criminally punished depending upon the nature and extent of the infringement and the consequences (Environmental Protection Law). Those committing breaches of environmental protection requirements may be required to compensate others for damages and the cost of remedying the consequences.

In **Sri Lanka** Land rights are enforced by Ministry of Lands' Coast Conservation Department and use of prohibited chemicals enforced under Cosmetics and Drugs Act. Incentives are provided for in respect of credit facilities, relief packages and duty free import of feeds, but it is not clear how these serve as incentives to regulatory conformity.

In **Bangladesh** illegal occupants of coastal lands for shrimp culture will be evicted on requirement from Department of Fisheries, the Department of Forestry or the Land Administration Department. Although no abstraction licensing requirements apply, obstacles to community water supply systems such as dams may be removed when this is requested by Department of Fisheries. No enforcement provisions exist for wastewater discharges, unlawful collection of fry, unauthorised movement or failure to report, or other requirements. Although no incentive-based mechanisms for regulatory compliance exist, outstanding producers may be given an award to recognise this.

In the **Philippines** the Department of Agriculture, through the Bureau of Fisheries and Aquatic Resources, has responsibility for the enforcement of regulations in respect of shrimp farms which are established on public lands, whereas private shrimp farms fall under the supervision of local authorities which are bound to enforce national policies and regulation. Also within the Department of Agriculture, the Bureau of Animal Industry has a specialised regulatory role in respect of the importation, registration and use of aquaculture feeds, biological products and chemicals. More generally, government support for aquaculture projects may be conditional on compliance with environmental conditions though it is not clear whether the mechanisms to allow this are yet in place.

It is understood that the ultimate duty for both environmental and fishery law enforcement in **Thailand** lies with the Police. Existing practice is that water pollution and fishery officers prepare a report of an alleged offence and gather supporting evidence including matters such

as the state of the water quality which is thought to constitute an offence, and this information will be passed to the Police for consideration. A range of powers for the enforcement of fishery law are also provided for under the Fisheries Act 1947, as amended. Provision is made to custodial sentences and financial penalties are provided for in relation to fishery offences. In respect of the latter, however, it is understood that financial penalties have not been increased to take account of inflation and may, for that reason, not offer such an effective deterrent as was originally envisaged. A range of criminal penalties are provided for under the Enhancement and Conservation of National Environmental Quality Act 1992 in respect of offences under the Act. These include a penalty which may be imposed upon a person who refrains from operating an on-site facility for the treatment of wastewater and illegally discharges untreated wastewater into the environment.

In respect of **China, India** and **Indonesia**, no information was provided as to the mechanisms for enforcement of shrimp farming legislation.

Chapter 4 National Legislation of East African Countries

4.1 Sustainable Development

Some evidence may be seen of measures which seek to implement the concept of sustainable development in **Mozambique** and **Tanzania**. The implementation mechanisms are not explicit in fisheries laws, but are more clearly seen in more recent legislation on natural resources management and conservation which is used as an instrument for translating sustainable development policies into action.

In **Mozambique** the Forestry and Wildlife Act 1999 provides for the concepts of "sustainable development" and "sustainable exploitation" and the Government has also approved policy and regulatory measures, such as the Environment Law (1997) and the Environmental Impact Assessment Regulations (1998) which will contribute to policy formulation for the sustainable development of aquaculture. It is envisaged that the Government will soon establish aquaculture development plans, aquaculture regulations and other legal instruments to ensure sustainable development of aquaculture consistent with a high level of environmental protection and sound management principles. Specifically, it is understood that the Fisheries Resource Institute is preparing a Development Plan for Aquaculture which is progressing towards receiving Government approval though it is not clear to what extent this will be based upon principles of sustainable development.

In **Madagascar** the concept of sustainable development does not appear to be adhered to in legislation, policy or guidance with reference to shrimp aquaculture or to coastal aquaculture. Although, the Government is finalising a national plan for shrimp aquaculture, which aims at increasing export earnings, contributing to food security and alleviating poverty, it is not apparent to what extent these objectives are interpreted alongside the need for sustainable development.

No information was available as to the implementation of sustainable development in **Tanzania**, though it is noted that the Village Land Act 1998 has amongst its objectives that of ensuring that land is used productively and in compliance with the principles of sustainable development.

4.2 Legislation

None of the East African countries reviewed have adopted specific legislation concerning aquaculture in general or shrimp aquaculture in particular. However, an "enabling clause" is usually provided for in a basic fisheries law, commonly enacted approximately a decade ago. Environment protection laws and land laws play an important role in establishing basic principles, objectives and procedures for the conduct of activities and outline responses to problems likely to arise when establishing and operating shrimp aquaculture farms.

There is no specific legislation in **Mozambique** concerning shrimp culture or aquaculture activities and these are currently governed by more general laws relating to the protection of the environment, land tenure, water use and fisheries. Fisheries resources are state property according to the Fisheries Law 1990 and, except for subsistence fisheries, all commercial and

industrial fisheries activities require a license from the Ministry of Agriculture and Fisheries which will be issued in accordance with conditions to be determined by regulations. Neither the Fisheries Law nor related legislation provide detailed guidelines for the development of aquaculture. The lack of specific legislation has been considered the primary reason behind complaints from prospective shrimp farmers concerning delays and difficulties in obtaining appropriate permits. However, it is understood that draft regulations concerning marine aquaculture have been prepared and these are currently the subject of consultation with the various stakeholders involved. It is understood that Aquaculture Regulations are progressing towards adoption along with a code of conduct. In summary, the draft regulations address the procedural aquaculture planning mechanisms, intend to regulate access to aquaculture and the permissible types of aquaculture system. Three "aquaculture permits" (research, commercial and artisanal) have been identified. It appears that with respect to shrimp aquaculture only extensive and semi-intensive farming will be allowed and that an environmental impact assessment may be required where the project exceeds 10 ha. Further consideration is given to issues concerning operational aspects including the collection of wild seeds and larvae, the protection of the environment (the use of chemicals, effluent discharges, disease outbreak, mangrove protection), the movement of fish (introduction of species, etc.). The provisions are also backed by offences and penalties.

In **Madagascar** there is no legislation with specific application to shrimp culture, though the Fisheries Ordinance 1993 provides that aquaculture is subject to an authorisation granted by the competent authorities and, where public land or waters are occupied, the authorisation must take the form of an aquaculture lease. Although authorisation procedures and conditions are intended to be provided for under implementing legislation, no relevant subsidiary legislation has been enacted. The Control of Fisheries Decree 1922, which regulates fisheries in general, provides that an authorisation is required for an aquaculture installations from the provincial authorities. The 1922 Decree also deals further with issues such as the transfer of facilities, the construction of dams and the withdrawal of abandoned facilities.

Aquaculture activities in **Tanzania** are regulated by a range of legal provisions though of central importance is the Tanzanian Fisheries Act 1970 which provides for the making of orders and regulations. There is no specific reference to aquaculture in the Act but this may be encompassed in provisions relating to "artificial fisheries". The first explicit references to aquaculture and its products appears in the Fisheries (Amendment) Regulations 1997 where the implication is that an aquaculture developer will need to obtain a licence from the authorities responsible for fisheries.

4.3 Institutional Responsibilities

In the East African countries surveyed, the overall picture is of a rather tangled web of laws and regulations governing shrimp aquaculture. Similarly, there are complicated interrelations between the institutions having competencies in aquaculture, including shrimp aquaculture and other activities. These competencies may impact upon the development phase of the activity or the operational phase or both and, without country visits, it was difficult to provide an accurate assessment of the respective roles of the institutions predominantly involved. Government agencies responsible for fisheries in general are usually the focal point for the planning, management and administration of (shrimp) aquaculture. However, because of the location of the shrimp aquaculture sites, or the economic and financial incentives provided for

by governments, those agencies directly responsible for shrimp aquaculture developments are often "overruled" by other bodies which are involved. Indeed among the myriad of institutions concerned, such as the land planning authorities, the increasingly important environment protection authorities and the government agencies promoting investments, the decisions of these other bodies may actually take precedence over the decisions of the agency directly responsible for aquaculture development, including shrimp aquaculture.

Mozambique has recently established a Ministry of Fisheries, though several other bodies have direct or indirect control over aquaculture development, particularly because of the diverse jurisdictions which apply over the coastal zone. The National Directorate for Fisheries, under the umbrella of the Ministry of Fisheries, is responsible for planning, management and administration of aquaculture sector. The National Directorate for Fisheries is supported by the Department of Aquaculture of the Institute for Fisheries Research which provides technical support to the Fisheries Directorate to assess aquaculture projects and to promote research activities in areas of interest to aquaculture. With regard to planning and development of aquaculture, the fisheries sector works in co-ordination with different national departments including the National Directorate for Geography and Cadastre, under the umbrella of the Ministry of Agriculture and Rural Development, the Directorate for Environment Impact Assessment and the Coastal Management Unit, the last two under the umbrella of the Ministry for the Co-ordination of Environmental Action, and the Investment Promotion Centre, a body under the Ministry of Planning and Finance which promotes and provides assistance for national and foreign investments including those in aquaculture sector. Within the Ministry for the Co-ordination of Environmental Action, the Coastal Management Unit is responsible for co-ordinating multi-sectoral planning, development and management of the coastal zone, and the Directorate for Environmental Impact Assessment for conducting environment impact assessment for all developments including aquaculture.

Incentives for aquaculture are provided for under the **Mozambique** Investment Law 1993, where aquaculture investments are placed in a priority position to receive incentives from the Government. In 1982, an Investment Promotion Centre was created to assist the Ministry of Planning in the co-ordination, assessment and assistance of both national and foreign investment. All investors seeking to obtain tax relief and benefit from incentives must submit a request to this effect to the Investment Promotion Centre (Decree 1995). Tax incentives may include exemption or reduction of import, circulation and consumption taxes and a 50% reduction of income tax such as the industrial contribution tax.

Because of the large number of bodies involved in obtaining the necessary permits for an aquaculture operation in **Mozambique**, it has been suggested that the procedures are rather bureaucratic in requiring separate permits for land concessions and for approvals to receive tax incentives, such as exemption or reduction of import taxes, circulation and consumption levies taxes, and reductions of income tax. Alongside these matters, a prospective shrimp farmer must also obtain technical and economical approval of the project from the Ministry of Fisheries, and an environmental licence from the Ministry of Environment. Permits are also required from the Ministry of Planning and Finances, from Ministry of Commerce the Ministry with responsibility for Forestry and Wildlife.

Likewise in **Madagascar**, there is a Ministry of Fisheries which is primarily responsible for aquaculture management and development and within which there is the Directorate for

Aquaculture responsible for the development, management and promotion of aquaculture under the Directorate for Fisheries Resources. Other Ministries also appear to have responsibilities with regard to aquaculture including the Ministry of Marine Affairs, the Treasury and Finance Ministry as well as the Land Authorities where an installation is to be established within the state domain. The Treasury and Ministry of Finance play a significant role in authorising aquaculture sites in preferential trade zones or which fall within regimes for preferential tax and financial treatment. There are special rules governing the lease of state owned land by enterprises which benefit from the Free Trade Regime (Law No. 89-027 (1989) amended and completed by Law No 91-020 (1991)) or which are located in free trade areas. Under the Fisheries Ordinance 1993 the establishment of the Interministerial Commission for fisheries and aquaculture is envisaged alongside decentralised consultative structures, however, so far no relevant subsidiary legislation has been enacted to implement these measures.

In **Madagascar** financial incentives feature prominently in the development of aquaculture. A special administrative unit (the “Single Window Office”) was established (Decree No. 94-0257 (1994) and Regulation No. 1879 (1994)) as a one-stop investment shop within the Offices of the Prime Minister (and is now within the Ministry of Economy, Plan and Social Recovery). The Office plays a key role in the development and establishment of commercial shrimp culture by (a) collaborating with technical ministries, informing potential investors on technical, administrative, legal economic and social environments as well as investment opportunities in the country; (b) assisting investors in complying with investment formalities and procedures; (c) receiving applications for companies to establish facilities in preferential trade zones or to obtain the status of free trade enterprises.

In **Tanzania** there is no specific authority responsible for overall aquaculture development and management, either on the mainland or in **Zanzibar**. On the mainland, the Division of Fisheries (Fisheries Development and Resource Utilization), in the Ministry of Natural Resources and Tourism, is primarily responsible for aquaculture development and management. The Division of Fisheries is responsible for development planning, budgeting and submission of projects for Government approval and financing; disbursement of funds for approved projects and projects supervision; procurement and allocation of necessary project resources; initial approval of mariculture project proposals; establishment of development guidelines; authority over issuing of permits and licenses; policy formulation and implementation; and formulation of legislation and legal enforcement. Aquaculture advisory and extension services are provided for, but the main focus of activities is upon freshwater aquaculture.

The National Environment Management Council, created under the National Environmental Management Act 1983, is charged with the creation of a national conservation strategy for **Tanzania**, including development of its formal program of environmental assessment. The Council functions include formulation of a policy on environmental management; co-ordination of all bodies concerned with environmental matters, fostering co-ordination between Government, local authorities and other bodies engaged in environmental programmes, stimulating public and private participation in environmental programmes; standard setting for the protection of beneficial uses and maintenance of the quality of the environment; and formulating draft legislation on environment issues.

The Planning Commission is an administrative body within the Tanzanian President's office which is under a mandate to develop "comprehensive environment management plans" to cover the whole country. Currently, this process is informal and incomplete, but when completed, the planning process will require the Commission to consult all governmental agencies and other parties interested in the use, development and occupancy of an area, and to consider all interests relating to that area. Land use planning on the Tanzanian mainland is primarily the responsibility of the Ministry of Lands, Housing and Urban Development. The National Land Use Planning Commission Act 1984 established the Commission as the principal adviser to the Government on matters of land use planning, in an attempt to provide better co-ordination of activities requiring competing land uses. Hence, the Commission has responsibilities, amongst other things: (a) to formulate a land use planning policy; (b) to co-ordinate all public efforts of land use planning; (c) to recommend land use and conservation measures; (d) to stimulate public and private participation in land use planning programmes and activities; (e) to specify standards, norms and criteria for the protection and beneficial use and maintenance of the quality of land; (f) to examine existing laws, and where appropriate formulate proposals for legislation; (g) to establish and maintain liaisons with other countries and international organisations; and (h) to prepare regional physical plans. In discharging these duties, the Commission is to work through the Land Advisory Committees established in districts and regions and the Commission also has the power to issue orders, directions, notices and other documents to these Committees.

An Investment Promotion Centre was created in 1990, to regulate and control private investment (both foreign and domestic) in **Tanzania**. Under the National Investment (Promotion and Protection) Act 1990 and the Tanzania Investment Act 1997, proposals to invest in new enterprises must apply to the Centre for a certificate and the Centre will circulate each application to the agency with appropriate sectoral responsibility for type of enterprise, and to any other agency which the Centre feels might be affected by the proposed investment. Each agency must submit its comments and concerns to the Centre, which may then impose conditions on the applicant's certificate, or require the inclusion of mitigation measures or solutions to multi-disciplinary concerns. The Centre's mandatory criteria include consideration of any significant contribution to the economic development of **Tanzania** (e.g. foreign exchange earning, technology transfer, and creation of employment) and the incentives which are provided for development include preferential tax regimes and exemption from import duties.

In relation to **Zanzibar**, the Commission for Lands and Environment was established in 1989 and encompasses the Department of Lands, the Department of Environment and the Department of Surveys and Urban Planning. The Ministry of Agriculture and Natural resources also plays a significant role in relation to coastal area resources.

4.4 Devolution of Controls

Information on devolution of controls with respect to aquaculture, including shrimp aquaculture was difficult to obtain in the East African countries surveyed. In accordance with their respective constitutions, some degree of devolution of management and control in respect to the use of natural resources, including land and water could be observed. Being heavily dependent on these resources, such devolution is likely significantly to impact on shrimp aquaculture developments.

In **Madagascar** a Law (No 93-005 (1994)) establishes the basic framework for the decentralisation process in defining the decentralized entities (Region, Department and Commune). Another Law (No 94-007 (1994)) makes provision for the powers, mandates and resources of the decentralised entities. In addition, further provision is made concerning the local management of renewable natural resources (Law No 96-025 (1996)) identifying those resources belonging to the state at central or local levels, hence, local communities receive exclusive rights to manage and develop resources through formal contracts defining mutual rights and obligations of communities and the local administration.

Local authorities as well as central authorities are vested with important responsibilities in relation to natural resources and environment management both in mainland **Tanzania** and **Zanzibar**. In mainland **Tanzania** their role is more significant than in **Zanzibar**, where decentralisation is less necessary because of the size of the island, and where local institutions are seldom endowed with any significant financial resources and technical expertise. Local authorities in the mainland consists of village councils, township authorities and districts and urban councils. All these authorities have the power to make by-laws to facilitate the implementation of responsibilities imposed upon local governments by central government legislation. The functions of local authorities are set in the Local Government (District Authorities) Act 1982. Further devolutionary mechanisms are provided for under the Village Land Act 1998 which provides for the management and administration of land in villages and related matters. It is notable also that the management of specific areas has also been provided for by legislation in some instances. For example, the Rufiji Basin Development Authority Act 1975 provides for the establishment of an Authority responsible for a whole range of activities within the Basin, including measures for fisheries (including aquaculture) and, notably, there has been a proposal for a large shrimp aquaculture development in Rufiji Delta Area.

In **Mozambique** some degree of devolution of controls exists insofar as land use licences may be issued by different levels of Government: local, provincial and national according to the size of the area which is to be developed (discussed below).

4.5 Acquisition of Land Rights

Increasing attention is being paid to access and use of land areas suitable for shrimp aquaculture. Relevant sites usually fall within the public domain and access and use of these sites is subject to special lease or concession agreements granted by authorities competent for land, with or without consultation with the authorities responsible for aquaculture development. Some procedures for acquiring suitable land involve a higher degree of complexity because of the extent of the consultative and participatory requirements that are imposed.

In 1995 a National Land Policy was issued by the Council of Ministers for **Mozambique** with the objective of promoting investment by introducing market principles to land management, while safeguarding the rights of Mozambican people over land and other natural resources, and promoting the sustainable and equitable use of these resources. Under the Land Law 1997, land belongs to the State so that it cannot be sold, mortgaged or seized and the Law establishes land use rights and conditions for exploiting public lands and the need to obtain a licence for land development. To avoid land use conflicts between newcomers and existing rural

communities, the latter are consulted and fully participate in the process of granting land concessions. Significant features in the Land Law include provisions allowing areas under public domain to be used for aquaculture, providing that a special licence is issued for that purpose. In principle, certain areas cannot be appropriated by anyone for exclusive use, these areas include full or partly protected zones such as the beds of fresh, brackish and marine waters, and a 100-meter wide strip of land measured from the highest tidal line along the coast, bays and estuaries. Where a person wishes to undertake an economic activity in a particular area he must submit an application to the competent authorities including a financial and operation work plan and proof of compliance with other laws. However, the Land Law has not yet been fully implemented by the adoption of subsidiary legislation, though it is understood that regulations are to be adopted imminently. Use licences may be issued by different levels of Government, local, provincial and national (ministers), according to the size of the plot. The process of rural land demarcation and licensing is performed by the National Directorate for Geography and Cadastre, under the Ministry of Agriculture.

The acquisition of land in **Madagascar** for shrimp aquaculture purposes is essentially a matter of an individual prospective shrimp farmer acquiring private rights to use land for this purpose. A person seeking to establish a shrimp farm on state-owned land must acquire a lease agreement from the central or local authorities depending on the location, status and size of the farm. The 1993 Fisheries Ordinance and the 1922 Decree require a lease agreement to be entered into, with the competent government authorities, for occupation of the public domain for a determinate period. Leaseholds have been used for various purposes, including for shrimp culture, where arrangements have been entered into for occupying coastal areas. Some companies appear to hold an ordinary lease, others hold a lease associated with a real security (*emphyteusis*), whilst others hold a permanent lease. The average duration may range from 18 to maximum 50 years. Leases above 500 Ha are granted by the Prime Minister. Leases are provided for in accordance with the Ordinance (No 60-099 (1960)) regulating the public domain and a Law relating to the private State domain (No 60-004 (1960) as amended). Under lease agreements provision is made for the establishment of buffer-zones, between 100 and 300m, between shrimp farms and mangrove areas and for the monitoring of the mangrove conservation status within farm estates.

The acquisition of land for shrimp aquaculture is a matter of some complexity in **Tanzania** since, though all land is vested in the President, there is a complex institutional framework determining the role of central and local bodies in respect of land rights. The position is further complicated by several recent pieces of legislation which have been adopted and which may be relevant to aquaculture land use, such as the Land Act 1998 (the text of which is not yet available) and the Village Land Act 1998. The Village Land Act 1998 Act sets the basic principles for village land administration and aims to clarify and secure existing rights and to recognise long-standing occupation or use of land; to regulate the amount of land that any person may occupy or use; to ensure that land is used productively and in compliance with the principles of sustainable development; and to enable all citizens to participate in decision making on matters connected with their occupation or use of land. Notably, the President may determine matters concerning the transfer of village land to general or reserved land or vice versa subject to certain conditions; the Minister may declare any area of a village to be hazard land where it is likely to pose a danger to life or to lead to environmental destruction on that or contiguous land and includes mangrove swamps and wetlands. However, whether mangrove areas have been declared "reserved land" is unknown. Under

the Land Act 1998 and the Village Land Act 1998, local community consultation is required prior to any acquisition, following which a certificate may then be issued for industrial, agricultural or residential use, subject to conditions. Once the land is obtained and certified however, it may apparently be leased to other users without further community consultation.

4.6 Development Licensing for the Establishment of Shrimp Farms

In absence of any specific legislation governing shrimp aquaculture developments, other environment and land-related legislation provides for controls on the development of shrimp aquaculture, including measures on access to, and operation of, shrimp farms. A significant point is that regulatory control is implemented through an environment licence (Mozambique) or an environment impact assessment procedure or both, as well as through measures (such as restrictions and prohibitions) to protect particular ecosystems (e.g. mangroves). Zoning for shrimp aquaculture is not common in the East African countries surveyed though in practice various suitable areas have been identified which guide potential investors and fisheries authorities in matters relating to suitable locations for the development of shrimp aquaculture.

In **Mozambique**, there is an absence of specific provisions concerning shrimp aquaculture but the Environment Protection Law 1997 requires an environmental licence and mandatory environmental impact assessment for marine and fresh water aquaculture projects where the area occupied equals or exceeds 5 ha (Decree approving the Regulation on Environmental Impact Assessment 1998). Under the same provisions, all plans, projects which are likely to affect, directly or indirectly, sensitive areas such as coral reefs, mangroves, protected areas or underground water resources are subject to environmental impact assessment. Hence, many aquaculture activities, if not all, are subject to environmental impact assessment process and general environmental licensing.

Forestry resources in **Mozambique**, including mangroves, are protected under the Forestry and Wildlife Act 1999. This provides for the creation of National Reserves which are areas set aside for the protection of certain plant and animal species that are rare, endemic, threatened with extinction or in imminent decline, and fragile ecosystems such as wetlands, dunes, mangroves and coral reefs, as well as the conservation of flora and fauna present in these ecosystems. In principle, it is strictly forbidden to undertake any activities in National Reserves with a tendency to modify aspects of the land or vegetation characteristics, as well as causing water pollution and, in general, any act which, by its nature, may provoke plant and animal perturbations. Shrimp aquaculture projects are likely to fall within the scope of these rules.

Finally, alongside the above requirements, in **Mozambique**, the implementation and operation of marine aquaculture projects will be subject to a prior permit from Ministry of Agriculture and Fisheries, according to conditions to be established by forthcoming regulations under the Fisheries Law 1990. In the meantime, two commercial shrimp aquaculture projects are in operation and have been authorised by analogy with mechanisms provided for under the Freshwater Fisheries Act 1967. This Act and its subsequent amendments address freshwater aquaculture marginally, establishing that this activity would be governed by the general provisions of this Act until specific legislation is enacted. Minimum requirements are established for five-year renewable concessions of land and license procedures. An integrated coastal area management program is also being developed, whereby all the relevant

institutions participate in the profiling of the coastal zone and in the selection of priority action areas through an Inter-ministerial Committee.

In **Madagascar**, as noted earlier, fisheries legislation has been used for regulating the development of aquaculture in respect of access and operations. The Control of Fisheries Decree 1922 regulates fisheries organisation in general, including the establishment of aquaculture installations, and provides that an authorisation for conducting aquaculture is required from the provincial authorities. An enabling clause is included in the basic Fisheries Law 1993 providing the agency responsible for aquaculture with regulatory powers concerning aquaculture development and management related powers. A prospective shrimp aquaculture developer will need to obtain an authorisation before engaging in such activity. Where the public domain is involved, a lease agreement needs to be obtained in addition to the aquaculture authorisation. So far, the basic Fisheries Law 1993 has not been implemented by regulations with respect to aquaculture and zoning for aquaculture has not taken place. However, financial and economic incentives have guided prospective shrimp farmers towards establishment in preferential trade zones. Nevertheless, in practice, since the early 1990s, areas for shrimp culture have been identified and designated and potential developers are invited to develop shrimp farms in these areas to obtain government financial and economic incentives, in respect of which potential developers will request a 'preferential trade status'.

There are no specific rules relating to the zoning of areas for aquaculture in **Tanzania** though various studies of coastal zone management have been undertaken in which aquaculture may have been contemplated. However, land use planning issues are covered under various pieces of legislation some of which may be noted. The Town and Country Planning Ordinance provides for "planning areas" in which the Minister thinks it necessary to establish a planning scheme. Where this is done an Area Planning Committee is established, or the competent local authorities as required to perform the necessary functions and to exercise planning, policy and management powers in relation to the relevant area. The Town and Country Planning (Public Beaches Planning Area) Regulation 1992 adopted under the Town and Country Planning Ordinance, declares some specified beach areas as planning areas for the purposes of the ordinance. The Range Development and Management Act includes detailed provisions for the establishment of range development areas, in respect of which a Range Development Commission is charged with rehabilitation, conservation, development and improvement of natural resources of the area.

Over the last 15 years, **Tanzania** has developed several pieces of legislation for the protection of the environment which are likely to impact on the development of aquaculture. Originally, environment management fell under the National Environment Management Act 1983, however, the National Environmental Policy approved by Cabinet in 1997 recognised the importance of environmental impact assessment as a planning control tool. Several environmental impact assessments have been conducted in relation to proposed aquaculture developments, and this is now provided for under the draft National Environmental Management Council Environmental Assessment Regulations. Hence, the normal procedure is that a shrimp aquaculture proposal is submitted to the Ministry of Natural Resources and Tourism for technical feasibility appraisal, and to the National Environmental Management Council for environmental assessment screening. The Council may require additional information, a screening report, a preliminary assessment, or a full environmental impact assessment, or it may determine that no environmental impact assessment is required

(National Environment Act 1983 and the draft Environmental Impact Assessment Regulations. The Regulations require environmental impact assessment for environmentally critical projects and establish requirements for environmentally critical areas. In practice however, environmental impact assessment is mandatory for "artificial fisheries" (which includes shrimp aquaculture). If the Council determines that environmental impact assessment is required then a public scoping exercise, involving consultation with interested or affected parties, is undertaken by the proponent in consultation with the Council, draft terms of reference for an environmental impact study are formulated. The terms of reference must address any public concerns expressed during the scoping exercise. They are then reviewed and further developed by the Council in consultation with a cross-sectoral Technical Review Committee comprising a range of relevant government departments. If the terms of reference are approved, the proponent may immediately start work on the production of an environmental impact statement resulting from a thorough environmental impact study. The Technical Review Committee, including the Minister responsible for environment and other lead agencies will review the environmental impact assessment and assist the Council in its decision.

4.7 Fresh Water Use Licensing

Water laws in **Mozambique** and **Tanzania** have been in existence over the last decade. All waters are vested in the State. Both countries contemplate a regulation dealing with the right to use water resources for aquaculture purposes rather as a part of the right to use water for fishing or agricultural purposes in general. As is common in other parts of the world, the amount of water available for shrimp aquaculture is almost invariably stated in an authorisation, permit or concession obtained from local or central governing bodies. Similarly, as will be seen in section 4.8, regulations concerning discharge of wastewater and effluent are provided for.

The Water Utilization (Control and Regulation) Act 1974 (as amended in 1981) is the main legislation on water use in **Tanzania**, vesting all water in the Government for the benefit of all people. The 1974 Act upholds the inherent right of everyone to use the water and, where water is required for industrial, agricultural, forestry, fisheries or mining activities, the user may have to apply for water rights. The type of uses identified in the Water Utilization (General) Regulations 1975 encompass the use of water for fish farming purposes. The applicant must state the intended use of the water, the amount required, particulars of the land in respect of which application is made, particulars of water rights for which application is made, particulars of possible pollution and measures to be taken to avoid pollution, particulars of works and the period of use amongst other matters. Subsidiary legislation requires the responsible government agency to elicit the views of the users of water who may be affected by the proposals contained in the application through prescribed publicity of the particulars of the application and through prescribed invitation for objections to be made. Seeking the views of such users may minimise the potential for conflict among water users in general, and, in particular for appeals against government water administration at a later stage. The Water Officer, in granting a right to use water, must provide terms and conditions for safe use including requirements to avoid contamination of the water while it is being utilised. Where the water is returned into a river or lake, the right holder must ensure that the water so returned is substantially undiminished in quality. To achieve this, the right-holder is required to treat the water in such a manner as to comply with prescribed effluent and receiving water

standards. Water allocation decisions may be the subject of an appeal and subsidiary legislation provides the necessary procedural and substantive details as to the filing and determination of appeals. Since the grant of a permit for the use of water for shrimp culture may not suffice to allow water utilisation on the farm, the Water Utilization (General) Regulations 1975 provide also for the grant of "easements" or "servitudes", subject to terms and conditions.

In **Mozambique**, under the Water Law 1991 (and a Decree of 1991), all waters are in the public domain of the State. The 1991 Act provides for a special concession regime concerning the use of water for fisheries, including stock enhancement and aquaculture in general. These "so-called" private usages are generally permitted through concession from the regional offices of the water administration. Private uses of water resources are permitted as long as they do not harm the environment and do not conflict with the protected zones established by the land legislation.

4.8 Wastewater Discharge Licensing

Tanzania and **Mozambique** have both adopted laws dealing with water pollution prevention and control as well as wastewater discharge, however, these provisions do not apply specifically to discharge of wastewaters from shrimp aquaculture premises. There are various legislative approaches to water pollution prevention and control by the Government. Common features include the prohibition of certain discharges into bodies of freshwater, into surrounding areas or under the surrounding areas, restriction on such discharges through permits, licences, authorisations granted by the Government as well as prescribing precautionary measures in respect of selected land-based activities. The extent to which these laws and regulations are likely to apply to shrimp aquaculture is difficult to ascertain.

In **Tanzania** the Water Utilization (Control and Regulation) Act 1974 sets out the relevant water quality standards in a Schedule though they appear not to have been subject to changes. Discharge from commercial and industrial installations requires the consent of a water officer. This consent will incorporate standards for effluents. The 1974 Act sets two standards for effluents, namely those for direct discharge into receiving waters; and those for indirect discharge via municipal water treatment works. On receiving waters, the law identifies three categories of which one is of particular interest: water suitable for use in feeding domestic animals, in fisheries, shell cultures, recreational and water contact sports. The Act incorporates offences relating to the discharge of effluent which is likely to cause injury directly or indirectly to public health, livestock or fish, crops orchards or gardens and different penalties are specified for this offence on initial and subsequent convictions. The Water Works Ordinance (1949, consolidated in 1993) specifies that water pollution is a criminal offence, and the Penal Code identifies fouling of water as a misdemeanour.

Further controls upon water pollution are provided for under fisheries legislation, so that the Fisheries Act (1970), the Fisheries (General Regulations), 1973, the Fisheries (Explosives, Poisons and Water) Regulations 1982, and the Fisheries Regulations 1989, amongst other things, ban the flow or passing into waters of any solid, liquid or gaseous matter which cause water pollution in any lake, dam, estuary or seawater. The polluter pays principle is followed insofar as a person responsible for pollution is required to clean the polluted water within a reasonable period and at his own expense.

In relation to **Mozambique**, the Water Law 1991 deals with prevention of water pollution and effluent discharges. In general effluent discharges must be licensed. Such licences may be refused for environment conservation and protection purposes and in the public interest.

4.9 Shrimp Movement Licensing

All the East African countries under consideration have some control measures relating to the movement of aquatic species, including shrimp. The purposes of such regulatory frameworks appear to be the protection of fishery resources and, indirectly, control of fish health.

In **Tanzania** the Fisheries Principal Regulations 1989 apply to fishing in marine, brackish and freshwater areas and make provision for restrictions on import and export of fish and introduction of non-indigenous species of live fish, the control of fish disease, water pollution and the protection of spawning areas and spawn. The Regulations impose a requirement that a permit is obtained from the Director of Fisheries for the import of non indigenous live fish or fish products into Tanzania's mainland; the introduction of certain species not indigenous to Tanzania's Mainland or eggs thereof; the transfer of any species of non indigenous fish or fish products; or the export of any protected live fish or fish products. Under the 1989 Regulations, where a licensing authority suspects that any fish or fish products in any waters are infected with any epidemic disease, notice may be given to the owners of the waters or of the fishing rights therein requiring the destruction of all fish or fish products in the waters or the taking of any other measures. A recipient of a notice of this kind is required to take the relevant measures immediately upon receipt of the notice, though provision is made for expenses to be recovered from a person who has been in default in the matter on which destruction of stock or other action is required.

In **Mozambique** the Fisheries Act 1990 does not provide for regulations concerning the movement of fish, including the introduction of non-indigenous species. Significantly, however, it does include an enabling clause for the government agency responsible for fisheries to take necessary measures in relation to freshwater aquaculture. No subsidiary legislation has so far been adopted. The Freshwater Fisheries Act 1967 establishes that aquaculture installations must be registered and that egg or species introductions must have prior authorisation from the Ministry of Fisheries and the competent veterinary services.

The basic Fisheries Law 1993 of **Madagascar** provides for an authorisation procedure for the import of eggs, larvae, fingerlings and live aquatic species. It further regulates the export of Malgachy fishery, including aquaculture products. No export is permissible without a certificate of origin and health. Subsidiary legislation laying down procedural aspects and other details has not been adopted so far.

4.10 Genetically Modified Organisms

No information was available in relation to controls upon genetically modified organisms in **Madagascar, Mozambique** or **Tanzania**.

4.11 Chemical Use Restrictions

It appears that the importance of controlling the use of chemicals for aquaculture purposes has not much received attention in the East African countries.

In **Tanzania** the Fisheries Principal Regulations 1989 prohibit any person from causing or knowingly permitting to flow or pass into water, any solid or gaseous matter, or cause water pollution in any lake, river, dam, estuary or sea water. Under the Regulations, the Director of Fisheries has to maintain and establish a system of consultation and co-operation with other technical agencies, such as the Ministry responsible for industry, to ensure that necessary steps are taken by law for the purposes of restoring any polluted waters.

No information concerning chemical use restrictions was available in relation to **Mozambique** or **Madagascar**,

4.12 Food Sources and Utilisation

No information in relation to food sources and utilisation was made available in relation to **Madagascar, Mozambique** and **Tanzania**.

4.13 Product Quality Controls

In **Tanzania**, under the Fisheries (Amendments) Regulations 1997, no person is allowed to export or cause another person to export fishery products unless he has complied with the grading and pricing scheme issued by the Director of Fisheries. The Food (Control of Quality) (Food Additives) Regulations 1998, which implement the Food (Control of Quality) Act 1978, apply to all types of food whether imported or locally manufactured. These Regulations require that only food containing additives listed in the Schedule may be sold. A request that a food additive be added to, or a change made in, the Schedule of the Regulations may be submitted to the National Food Control Commission and must include the relevant information including a proposed maximum limit for residues of the food additive.

No information in relation to product quality controls was made available in relation to **Mozambique** and **Madagascar**, where it was suggested that responsibility for product quality controls lies with the shrimp production companies.

4.14 The Internationalisation of Standards

Shrimp producers in **Madagascar** are promoting "eco-friendly" shrimps. They are moving towards eco-labelling and are in discussions with World Wide Fund for Nature in relation to this initiative.

No information was available concerning the internationalisation of standards in **Mozambique** or **Tanzania**.

4.15 Guidance and Producers' Organisations

In **Mozambique**, in accordance with the basic Fisheries Law, 1990 the Ministry of Agriculture and Fisheries is competent to establish guidelines for marine and fresh water aquaculture development including brackish water aquaculture. It is understood that Aquaculture

Regulations are progressing towards adoption along with a code of conduct. This code will involve (a) prohibition of ponds in mangrove areas; (b) restrictions upon access to mangrove areas except for matters such as water supply; (c) restrictions upon collection of wild post-larvae and juveniles from the wild; (d) restrictions upon import of non-native species other than for research activity; (e) restrictions upon the use of infected animals; and (f) allowing the conduct of intensive aquaculture only under strict conditions.

In **Madagascar** it is recently reported that the *Groupement des Armateurs et Aquaculteurs de la Pêche Crevettières Malgache* intends to set up a shrimp culture branch to engage in research, marketing and other activities to promote the Malgache cultured shrimp. The *Groupement des Aquaculteurs Artisanaux de Madagascar* also exists, though it is not clear what activities it undertakes in relation to aquaculture.

With respect to **Mozambique** and **Tanzania** no information was available concerning producers' organisations.

4.16 Enforcement

Little information has been made available regarding law enforcement in the East African countries. Despite the range of permits and the consequent rights and obligations to which the holders are subject, no particular reference was made to control and monitoring aspects in relation to aquaculture, including shrimp culture. Where, aquaculture is dealt with under a basic fisheries law, the law enforcement section has often been drafted with only capture fisheries in mind. Further, where such fisheries law defers to other laws like the land law and environment protection laws in relation to access to aquaculture, the law enforcement section is silent with regard to effective control and monitoring aspects and does not indicate the roles of possible competent authorities or collaborative approaches which may be taken towards enforcement.

In **Madagascar** there is no particular monitoring and control activity in relation to shrimp aquaculture undertaken by technical departments concerned with forestry, fisheries and environment. However, some monitoring is being though undertaken, for the purposes of the Investment Code and the Free Trade Regime, concerning the use of equipment, apparatus and other tools in shrimp farms that have benefited from the preferential tax regime; the conditions and duties under lease arrangements; and duties and obligations under the law.

In relation to **Tanzania** no information was available concerning enforcement, though it was noted that there appears to be no comprehensive administrative procedures to ensure that environmental impact assessment recommendations are complied with or to ensure that performance standards are monitored during implementation and decommissioning of projects.

Although no specific information concerning enforcement in **Mozambique** has been made available, indications of enforcement responsibilities have been noted above, in particular in relation to institutional responsibilities.

Chapter 5 The Latin American Countries

5.1 Sustainable Development

The national constitutions of Latin American Countries usually provide for a general right of citizens and duty of the State concerning the protection of the natural resources and allow for the enactment of national laws for this purpose. In **Argentina, Brazil, Colombia** and **Ecuador** the constitutions require that the use of the natural resources must be sustainable and the environment must be preserved for present and future generations. In **Honduras** the constitution states that the technical and rational use of natural resources is a matter of public interest and utility. In **El Salvador**, the protection, restoration, development and use of the natural resources are recognised to be matters of social interest.

These broad constitutional principles are implemented through national laws and government policies. As a consequence, all economic activities, including shrimp aquaculture, should be undertaken in such a manner as to ensure the protection of the environment and within the framework of the principle of sustainable development. Likewise, governments must provide for the necessary rules to ensure the implementation of the concept and the rights of the citizens. In the sections which follow, a number of examples are given of legislative provisions which require the environment to be managed “sustainably”, however, no information has been provided of more specific measures by which sustainable development has been interpreted specifically or applied directly in the context of shrimp aquaculture.

5.2 Legislation

The general position is that most countries have little or no primary legislation which is specific to shrimp aquaculture and this activity is made subject to more general legislation concerning fisheries, though other legislation, particularly concerning the environment, is of considerable importance. Environmental legislation tends to overshadow specific legislation governing aquaculture in a piecemeal way. However, it is pertinent to note that environmental legislation has frequently been enacted since the establishment of many shrimp aquaculture installations.

In **Colombia** there are no laws which are specific to coastal aquaculture, but there are laws, decrees and resolutions which provide for a legal framework for the regulation of shrimp aquaculture. The main provisions arise under the Fisheries Law (1990) and its regulations; the Law on Agriculture and Fisheries Development (1993); the Law Governing the Public Sector Responsible for the Management and the Protection of the Environment (1993); and decrees on fishing in the waters of Colombia, concerning the prevention and control of activities detrimental to the environment and environment licences, leases and concessions. There are also resolutions regulating the management of mangroves. The Ministry of the Environment is generally responsible for conservation, use and management of the environment, renewable natural resources in the marine and coastal areas and for the regulation of the conservation and management of swamps, marshes, lakes, lagoons and other aquatic ecosystems. The Fisheries Law is centrally important in containing provisions which are of direct relevance to aquaculture and requires the national government to encourage and develop this activity. Powers are provided to the National Institute of Fisheries and Aquaculture to determine the conditions under which aquaculture may be conducted.

Aquaculture operations are classified as marine or freshwater, according to the nature of the activity undertaken and the phase of the life-cycle involved. Orders may be issued by the Ministry of Agriculture to ensure that areas for potential aquaculture are included in the territorial zoning plans; to provide for a general register for fisheries and aquaculture; to facilitate collection of fisheries statistics; and to specify infringements and related sanctions. Provision is also made for incentives.

The Fisheries Law (1974) of **Ecuador** contains only a minor reference to the regulation of aquaculture, however, a more specific regulation concerning the culture of aquatic species is also operative. Other matters are provided for under the Forestry Law (1981) and a specific regulation dealing with forestry matters and the conservation of natural areas, though wildlife and management of the environment is also subject to specific legislation. The Fisheries Law defines regulated activities to encompass any activity undertaken with a view to using marine living resources, hence aquaculture is included. The Law provides for the National Council for Fisheries Development to be responsible for establishing policies; empowers the Directorate General for Fisheries to manage and control fishing activities; defines the “culture phase” involved in aquaculture; prohibits the destruction of mangroves and the development of ponds in natural reserves; and regulates the discharge of waste water. It also provides powers to determine areas where aquaculture facilities may be established and for a general duty for aquaculture facilities to comply with the technical regulations concerning certain aquatic species. The Law further contemplates aspects of quality control, extension services, incentives and infringements, sanctions and procedures. The Regulation implementing the Law follows the same structure but without dealing specifically with aquaculture. The Regulation concerning the culture of aquatic living resources deals mainly with authorisations and concessions, but provides for application procedures and requirements, and for obligations of fish farmers. These require farmers to facilitate inspections; protect mangroves; use appropriate systems to avoid pollution; keep records of harvests, production and sale, and holdings of natural or artificial seeds. Certain prohibitions are also imposed upon lease or concession holders against the blocking of streams, rivers, channels or other hydraulic structures; the destruction or damaging of mangroves; against hindering of navigation; changing the properties of the soil; discharges of waste waters without treatment; establishing aquaculture facilities in natural reserves. Restrictions also apply in relation to multiple holding of concessions; transfers of concessions; and the procedures and durations relating to concessions, for example, in circumstances where a site is abandoned or where a fish farmer becomes bankrupt. A new fisheries and aquaculture Act is presently being prepared.

Shrimp aquaculture in **El Salvador** is primarily governed by the General Fisheries Law (1981), the Regulation concerning the establishment of aquaculture facilities in salt forests and the Laws on the Environment (1986 and 1998) and its regulations. The General Fisheries Law contains provisions specifically relating to aquaculture which concern the areas where aquaculture is allowed, the authorisation procedure, and, among the provisions common to fisheries, it includes duties and prohibitions related to shrimp aquaculture, sanctions and related procedural matters. The Regulation on aquaculture developments in salt forests details the application procedure for a concession; the obligations which arise (complying with technical conservation instructions, providing data and reports, presenting topographic plan) and prohibitions (against dumping noxious substances, using explosives and contaminating substances, causing damage to mangroves, forests and wildlife, extending an

authorised area, using facilities for purposes other than those authorised). Requirements are also specified concerning the applicant; the grounds for suspension of a concession (lack of compliance with the rules established by the authority or non payment of fees); and for cancellation (failing to start the project within a sufficient period after receipt of the authorisation, undertaking prohibited activities and failing to rectify the matters which have led to suspension).

In **Guatemala** aquaculture is dealt with in a confusing manner under a Regulation governing Aquaculture and Fishing which dates from 1932. The relevant provisions of the 1932 Law deal with the obligations of the authorities in relation to aquaculture are primarily concerned with the protection of oyster banks. Alongside other laws and regulations on fisheries, there are various Government Agreements which impact on shrimp aquaculture. With respect to the enhancement, conservation and rearing activities, and as far as private, municipal and State hatcheries are concerned, the law specifies that private entrepreneurs need a licence for the breeding of any aquatic species and that the State may inspect the facilities as appropriate. The Law authorises the competent authority to lease fishery areas, and to grant concessions of coastal areas for not more than 10 years. Requests by the prospective developer must include a map of the project area and details of the project infrastructure. The area may not exceed 6 Ha, though this may be extended after 5 years. A concession will become void after two years of abandonment. A draft Fisheries Law, which includes provisions on aquaculture and a National Plan for the Regulation of Shrimp Aquaculture is presently being prepared.

The basic rules concerning shrimp aquaculture in **Honduras** are laid down in the Fisheries Law (1959), the Environment Law (1993); the Law on Animal Health (1974), and the Regulation on the health of the environment. There is also a law on the sovereignty of the country which is relevant to the exploitation of marine fishery resources. The Fisheries Law concerns the conservation and propagation of riverine, brackish and marine fauna and flora and their exploitation, trade and processing. With respect to shrimp aquaculture, it provides for the seizure of imported species which do not comply with certain conditions; the prohibition of fishing in aquaculture facilities; the prohibition of waste dumping in the sea and to removal of surrounding trees. The Law also empowers competent authorities to authorise the import and export of eggs of live species of aquatic fauna and flora.

In **Mexico** the Federal Fisheries Law (1992) and its regulation encompass aquaculture, though the regulation was significantly modified in 1999 to provide for a clearer separation between aquaculture activities and fisheries. In addition, the Political Constitution (1917) and a complementary law concerns environmental matters and covers the ecological equilibrium, the protection of the environment and the mandates of the various institutions including the Sub-secretariat for Fisheries. All sectoral, state and municipal environment regulations have to be consistent with this fundamental environment law. There are a number of important Decrees, Official Mexican Rules, Agreements and other rules which implement the environmental law. In addition, the Criminal Code (1931) contains a chapter on environment infractions which may be relevant to shrimp aquaculture. The Fisheries Law (1992) empowers the competent authority to define aquaculture areas, to regulate the introduction of species and to establish sanitary and control requirements. It deals also with concessions, permits and authorisations and specifies a general obligation upon concession holders to inform the competent authority about the methods and techniques which are used and to comply with duties and prohibitions provided for under the Law and the Regulation. The

granting of concessions, permits and authorisations are subject to a general condition of public interest. Permits and licences may be revoked when the ecosystem is being adversely affected and it is specified that the introduction of species which affect the conservation of fisheries resources constitutes a violation of the law. The Regulation defines the term “aquaculture” and places a general obligation upon the competent authority to encourage the development of aquaculture; it provides for an authorisation procedure for the collection of broodstock and larvae; for a National Register; for sanitary requirements; for the introduction of species and the prohibition upon introductions of species which are likely to destroy native species; for the obligation to re-stock; and to provide information on the harvest. The Regulation also deals with aspects of revocation; cancellation of concessions; aquaculture hygiene; and violations and breaches and related sanctions and procedures.

In **Nicaragua** the Special Law Concerning Fisheries (1961) includes clauses concerning concessions for aquaculture, environmental protection requirements and rules on the organisation of the State. There are also rules providing for the regulation of concessions for the culture and exploitation of “certain species”. Concessions may be granted in waters belonging to the State, for an experimental and exploitation period. It is also specified that concession holders have the right to use, free of charge, state land for the purposes of building facilities and paths, though there is also a reference to a “culture tax”. The institutional framework has undergone several changes and, most recently, the Law on the Organisation of Executive Power (1998) required the restructuring of several institutions, including the transfer of functions to the Nicaraguan Corporation of fisheries. Environmental requirements are dealt with under the General Law on Environment and Natural Resources (1996), and its regulations. One of the objectives of the Law is to ensure the rational and sustainable use of the environment and to regulate any activity likely to cause deterioration of the environment or contamination of natural resources. For several years a new law on fisheries and aquaculture has been in preparation and under discussion.

The principal enactments governing shrimp aquaculture activities in **Panama** are the Law Governing Fisheries and the Export of Fisheries Products (1959) and the General Environment Law (1998). It has not been possible to obtain more specific details of these measures and their particular implications for shrimp aquaculture activities.

5.3 Institutional Responsibilities

A common feature of the allocation of institutional responsibilities for shrimp aquaculture is the wide range of governmental and specialist bodies that are involved in regulation. In some cases, this has led to problems of bureaucracy through duplication of application processes, though there are significant examples of this having been addressed through a streamlining of administrative procedures.

The usual pattern of institutional responsibilities found in the Latin American countries surveyed may be broadly summarised as follows:

- i. a national council for policy validation, which advises the executive and lays down or advises on sectoral fisheries policies and/or an environment council;
- ii. a ministry or government department which establishes regulations and has operational

authority for the protection of the environment and safeguarding natural resources;

iii. a ministry or government department responsible for fisheries, with regulatory powers and powers to promote an activity;

iv. a specialised operational body, with or without legal personality, depending on the ministry responsible for fisheries;

v. various specialised agencies, normally centralised, belonging to different ministries or government departments with specific areas of jurisdiction such as the granting of land and water rights, health issues, water management facilities, marine and coastal control, customs, police, research and development; and

vi. in some countries, such as **Nicaragua** and **Colombia**, the municipal authorities are also involved, particularly with regard to plans to use and develop lands within their jurisdiction, but in respect of legislation the municipal authorities' powers are rather marginal.

In **Colombia** the Government is responsible for encouraging sustainable productive activities and for encouraging comprehensive development of fisheries activities, including aquaculture. The Ministry of Agriculture and Rural Development is responsible for formulating the National Policy and Plan for Fisheries Development. The National Council for Fisheries is the advisory body to the Ministry and is composed of representatives from the private and public sector. The Ministry of Environment is responsible for formulating a national policy on the environment and renewable natural resources; for establishing the rules regulation of the use of the land territory and the adjacent sea; and for sustainable development of natural resources and the environment. This Ministry administers the National Environment Policy and, the National Environment Council is responsible for inter-sectoral co-ordination. The National Fisheries and Aquaculture Institute has executive responsibility for fisheries policies and plans and is specifically responsible for regulating, encouraging and controlling aquaculture, issuing regulations concerning aquaculture activity and determining and issuing aquaculture authorisations, permits, licences, and concessions. The Institute is also responsible for maintaining the National Fisheries and Aquaculture Register, collecting statistics and liaison with other government bodies dealing with fisheries. The Financial Corporation for Fisheries Development finances fisheries and aquaculture investment programs and projects. The Maritime and Port Directorate General of the National Army regulates concessions for shores, coastal low tide areas and marine waters. A fund for financing the agriculture and livestock sector has been established to support the development of aquaculture and the organisation of aquaculture co-operatives.

At regional level in **Colombia**, the responsibility for management of the environment and renewable natural resources, and for the encouragement of sustainable development, lies with the Regional Autonomous Corporations, which are composed of representatives of the public, private, academic, indigenous and productive sectors, depending on the region. The Departments, Districts, Municipalities, Indigenous Territories, Regions and Provinces may also establish certain environmental rules. Other institutes provide scientific and technical advice to the Ministry of Environment and the National Environment System: the Institute of Hydrology, Meteorology and Environmental Studies, the Institute of Coastal and Marine

Research, the Institute of Research in Living Resources, the Amazonian Institute for Scientific Research and the Institute for Environment Research in the Pacific. Besides these advisory bodies, advice is also provided by the State Universities. The Colombian Oceanographic Commission also co-ordinates, directs and undertakes research activities and there is a Colombian Fund for Scientific Research and Special projects which contributes to funding scientific research plans, programmes and projects. Producers organisations and private institutions also undertake research activities relevant for aquaculture development.

The National Council for Fisheries Development in **Ecuador** is responsible for approving programmes for the development and enhancement of the fisheries sector. Within the Ministry of External Trade, Industry and Fisheries, under the Sub-secretariat for Fisheries Resources, the Directorate General for Fisheries is responsible for managing and controlling fisheries, for executing programmes within the fisheries sector and controlling industry and trade in fish and fishery products. This Ministry of is responsible for regulating the culture and use of aquatic living resources in freshwater, marketing fish and fishery products (in domestic and foreign markets), and it is generally entitled to resolve and regulate “special and unforeseen cases” which arise from the implementation of the law. By means of contractual ministerial agreements or arrangements, a number of fishing activities, including aquaculture, may be prohibited, restricted, or made subject to conditions. The National Fisheries Institute is devoted to research activities on living aquatic resources, and it also exercises functions relating to the issuing of technical standards, on environmental impact and quality control, and provides technical and scientific support to the private and public sector. There is also a National Council for Sustainable Development which provides guidance concerning environmental policies. The Ministry of the Environment and the Ministry of National Defence, acting together, and after having informed the Directorate General of Marine Merchant Affairs and of the Coast, identify and define the areas where shrimp aquaculture may be authorised. As far as high tide areas are concerned, a certification procedure applies whereby the Ministry of Agriculture, the Ecuador Institute of Forestry, Natural Areas and Wildlife, the Institute of Agricultural Development and the Directorate General of Marine Merchant Affairs and of the Coast collaborate in making determinations. The Municipalities provide for development plans and regulatory plans and may also establish rules. The National Council for Water Resources, attached to the Ministry of Agriculture, has responsibility for the quality of waters. Recently, some powers relating to the protection of the environment, which had previously been exercised by the Ministry of Agriculture and Livestock, were transferred to the Ministry of Tourism and the Environment.

In **El Salvador** the Ministry of Agriculture and Livestock is responsible for the preparation of the national fisheries policy, within which aquaculture features prominently. Within this Ministry, the Directorate General for the Development of Fisheries is responsible for the management and implementation of the General Fisheries Law (1981) and keeps a register of fish farms. The Council of Ministers issues an environment policy which is, in turn, implemented by the Ministry of Environment and Natural Resources in accordance with the National System of Management of the Environment. Protecting and improving the environment are of social importance and all government institutions and municipalities have to adopt plans and programmes consistent with the general environment policy. The Ministry of the Economy is entitled to allocate tax exemptions to persons authorised to culture, harvest and market fisheries resources.

The most important authority dealing with fisheries in **Guatemala** is the Ministry of Agriculture, Livestock and Food, within which there is a Special Executing Unit for Fisheries and Aquaculture. The Technical Directorate for Fisheries and Aquaculture, within the General Directorate of Animal Issues has the overall mandate to formulate and apply appropriate rules to ensure the rational use and the conservation of fisheries resources, whether marine or freshwater, and to keep related registers. The same Ministry is required to maintain information concerning the control and protection of forestry resources, fauna, flora and soil and water resources linked to agriculture activities.

In **Honduras** the Directorate General for Fisheries and Aquaculture, within the Secretariat for Agriculture and Livestock, determines the national policy for aquaculture and co-ordinates and controls relevant activities, while the Secretariat for Natural Resources and Environment establishes environment policies and supervises environmental aspects of public or private programmes and projects. Within the latter institution, the Directorate General for Environmental Evaluation and Control is responsible for the national system of environmental impact assessment. The Centre for the Evaluation and Control of Contaminating Substances, within the Secretariat for Health and the National Service for Animal and Plant Health, within the Secretariat for Agriculture and Livestock have some pertinent powers within their respective areas of competencies.

The Federal Government in **Mexico** governs the sustainable use and the protection and conservation of natural resources. The major powers in relation to shrimp aquaculture are vested in the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food. From 2001, the federal government will promote new institutional arrangements in passing the Sub-secretariat for Fisheries, its Directorate General for Aquaculture and the National Fisheries Institute to the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food. Other bodies which are competent in specific matters, under the Secretariat for Environment and Natural Resources, include the National Water Commission, the National Ecology Institute with its Directorate General for the Ecological Order and Environmental Impact, the Directorate General for Federal Maritime Zones, the Directorate General for the Restoration and Conservation of Soils and the Federal Attorney for Environmental Protection with its Directorate General for the Inspection and Surveillance of the Fisheries Resources and the Marine Resources. The Secretariat for the Land Reform is competent with respect to contractual arrangements and maintains the National Agrarian Register, while the Secretariat for External Relations has powers relating to the denominations of firms. However, discussions are currently taking place regarding the allocation of responsibilities for monitoring and inspection of fisheries and marine resources.

In **Nicaragua** the Ministry for Development, Industry and Commerce is responsible for the management, use and exploitation of fisheries and aquatic resources and implements licence and concession regimes in accordance with technical rules concerning sustainability and the regulations set by the Ministry of the Environment and Natural Resources. The latter is the regulatory body for environment policies and the implementing body for the environment law. The National Environment Commission is the coordinating body concert instance with respect to environment policies, comprising representatives of different ministries and sectors under the chairmanship of the Minister for the Environment. The same Ministry has to co-ordinate with the Ministry for Industry and Commerce in respect of sectoral planning for sustainable uses in relation to aquaculture activities. To fulfil its duty, the Ministry has a de-

centralised arm called the National Administration for Fisheries and Aquaculture, with a specialised Directorate for Aquaculture. The Centre for Research in Fisheries and Aquaculture Resources and the Ministry of Environment and Natural Resources also provide technical support.

In **Panama** the State has the general duty to ensure that the population lives in a healthy and non-polluted environment and a duty to bring about social and economic development without pollution of the environment, disturbance of an ecological equilibrium or the destruction of ecosystems. For these purposes, it regulates, controls and implements measures to ensure the rational use and exploitation of the terrestrial, riverine and marine fauna, as well as forests, land and waters, in order to avoid the depreciation and to secure their conservation or renovation in perpetuity. The Ministry of Agriculture is responsible for setting and implementing rules concerning fisheries and other issues relating to aquatic fauna and flora. The Maritime Authority includes a General Directorate for the Marine and Coastal Resources. The main advisory body is the National Fisheries Council.

5.4 Devolution of Controls

Although essential responsibilities for policy-making and legislation remain with central government in all jurisdictions, a range of devolutionary mechanisms are provided for in most countries allowing regional or local authorities fairly extensive powers to make rules and to administer and implement regulation at their respective levels.

Fisheries and aquaculture laws do not generally provide for devolution mechanisms while environmental protection laws adopt a markedly different approach. They tend to broaden the base for environmental decision-making by entitling everyone to intervene with specific agencies and authorities, creating councils and participatory bodies, and giving a paramount role to the local authorities to draft environmental plans and programmes and controlling their implementation.

The Regional Autonomous Corporations in **Colombia** have the power to grant concessions, permits, authorisations and environment licences in accordance with the law and the policies of the Environment Ministry. The Departments, Districts, Municipalities, Indigenous Territories, Regions and Provinces must exercise their constitutional and legal powers with respect to environmental matters in a co-ordinated manner and consistently with the national environment policy. These bodies may issue subsidiary rules within their respective areas of jurisdiction providing that these are in accordance with the superior legislation. With respect to environmental issues, the rules that are established locally may be more stringent when established by bodies further down the legislative hierarchy but may not be less stringent than the superior legislation. No concessions will be issued without permission of the mayor to establish that there is no inconvenience for the municipality. In granting environment licences and concessions, permits and authorisations the issuing authority has to comply with the provisions relating to the environment and the preservation of the ecological heritage set by the respective territorial entities. Notwithstanding this, the National Institute for Fisheries and Aquaculture is the only competent body which sets requirements and conditions for the development of aquaculture and the other government bodies must comply with these.

In **Ecuador** the Municipalities may require any development to comply with management plans, adopted by the Town Hall following an environmental impact assessment. The Regional Development Corporations may deal with certain issues relating to water quality. When establishing environmental policies, the Provincial Councils as well as the municipalities must respect national rules concerning the Heritage of Natural Protected Areas and they must consult with the representatives of the indigenous population, afro-Ecuadorians and the local population, in relation to the determination, management and regulation of conservation areas and ecological reserves.

All the powers relating to shrimp aquaculture in **El Salvador** are vested in the Ministry of Agriculture and Livestock, and more specifically within the General Directorate of Fisheries Development.

The Municipalities in **Guatemala** may lease, for aquaculture purposes, without authorisation but after consulting the Ministry of Agriculture, Livestock and Food, areas of rivers, lagoons, lakes or coastal areas within their territorial jurisdiction providing these areas are less than 0.5 km².

The Municipal Environmental Units in **Honduras** must, in accordance with the General Law on the Environment, promote and organise environmental studies, register and verify whether environmental impact assessments have to be made, monitor the implementation of mitigation measures and participate and promote compliance with the legislation on the environment.

In **Mexico** States are responsible for the implementation of environment policies provided for in the state laws and for the preservation and restoration of the ecological equilibrium and the protection of the environment within their jurisdiction. The Municipalities formulate and direct the municipal environment policy, create areas of ecological preservation and initiate programmes of local ecological management. The Federation, through its Secretary of Environment and Natural Resources, may negotiate and enter into co-ordinating agreements with the Federal Districts and the States and, in turn, the States and the Municipalities may assume relevant functions.

In **Nicaragua**, prior to granting “contracts for the rational use of natural resources”, the State must consult and take into account the advice of the respective municipal authority. In addition, for contracts relating to areas located in the autonomous regions of the Atlantic Coast, where a large number of indigenous communities live, the State must receive the prior approval of the relevant Autonomous Council. The Municipalities and Autonomous Regional Councils, in collaboration with the Ministry of Environment and Natural Resources, and with a view to enforcing environment laws, must formulate and implement Territorial Management Plans. In particular, the Municipalities are bound to develop, conserve and control the rational and sustainable use of the environment and participate in the evaluation of environmental impact studies. The Municipal Councils, the Regional Autonomous Councils of the Atlantic Coast and the Ministry of Environment and Natural Resources may submit to the President of the Republic a proposal to declare an area a “contaminated area”, because the levels of pollution are higher than those specified in permitted standards and, where this is done, specified control and mitigation measures must be adopted.

5.5 Acquisition of Land Rights

In most countries, coastal land and waters are the property of the State, so that acquisition of land for shrimp aquaculture involves a prospective farmer securing the appropriate, authorisation, licence or concession for the use of an area. However, some fairly wide variations are seen amongst the different national mechanisms enabling concessions to be granted and between the different conditions (e.g. duration, transferability, exclusivity, monitoring, etc..) to which these are subject. Within the countries reviewed, there are few distinctions drawn between "backyard" shrimp aquaculture, practised by hundreds of small-scale farmers, and the large scale shrimp farmers/companies.

The shores, tidal areas and marine waters in **Colombia** are government property and cannot be transferred to private individuals. However, individuals may acquire rights to use these areas through concessions, permits or licences. The Maritime and Port Directorate General of the Ministry of Defence is the competent government body for granting concessions for the development of shrimp aquaculture in these areas. An application for a concession has to be accompanied by a municipal certificate confirming the absence of nuisances and by an environment licence issued by the relevant Regional Autonomous Corporation. The areas of public use which have been identified as suitable for aquaculture will be preferably allocated to those engaged in small fisheries.

Concessions for shrimp aquaculture in **Ecuador** are granted jointly by the Ministry of External Commerce, Industry and Fisheries and the Ministry of National Defence. These Ministries also determine, in consultation with the Directorate General for Marine Merchant Affairs and the Coast, those marine areas, shores, marsh lands, river banks and lakes, on which the specified developments may take place: including hatcheries, stock enhancement or culture of living aquatic resources, laboratories, aquariums and experimental centres. Any person, whether national or foreign, whether an individual or a company, may submit an application for a concession. The application must include, amongst other things, a map and a statement that mangroves are not concerned. Whenever land is located at the upper tide limit of the shore area, then approval must be obtained from: the Ministry of Agriculture (to certify that land in question is not agricultural land); the Ministry of Tourism and Environment; the Institute of Agricultural Development (to certify that land in question is vacant); and the Directorate General of Marine Merchant Affairs and the Coast.

The initial duration of concessions is 10 years, though they may be renewable where it can be shown that the area has been effectively used. An individual may obtain a concession of for a maximum area of 50 Ha and a company may obtain a concession of up to 250 Ha. The concession area is limited to 10 hectares where the development occurs on aquatic areas, sandy areas, mud areas, rocky areas and is used for breeding grounds, pre-farming activities, or for reproduction purposes. A concession will not be granted if navigation is hindered or tourist areas are disturbed. Once the concession agreement is issued, the developer must obtain a certificate of occupation from the Directorate General for Marine Merchant Affairs and the Coast, which is renewable annually upon payment of a fee. Concession holders may form an association or company among themselves provided approval is obtained from both the Sub-secretary for Fisheries Resources and the Ministry of National Defence. This is the only mechanism by which concessions may be transferred.

Potential areas for shrimp aquaculture development have been identified where developments are not likely to have adverse ecological impacts and where all chemical, physical and biological conditions are met to allow for a controlled use of marine living resources. Hence, areas are not located in national parks or reserves, or in areas which are important for irrigation or housing purposes. There are coastal zone management plans and plans for the conservation of the coastal areas, however, it is likely that approximately 36,000 hectares are actually occupied by non-authorized shrimp aquaculture facilities. It is revealing that, since 1990, no authorisations for the purposes of shrimp aquaculture development in coastal areas and bays have been granted. A strict prohibition is imposed on the development of hatcheries in natural reserves and the destruction of mangroves. Mangroves have received a special protection since 1995 through the adoption of a Decree on the Protection of Mangroves in 1995 and a Regulation for the management, conservation and use of mangroves of 1995. The unauthorised destruction of mangroves gives rise to a duty to repair the damage caused. Mangroves are also protected under forestry legislation, the Maritime Police Code, and the Law on Municipalities. On the other hand, local communities and traditional users may obtain a concession for the use of mangroves for subsistence purposes and for the purposes of exploitation of fish, molluscs and crustaceans. Likewise, the Sub-secretary for Sustainable Development may grant agreements for the sustainable use and the protection of the mangroves. These agreements may allow stock enhancement activities and the farming of aquatic species native to the area. This is without prejudice to any concession which will need to be obtained for the use of coastal areas and bays from the Directorate General for Marine Merchant Affairs and the respective authorisations from the Sub-secretary for Fisheries Resources.

Recently, the President of the Republic has been authorised to revise the legal status of coastal areas and bays from public or government to private ownership by means of an interministerial agreement and upon payment. As a consequence, concession holders will become owners of the leased area. According to the concession holders, represented in the National Chamber of Aquaculture the mangroves will not be affected and, though contentious, it is suggested that this change may allow some of the shrimp farmers to become owners of the land which they intend to develop and so allow them to have access to funding sources against a mortgage on their land. Not every one agrees with this statement.

In 1981, the Government of **El Salvador** started to require authorisations for fish farming purposes where farms were to be located on government, state or municipal land, in waters designated for public use and when the culture of exotic species was involved. The competent authority for granting such authorisations is the Ministry of Agriculture and Livestock. Despite the authority to grant concessions, of up to 10 years, for the establishment of marine aquaculture facilities in salt forests or on land within the latter, the Directorate General for Natural Resources of the Ministry of Agriculture and Livestock decided not to grant further concessions, given the degradation of mangroves. Those who obtained a concession were subject to obligations such as: complying with technical standards set by the authorities; communicating data and reports; presenting a topographic plan of the area; prohibitions upon dumping or discharge of water containing noxious or polluting substances; prohibitions upon the use of facilities for purposes different from those authorised; and violations punishable by suspension or cancellation of the concession, depending on the gravity of the violation. During the authorisation process, the General Directorate for Fisheries Resources was required to be consulted. Transfer and extension of a concession are

subject to the same requirements as for obtaining an authorisation. Mangroves are legally designated as ecological reserves and the areas where they are located as fragile areas. The Minister of Environment and Natural Resources has the duty to propose a National Policy for the Management of Marine Coastal Resources. The authorities concerned have formulated plans for the management and use of coastal areas which encompass shrimp aquaculture. However, it is unknown how many hectares are presently occupied by illegal shrimp farms.

In **Guatemala** the Ministry of Agriculture, Livestock and Food may lease areas of rivers, lagoons, lakes or coastal areas including salt waters, salt marshes, bays and the sea, by means of public tender, for a period of not more than 10 years, for aquaculture purposes. Municipalities may lease areas smaller than 0.5 km², without the need for tender but after consultation with the Ministry. Applications for leases must include a map of the area and plans which specify the water or canals involved and provide details of the scheme for development including sedimentation ponds. The same Ministry may grant leases over shore areas, to a maximum 6 hectares, for periods not greater than 10 years. After 5 years, the leased area may be extended upon application, though no transfer of the concession will be allowed without the consent of the competent authority. A concession will be withdrawn where the site has been abandoned for two consecutive years. Presently, plans are being formulated for the management and use of coastal areas relevant shrimp aquaculture, involving more active monitoring of the coastal area and the protection and re-habilitation of mangrove areas. It is believed that, of the existing shrimp farms, almost half are failing to comply with formal leasing requirements and need to obtain an authorisation to regularise their situation.

In **Honduras** the General Fisheries Directorate under the Secretariat of Agriculture and Livestock authorises the use of land after having verified that it is not protected and that non archaeological areas are involved. The removal of mangroves is prohibited along river sides, the seashore and other areas which serve for the protection of the fish. Competent authorities must define protected coastal areas and develop environment management plans to combat environment pollution and degradation. Since 1995, the Project for Environment Development of **Honduras** is being implemented. **Honduras, El Salvador and Nicaragua** have implemented a joint project for the protection of the Gulf of Fonseca, where shrimp farms of the three countries are concentrated. This project is being undertaken with a view to preparing management plans for strategic development of the area and to prevent damage to natural resources, water pollution, sedimentation, destruction of mangroves and other environment problems.

Concessions for the use and exploitation of maritime shores, port areas, coastal wetlands and other coastal culture areas in **Mexico** are granted by the Secretariat for Environment and Natural Resources and, in particular, by the General Directorate for the Maritime Terrestrial Federal Zone. Where a concession envisages use of a forest area, then an authorisation for a change in use is required from the Directorate General for the Restoration and Conservation of Soils (under the same Secretariat). The duration of concessions may vary from 5 to 20 years. Concessions are transferable if duly authorised and legal requirements have been complied with, and provide for various obligations on concession holders, with sanctions for non compliance. The Secretariat has a special 'box office' system for processing aquaculture concessions applications. The use of brackish and marine waters for aquaculture does not require special authorisation, subject to the condition that the use of suspended structures in these waters is only allowed providing the flow of a stream is not changed, the quality of the

water is not affected, and navigation and other authorised uses and the rights of third parties are not hindered. The Sub-secretariat for Fisheries must define areas which are suitable for aquaculture.

Without prejudice to other reasons, concessions will become lapsed in various circumstances: where activities are not initiated in the conceded area; activities are suspended for more than 30 consecutive days; construction is not commenced; operations and installations are undertaken or established within stipulated dates; or an investment plan is not implemented. Permits and concessions may be revoked in case of: damage to the ecosystem; provision of false information or no information; non-compliance with technical standards set by the authority; transfer of concession and authorisation without written consent; bankruptcy, litigation, dissolution or liquidation. The National Programme for Natural Protected Areas enclosed about 100 zones of which 4% are National Marine Parks and about 9% are Protected Areas for Forestry and Aquatic Flora and Fauna. There are coastal zone management plans and programmes, monitoring and evaluation programmes and controls upon sources of pollution. The system of environmental planning contains a programme for the general ecological planning of the territory and regional, local and maritime programmes, some of which are already being implemented in certain areas.

The natural resources of **Nicaragua** are considered to be a national heritage, but the State may grant the right to exploit them by means of concessions, permits, licences and quotas. The State property includes river beds and banks, estuaries (and a strip of land of 30 metres alongside these) and land on the shores including salt marshes. The Ministry for Development, Industry and Commerce is empowered to implement a regime of licences and concessions, for the use and exploitation of the waters and their fishery resources. With respect to shrimp aquaculture, the responsible authority is the Directorate for Aquaculture of the National Administration for the Management of Fisheries and Aquaculture. The Ministry of Agriculture, Livestock and Forestry is also responsible for the designation of areas for aquaculture development, in co-ordination with the Ministry of the Environment. When granting concessions, the Ministry for Development, Industry and Commerce has to comply with preventative environment legislation and policies, and must also comply with the legislation on reserves and natural protected areas. The public has a right to be informed of policies, programmes, activities and projects which are likely to affect the quality of the environment and sustainable development. The State must also support indigenous communities in their efforts to preserve the environment. Concessions for aquaculture are granted for a maximum period of 20 years, for experimental and exploitation purposes. Concessions may be granted over areas of land and water from 5 to 10 hectares, in continuing or discontinuous plots, however, a maximum limit is set at 100 Ha and a concession may not be granted where it is located too close to an existing concession. As a result of the need for government authorisation for shrimp farms, since 1990, no new farms have been allowed in mangrove areas, however, it is thought that a large area of land is illegally occupied.

In **Panama** the territorial sea, waters, rivers and lakes, the shores and navigable streams, ports and estuaries all belong to State. They may be freely used in conformity with legislation. Panama subscribed to an international protocol that obliges the country to adopt appropriate measures for the protection and conservation of fragile ecosystems. It is prohibited to fish in salt marshes and shore areas which have been artificially flooded under concessions for the farming of fish, crustacean or molluscs.

5.6 Development Licensing for the Establishment of Shrimp Farms

Although, as has been seen, the leasing or concession systems which apply to land use in many jurisdictions are commonly used to impose various requirements upon the establishment of shrimp farms, an additional environmental licence is also frequently provided for. The purpose of the environmental licence is to regulate the activities and operations which may be undertaken and is often used as a mechanism for requiring environmental impact assessment prior to the establishment of a shrimp farm.

To undertake commercial aquaculture in **Colombia**, a permit is required from the National Institute for Fisheries and Aquaculture, which may be granted for up to 10 years duration. This Institute has also the power to issue permits, licences, concessions and other authorisations needed for the undertaking of aquaculture, though this power must be exercised in consultation with other environment authorities. Significantly, the obtaining of a land concession and an authorisation to commence development are not sufficient to allow a project to commence. The prospective developer will also need an environment licence, which is an authorisation for activities which may cause serious deterioration to renewable natural resources or to the environment or generate significant changes to the landscape. Environment licences are granted by the Ministry of the Environment, by the Regional Autonomous Corporations and by some Municipalities and Districts, in accordance with the legislation on the control and preservation of the environment issued by the local legally competent authorities. The Regional Autonomous Corporations may delegate to the Territorial Bodies the power to grant licences, concessions, permits and authorisations which they are entitled to issue, unless the applicant is the entity itself. In a number of cases, licences may only be granted by the Ministry, for instance when the activity affects a National Natural Park. There is a General Register of Fisheries and Aquaculture.

Obtaining an environment licence requires the preparation of an environment impact study and assessment of environmental alternatives, which will include information on the location of the project and on the environmental, ecological and socio-economic impacts (particularly in relation to indigenous communities), along with measures to prevent, mitigate and compensate for these impacts through an environmental management plan. Without prejudice to these requirements, new rules have been adopted to reduce the length and complexity of the administrative procedures which will allow the environment licence to be superseded by an environment guide, supervised by the Ministry of the Environment. The participation of citizens in matters relating to fisheries and aquaculture is generally secured through the National Fisheries Council. However, this does not detract from the right of any person to participate in administrative procedures which have been initiated for issuing, or modifying or cancelling permits or licences, for activities likely to impact on the environment, or for imposing or revoking sanctions for non-compliance with environment legislation. Likewise, any person may request the effective enforcement of laws and administrative rules which are directly related to the protection and the conservation of the environment. In any event, the exploitation of natural resources may only take place with full respect for the cultural, economic and social integrity of the indigenous communities living in the relevant area and these communities have to be consulted.

To initiate aquaculture activities in **Ecuador** an authorisation must be granted by the Ministry of External Commerce, Industry and Fisheries, through the Sub-secretariat for Fisheries Resources. The application for an authorisation is submitted to the Director General for Fisheries, together with the project plans and economic and technical studies, and any concession agreement or other studies required where tidal areas are involved. No environmental impact assessments have been required, but environment management law requires that the activities and projects which are likely to cause adverse environmental impacts must be outlined before their implementation, consistent with the Special System of Environment Management, based upon the precautionary principle. Before initiating any activity which carries an environmental risk, a relevant licence will be required and the environment management systems or programmes have to include: basic studies; environmental impact assessment; risk assessment; management plans; risks management plans; monitoring systems; contingency and mitigation plans; environment auditing and abandonment plans. The environment impact assessment must include an assessment of the impacts on population, biodiversity, soils, air, waters, landscape and ecosystems, public serenity; and also the impacts on those elements upon the historical heritage, landscape and cultural heritage in the relevant area. Projects may be assessed at any time, upon request of the authorities or those affected. The National Fisheries Institute has a Division for Basic Research and Environment Assessment which provides technical and scientific advice to the public and private sector. Construction works which are undertaken on shore and bay areas also require an authorisation of the relevant municipality, as well as from the General Directorate for Merchant Marine Affairs and the Coast. The latter is responsible for construction of development plans and regulatory plans which include restrictions with respect to the use of land. The licence of occupation has to be annually renewed by the authorised developer.

In **EL Salvador** any resident person, Salvadorian or otherwise, is allowed to undertake shrimp aquaculture provided an authorisation is obtained from the Directorate General for Fisheries Development. Aquaculture is defined as the culture of aquatic organisms in controlled circumstances, with due preference for those projects which benefit the rural economy. Pond aquaculture may be generally authorised for an indefinite period, but culture activities in areas of public interest involving floating structures or fences, may only be authorised for a period of 10 years, though authorisations are renewable for a same period. Authorisations will expire upon abandonment or failure to implement the project on the site within 6 months. Aquaculture is explicitly identified as an activity requiring an environment impact study, which must be considered at a public hearing and which must provide for all prevention, mitigation and compensation measures required under an environmental management plan. An environment permit for the location and construction, and an environmental operational permit are also required. However, those farms which are already operating in designated zones, and which rely on a development plan, have to register with the Ministry and comply with the programs for environmental adaptation during a transition period. Under the Environmental Order, the population has the right to be informed of certain environmental projects in an appropriate, concise and efficient manner, and there is a duty upon the authority to adopt measures and programmes for promoting the participation of the community in preventing the deterioration of the environment.

In **Guatemala** an authorisation and an environment impact assessment is required to construct shrimp aquaculture facilities. The authorisation is granted by the Ministry of Agriculture,

Livestock and Food, usually for a period of 5 years. According to the Law on Aquaculture and Fisheries, authorisations for fish hatchery activities may be granted for 25 years. Once a request for an authorisation has been received, the Technical Service for Fisheries and Aquaculture of the Directorate General of Animals Issues, will inspect the facilities to establish whether conditions are met concerning the production capacity. There are coastal zone management plans and plans for the use of natural resources. If an aquaculture facility occupies land of the Nation Reserve, then a certificate is needed from the Office of Control of the Reserves of the Nation. Since 1994, no building of new facilities in mangrove areas has been authorised. With regard to stock enhancement, conservation and propagation activities, and hatcheries, whether private, municipal or state, a private person needs a breeding licence for any aquatic species and the State may inspect the facilities at any time.

The Secretariat for Natural Resources and Environment in **Honduras**, which has a Service for the Control and Assessment of the Environment, constitutes the authority responsible for granting aquaculture operation licences. These are granted following an environmental impact assessment and technical reports for the Directorate General for Fisheries, the Honduran Corporation for Forestry Development and the relevant municipality. Following approval of an environmental impact assessment for a shrimp aquaculture project, and prior to granting an environment licence, a Contract For Implementation of Mitigation Measures is entered into between the developer and the competent authority.

The Directorate General for Aquaculture of the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food in **Mexico** may grant an aquaculture concession for up to 50 years and the Directorate General for Ecological Management and Environmental Impact issues a certificate of compliance with environmental impact requirements. Within the Aquaculture Directorate there is special 'box-office' for aquaculture development which handles requests for all the required permits, concessions and authorisations for establishing an aquaculture installation within its jurisdiction, thereby avoiding bureaucratic procedures which were previously required. The concession holder is under a duty to: farm the authorised species; farm within the authorised area and in accordance with the approved procedures; comply with the technical and economic conditions for the exploitation of each species or area; facilitate access by researchers and recognised technicians; and report on the methods and techniques used. Although, no concession is required for undertaking aquaculture in areas which are not within federal control (that is, on private property, common property or municipal property) fish farmers in such areas must register with the National Fisheries Register and have to comply with sanitary and other applicable rules. As a result of the environmental impact procedure, the Directorate General for Aquaculture will impose conditions for those works and activities which are likely to cause ecological imbalances or to exceed requirements for the protection of the environment. In particular, such conditions will be applied where aquaculture activities are undertaken in wetlands, mangroves, lagoons, rivers, lakes and estuaries connected with the sea, or on the coast and federal areas, or in natural protected areas. The procedures incorporate mechanisms for publicity and participation of persons who may be interested in the impacts of developments.

Semi-intensive and intensive shrimp culture in **Nicaragua** is amongst those activities which require an environmental impact assessment before an environmental permit may be obtained. Those activities which do not require environmental assessment, such as extensive shrimp aquaculture, have to submit an "environmental standard form" to the Municipality prior to

obtaining the environmental permit. The system is generally managed by the Ministry of the Environment and Natural Resources, which has to consult with other sectoral institutions and relevant municipalities, but in the Autonomous Regions of the Atlantic Coast, the system is administered by the Regional Councils. A special permit is always required by the Ministry of the Environment and Natural Resources for the development of mangroves and the undertaking of any work on beaches. Although natural resources belong to the State, the Constitution guarantees the communities of the Atlantic Coast the right to manage and administer relevant matters and recognises the rights of citizens to enjoy, use and exploit the waters and forests on public lands. Irrespective from the size of a project, the authorities responsible for aquaculture will only grant a concession agreement after having assessed the site, the topographic plan, the outline of the project and after payment for the concession. The authorities require an environmental impact assessment for any farm of 200 hectares or more for the farming of shrimp in a semi-intensive or intensive manner, after having inspected the site to verify that there is no intention to build in protected areas. A special 'box office' has been established to facilitate and expedite the administrative procedures for processing applications in the fisheries sector.

5.7 Continuing Controls upon Shrimp Aquaculture Activities

All the national fisheries authorities in the Latin American countries surveyed have powers to control and inspect aquaculture activities, with different levels of precision and sophistication, and with technical support rules varying in quantity and quality. Other specialised government agencies play also an important role in relation to such matters as water quality and food quality. **Mexico** seems to have the most highly developed legislation in this regard, followed by **Colombia** and **Ecuador**.

In **Colombia** a permit to farm and sell shrimp is granted by the National Institute for Fisheries and Aquaculture subject to a duty regularly to furnish reports in a prescribed form and subject to revocation on certain grounds and the application of sanctions. Among the conditions set by the Autonomous Regional Corporations upon granting an environment licence is the requirement for a plan for environmental monitoring. Generally, corporations are responsible for the evaluation, control and monitoring of the environment, however, as far as aquaculture is concerned, the Aquaculture Institute will undertake these activities. The Institute has adopted a *Manual for Registration and Control of the Fisheries and Aquaculture Activities*. Nevertheless, both the Ministry of Environment and the Autonomous Regional Corporations, which grant the licences, permits, authorisations and concessions for the use or exploitation of natural environmental resources, may revoke or suspend them in a case of non-compliance with the terms and conditions and apply sanctions which the law provides for. The powers to control and enforce lie with the Environment Ministry and corporations as well as with certain departments, municipalities and districts. Any person may intervene to require the rules to be enforced by making the necessary request but there is also the possibility of intervention by the Attorneys Office for Environmental Matters.

In **Ecuador** the law specifies that operational aspects of aquaculture facilities, have to comply with technical standards set by the Directorate General for Fisheries and the National Fisheries Institute, which has to examine the relevant ecosystems and recommend measures to redress and mitigate pollution. The law also requires that rearing, culture and production activities must be conducted in a responsible manner so as not to interfere with the ecological

equilibrium. There are general obligations upon aquaculture permit holders to facilitate inspections; to control and protect the mangroves; to use those systems for avoiding pollution which have been specified by the competent authorities; to keep natural or artificial rearing or hatchery facilities to ensure the provision of larvae; and, in general, to comply with the law and regulations. The Directorate General for Fisheries and the Directorate for Marine Merchant Affairs and the Coast undertake annual inspections to evaluate works undertaken by concession holders. However, projects may also be evaluated at any time, upon request of the authorities, or those interested, and anyone who causes, or may cause, damage to the environment is obliged to inform the authorities. Failure to do so may lead to penalties. Damaging or destroying mangroves is a ground for withdrawal of a concession and there are several institutions with monitoring powers in this regard. The Directorate General for Marine Merchant Affairs and the Coast is responsible for matters relating to the pollution of the marine and fresh waters, caused either by vessels or terrestrial installations.

The Directorate General for Fisheries Development in **El Salvador** has powers to control and regulate the harvesting of aquaculture products, but there is no general monitoring programme of the coastal environment. Amongst the obligations upon fish farmers is a duty to respect rules relating to the fish size and other rules for the protection of the natural resources; to comply with technical management standards for the production process; to allow access to the officials of the Directorate General and other competent institutions to facilities; and to provide a report and such information as may be requested. Under environment legislation, it is provided that an environmental operation permit will be valid for the duration of a project, but requirements are also imposed upon abandonment subject to the monitoring and supervision of the Ministry of the Environment and Natural Resources. The environment authorities may undertake, periodically or occasionally, audits of environmental evaluation, to confirm compliance with the conditions in the environment permit. The holder of the permit must also provide a “security (or compliance) deposit”, which may be an amount up to the amount of the investment. Further, it is a duty of each person, including the state bodies, to avoid actions which damage the environment, and to prevent, control, monitor and report polluting activities which affect health, welfare and ecosystems. The Ministry of the Environment, the Ministry of Public Health and Social Assistance and the National System for the Management of the Environment have to prepare programs for the prevention and control of pollution and to ensure compliance with quality standards.

The Technical Directorate for Fisheries and Aquaculture in **Guatemala** has the powers to undertake regular inspections of aquaculture sites, which fish farmers must facilitate. The Directorate must notify the Directorate General of Animal Issues Services of any pollution, deterioration of species and whether the production which has been achieved corresponds to what had been foreseen in the operational plan. In turn, the Directorate will inform the Ministry of Agriculture, Livestock and Food to ensure that relevant sanctions are implemented in cases of non-compliance. There is a system of sanitary certification for shrimps and a system of measures for quality control on shrimp farms and guidelines for the use of antibiotics on farms.

In **Honduras** the Directorate General for Fisheries and Aquaculture of the Secretariat for Agriculture has general powers to control aquaculture, while powers to supervise, control and assess the state of the environment belong to the Secretariat of Natural Resources and Environment which acts through its Directorate General for Environmental Assessment and

Control. The Centre for the Assessment and Control of Pollution as well as the National Service for Animal and Plant Health also empowered to undertake particular control initiatives.

In **Mexico** the law provides for the necessary powers to the authorities to undertake control activities concerning aquaculture, including shrimp culture and to prescribe rules in this regard. The law provides for various regulations which set technical standards for the conduct of shrimp aquaculture. For this purpose there is an Advisory Council for Standardisation and Responsible Fisheries, which allows discussion of all aquaculture related regulations. In this regard, and according to the Federal Law for Standards, the relevant authorities must publish in a preliminary form all regulatory projects in the Official Federal Diary, allowing stakeholders and the general public interested in participating in the process, the time and opportunity to submit written opinions or request more information about any regulation before it takes legal effect. This procedure is thought desirable in enabling the authorities more clearly to explain the purposes of regulatory contents and the evidence upon which regulations are based.

Environment permits in **Nicaragua** specify all the obligations upon the owner of an aquaculture installation. The shrimp farmer has a duty to conduct monitoring activities and to assume the administrative, civil and penal responsibility for damages caused to the environment, as well as to observe special rules and regulations which are applicable. The Ministry of the Environment and Natural Resources is responsible for the exploitation of natural resources and the monitoring, quality and appropriate use thereof. Among the obligations for water use permit title holders, is the obligation to facilitate inspection and monitoring activities by the authorities and to adopt appropriate measures to avoid physical, chemical and biological contamination. The authorities have the responsibility to control and regulate all the procedures, equipment, infrastructure, products and waste which may affect the environment, natural resources and human health. Activities in protected areas have to be conducted in accordance with management plans supervised by the Ministry of the Environment and Natural Resources, which is in charge of the regulation and control of the areas.

5.8 Water Use Licensing

The general tendency is for countries to control water use by the use of concessions or environmental licences, as previously described, though there are some national examples of provisions which are more specifically concerned to regulate supplies of water to shrimp aquaculture facilities.

In **Colombia** the Directorate general of Marine and Port Affairs is responsible for allocating the use of marine waters and surrounding areas which are subject to taxes which the Government must define, in the light of the environmental and social costs. Determination of an application for an environmental licence requires the applicant to provide various information about water use: the purpose for waterside land is occupied; any hydraulic works which are to be construction; the use of water resources; the infrastructure for management of waste waters; the physical and chemical characteristics of waste waters; and the operating practice of the farm. This information is provided without prejudice to the exclusive competencies of National Institute for Fisheries and Aquaculture with respect to aquaculture.

The Regional Autonomous Corporations are responsible for the regulation and the setting of standards and guidelines for the management of hydrographic basins; and each project which involves the use of waters must allocate at least 1% of the investment to the recovery, protection and control of the basin and water sources.

Prior to obtaining an authorisation for an aquaculture development in **Ecuador**, it is necessary to secure a lease agreement concerning the area on which the farm will be located. A concession of this kind is granted usually by the Ministry of External Trade, Industry and Fisheries and the Ministry of National Defence and implicitly includes the authorisation to use the waters which under the jurisdiction of the Directorate General of Merchant Marine Affairs and the Coast. The right to use freshwater is subject to a concession in accordance with the Water Law (1972) and its regulations. A concession of this kind will be granted by the National Council for Water Resources. The Council may delegate this power to the Regional Development Corporations. There also exists a National Commission for the Protection and Development of Hydrographic Basins.

The use of waters in **El Salvador** is allowed if the use is compatible with the protection of ecosystems, the social interest, the usefulness and the development to the country. The Ministry of Environment and Natural Resources must consider any authorisation issued by the competent service of the Ministry of Agriculture and Livestock. Before issuing the necessary environment permit for the use and development of natural resources the Environment Ministry will consider the measures which are to be taken to prevent, minimise, redress and compensate adequately for any environmental damage. The Environment Ministry must submit proposals to the President of the Republic in order to adopt the necessary regulations for the development, use, protection and management of waters and aquatic ecosystems in accordance with the criteria set in the law. Each holder of a permit to use water is responsible for its protection.

In **Guatemala** a law which dates from 1932 provides that anyone who wants to develop a hatchery or culture farms of whatever animal species, in freshwater or salt water within the public domain, must obtain the appropriate licence and registration, upon payment of a fee. The Ministry of Agriculture, Livestock and Food has powers to regulate, evaluate, grant, refuse, cancel, renew, transfer, supervise a licence or concession for the use and development of natural resources, including water resources, closely linked to agriculture activities.

The Directorate General of Fisheries of the Secretariat of Agriculture and Livestock in **Honduras** authorises the use of the appropriate space for the establishment of shrimp aquaculture activities and this is thought to encompass the use of any necessary water resources.

In **Mexico** the use for aquaculture of brackish and marine waters, the territorial sea, navigation routes, shores, maritime federal areas and livestock areas on seaside is unrestricted, provided these are not otherwise allocated to leased or permitted areas, and provided the right of third parties is not affected. Where an authorisation is required, this is determined by the Directorate General of the Maritime Terrestrial Federal Zone. Authorisations are not required to construct water discharge channels, providing that these do not obstruct the natural flow of the receiving waters. A leaseholder will be subject to obligations, amongst others, to undertake only the authorised activity, to undertake only

authorised works and to leave the area at the end of the lease, though provisions exist for the transfer of the lease or concession. An authorisation or concession to use freshwater, from surface or ground sources, must be requested from the National Water Commission.

Water in **Nicaragua**, belongs to the public domain, however, certain uses require an authorisation. For instance, the use of shores and riverbeds and the discharge of used waters are subject to authorisation requirements. Any activity undertaken in the sea involving the use the natural resources of the soil, the seabed or other parts of the marine habitat requires a concession, licence or permit, depending on the situation. Determination of applications for authorisation involves consideration of the relationships with the other resources and avoiding damage to the physical, chemical and bacteriological conditions of the water resource. Preference is given to those activities which tend to use the waters and the surrounding areas in the most rational way. Hence, the use, management and development of coastal aquatic ecosystems, and the water resources included therein, must be undertaken on a sustainable basis and in accordance with management plans which ensure the conservation of these resources.

5.9 Waste water Discharge Licensing

Although, as has been noted, the control of waste water from shrimp farms may be provided for under environmental licences and addressed by other mechanisms, there are also a range of controls which relate more specifically to the control of effluent from shrimp aquaculture. Whilst many of these provisions create explicit offences in respect of the pollution of waters, in circumstances which include the discharge of waste water from shrimp farms, a number of examples are provided of more sophisticated approaches towards water quality. Particularly notable in this respect, is the fairly widespread provision for water quality parameters for liquid discharges or for permissible levels of impact upon the quality of the receiving aquatic environment.

In **Colombia** the Ministry of the Environment, through technical studies and on the basis of the precautionary principle, must define maximum authorised limits for the emission, discharge, transport or deposit of substances which may impact on the environment. The Ministry must also prohibit, restrict and regulate the processing, distribution, use disposal and discharge of substances which cause environmental degradation. The Regional Autonomous Corporations have similar powers, within their jurisdictions, but the limits and restrictions which they impose must be consistent with, and not less stringent than, those set by the Ministry. More specifically, the Corporations are bound to control the discharge, emissions and the integration of solid, liquid and gaseous residues in the waters, the air and the soils. Nevertheless, these competencies may be limited by the more specific powers of the National Institute for Fisheries and Aquaculture with respect to aquaculture. Those who use the waters to discharge, directly or indirectly, have to pay fees and such discharges require a permit, which may be incorporated in an environment licence. It is the duty of the National Institute for Fisheries and Aquaculture to ensure the maintenance of optimal conditions of the aquatic environment. With regard to irrigation and drainage activities, the Ministry of Agriculture is empowered to issue necessary rules to avoid the contamination of waters and to protect the aquatic fauna and flora, but the provisions of the law on the environment prevail.

In **Ecuador** an explicit prohibition is imposed upon the discharge of waste waters without necessary treatment or without the use of technical measures which to avoid contamination of the environment. This prohibition applies to discharges on beaches and shores, rivers, lakes, natural and artificial streams and to the causing of any other form of contamination. There are also prohibitions upon discharges of waste or objects which are dangerous to navigation or life, and alteration of the physical, chemical and microbiological properties of soil. Likewise, used and domestic waters cannot be discharged from laboratories for aquatic species without prior treatment. The National Institute for Fisheries, amongst others, through its Contaminated Aquatic Areas Service, has the power to determine the presence of chemical substances or elements which are potentially toxic in the aquatic environment; to compare the concentration of substances to national and international standards; and to advise the public and private sector on the permissible levels of toxic substances in the aquatic environment. The National Council for Aquatic Resources, within the Ministry of Agriculture and Livestock, must adopt appropriate policies to avoid the contamination of the waters, by identifying the maximum permissible limits and requiring necessary treatments to realise these limits.

The Directorate General for Fisheries Development for **El Salvador**, is empowered, in accordance with the General Fisheries Law, to establish necessary regulations, together with appropriate administration, to prevent and combat the contamination of the aquatic environment, internal waters and marine waters. Similarly, the Ministry of the Environment, in co-ordination with the competent authorities, has the power to set guidelines concerning the management of wastes generated by shrimp farms and concerning the use of treatment systems for waste waters from any activity which discharges contaminating substances into the coastal marine area and which needs to obtain an environment permit. The General Fisheries Law prohibits the discharge of waste water without the necessary treatment, on beaches, shores, rivers, lakes, natural and artificial streams and freshwater areas and the causing of any other form of contamination. The same Law provides that fish farmers are obliged to use any equipment or systems, which are the subject of technical advice, to avoid the contamination of the environment and to comply with the provisions relating to the protection of resources; to ensure proper technical management of the whole production process; and to facilitate the free access of the competent authorities to any aquaculture facility. Likewise, the Regulation on Water Quality establishes specific measures for the protection of coastal and marine waters and grants powers to relevant authorities to authorise the discharge of waste waters and solid wastes in a manner which does not contaminate the waters, and to undertake relevant inspections and controls.

In **Guatemala** it is prohibited to alter the condition of waters by introduction of industrial wastes, materials and substances harmful or noxious for fishing, unless under a right recognised and regulated by the authority, and after having proved the convenience for the interests of the country and subject to the payment of indemnities for any damages.

It is prohibited to discharge in the sea, rivers, lakes, lagoons and streams in **Honduras** industrial wastes, and to deposit such wastes in areas which allow them to pass into listed zones. There is a regulation which deals with the purification and treatment of waters, which refers to both maritime and coastal waters and which provides for permissible limits. The control of marine and fresh waters belongs to the Secretariat for Natural Resources and Public Health, which delegates to the authority of each Region or Health Area the power to authorise

the discharge liquid wastes in rivers, lakes, beaches, seashores, lagoons or fishing, aquaculture or shrimp aquaculture areas. The treatment system which wastes must undergo must ensure that discharges comply with the relevant standards on the discharges of waste waters in receiving ambient and sewer systems. The use and final disposal of biodegradable wastes is also subject to technical standards. Mitigation and control measures are set through environmental impact evaluation. Through a programme of international co-operation, and with the assistance of a university in the United States, a programme has been conducted for the evaluation of the quality of the water in five estuaries used for the discharge of waters from shrimp aquaculture, agriculture and other activities. Honduras has signed the Convention on the Discharge of Wastes in the Sea and the Convention of Central America for the Protection of the Environment.

Authorisations to discharge effluent into fresh waters, and the concessions required in the federal areas in **Mexico** are granted by the Secretariat for the Environment and Natural Resources, within which is the National Water Commission. When discharges are made into the sea, authorisations and concessions are granted in co-ordination with the Secretariat for Marine Affairs. The Commission exercises the functions of the Federation with respect to the prevention and control of the contamination of waters and is bound to establish standards for discharges taking account of dilution and assimilative capacity of the receiving aquatic areas. Authorisations must specify the location and characteristics of the discharge, quantity and quality of the effluent, the regime for preventing and controlling the contamination and the duration of the permit. Concessions, authorisations or permits will be granted provided necessary treatment of discharges have been provided for. In a case of infringement, the authority may revoke the permit or suspend the activities which generate the discharges. Concessions, authorisations or permits must incorporate explicit legal criteria or standards set to prevent and control contamination of waters and aquatic ecosystems, the control of which belongs to the Federation, the states and the municipalities, in accordance with the level of competence. There exist specific regulations in relation to this matter. No authorisation is required to build discharge channels, providing these do not obstruct the free passage, in brackish waters and in marine waters of the territorial sea, in navigable channels, on shores, in federal maritime terrestrial areas and culture areas by the sea. If an authorisation, and eventually a concession, is required, this will be granted by the General Directorate for the Federal Maritime Terrestrial Zone. Since these entities are located within the Secretariat for the Environment and Natural Resources, the special 'box office' system for aquaculture applications must be used. There is a regulation which deals with the prevention and control of maritime contamination which is being implemented by the Secretariat for Marine Affairs.

It is prohibited directly to discharge contaminating substances and wastes in any watercourse in **Nicaragua**. An authorisation is required for the discharge of waste waters in the waters belonging to the public domain. Further, if there is a risk to the sustainable use of water resources, because of contamination, excessive use or any other reason, concessions, permits and authorisations which have been granted may be restricted, modified or cancelled. The Ministry of Environment and Natural Resources, in co-ordination with the Ministry of Health, determines the required treatment measures and the permissible concentration and quantities of contaminants and will assign authorised laboratories for this purpose. The relevant waters are also under the jurisdiction of the Ministry for Development, Industry and Commerce. This Ministry has the power to manage the use and exploitation of waters and to grant the necessary use concessions and licences as well as to suspend and cancel them when

appropriate. The responsible service within this Ministry is the National Administration of Waters which, amongst others, has powers to support, review, qualify and inform with respect to an applications for a water use or exploitation concession and to grant discharge permits. The National Commission for Water Resources is the inter-sectoral consultative and co-ordinating body.

5.10 Shrimp Movement Licensing

The possibility must be noted of shrimp movements being generally regulated under general environmental licences and similar mechanisms. However, a number of more specific national examples are provided of systems of control to address the ecological and disease control implications of unrestricted movement of shrimp for shrimp aquaculture purposes. In many instances these provide quite extensive powers to the relevant authorities to restrict international movements of live shrimp or shrimp products, particularly where the possibility of introduction of non-native species arises, and allow actions to be taken by relevant authorities to contain the spread of disease.

The transfer of shrimp in **Colombia** requires an authorisation of the National Fisheries and Aquaculture Institute. Colombia has adopted the International Sanitary Code of the International Organisation of Epizooties and the Institute requires a quality and purity certificate (in the form prescribed by the International Organisation of Epizooties) for the import of shrimp larvae. In addition, the applicant is required to install a system of containment which will ensure that these larvae will not invade the environment. The same Institute is responsible for establishing quarantine procedures, for authorising all imports and exports of fisheries products and issuing zoo sanitary certificates for the import and export of live crustaceans, including eggs, embryo, larvae and broodstock. It also authorises stock enhancement activities for native species in the environment, through authorising permitted seeds and broodstock, specifying its stage of development, quantity, modalities and period. For the transport of crustacean and other fisheries products a safe-conduct and sanitary certificate is required. For this purpose there is a list of diseases which must be declared. The import of broodstock for the reproduction of alien species of wild fauna, which is likely to impact on the stability of the ecosystems, is subject to an environment licence. The possible sanctions include the destruction of products. Moreover, the transmission to the authority of incorrect or incomplete information is a contravention.

The movement of larvae and post-larvae shrimps and their sale to the shrimp aquaculture facilities for growing and development purposes is not regulated by law in **Ecuador** despite its potentially significant environmental impacts. However, the National Fisheries Institute is responsible for the determination of areas for spawning of shrimp of commercial importance and the areas for the recruitment of juveniles, and it has established maritime areas, shore, lagoons and mangroves of public use as zones for the free capture of post-larvae. The National Fisheries Institute is also responsible for conducting research in relation to diseased, native and exotic organisms, which may affect the population of crustaceans; for undertaking sanitary controls, by means of quarantine periods for introduced species, in order to determine possible infectious agents or diseases; for developing techniques for the control of diseases in cultured crustaceans; for protecting the aquaculture products from exotic diseases and from those diseases introduced by alien species, through sanitary control regulation; and for conducting sanitary control on native and exotic living resources introduced or culture

purposes. For the movement of shrimp, companies must issue an information sheet which specifies the origin, destination, means of transport and product quantity. In 1999, for reasons of sanitary control, the Sub-secretariat of Fisheries Resources, prohibited the import of any shrimp species, in whatever state of development. There are special rules for the artificial reproduction of living larvae, the export of which is prohibited.

The General Directorate for Fisheries Development in **El Salvador** is responsible for the regulation of the import of fisheries species. The import of fisheries products without an authorisation is an infringement. The storage and sale of fisheries products must take place in locations which comply with the requirements set by the Fisheries Law. There is no system for requiring notification of disease outbreaks. The Directorate may authorise the sale of broodstock and shrimp producers for the purposes of commercial reproduction in nationally-established laboratories.

The Ministry of Agriculture, Livestock and Food in **Guatemala** may authorise the import of aquatic species which are likely to contribute to a greater output of shrimp products. Such imports may only be undertaken following a decision of the Technical Directorate for Fisheries and Aquaculture and providing this decision confirms that the introduction of exotic species will not generate an ecological dis-equilibrium among the native species in the country. Likewise, the export of live seeds for commercial purposes may be authorised provided requirements of the national market are complied with. The Ministry of Agriculture is responsible for issuing rules and discharging related functions for the protection of the animal health of the country. The collection of shrimps from the wild is subject to the requirement of a fishing licence.

The capture of wild post larvae in **Honduras** is authorised to registered fishers and regulated by the Directorate General for Fisheries. Only native species are cultured and the National Association for Aquaculture provides information to fish farmers on diseases and on experiences of other countries. The National Service for Animal Health, of the Secretariat of Agriculture and Livestock, has competencies for regulating, restricting or prohibiting the production, import, export, internal movement and the existence of animals. The Law on Animal Health provides for powers to prohibit and restrict the import and export of diseased animals, or animals suspected of being diseased, and the establishment of relevant rules, such as quarantine and observation procedures, the prohibition of transfer from and to the diseased areas, and the destruction of animals and products without any right to compensation or indemnity. The owner must bear the cost of expenses for quarantine procedures, diagnosis, fumigation and vaccination. A fish farm owner, or any other person, is obliged to inform the authority of any suspicion or indication of disease amongst his own animals or animals belonging to others. Imported fish species which do not meet the legal requirements may be destroyed. There is a regulation which deals with the inspection and zoo-sanitary certification of aquaculture products. The import and export of wild animal species is subject to an authorisation issued by the Corporation for Forestry Development and subject to compliance with compensation measures.

The Sub-secretariat for Fisheries in **Mexico**, on the basis of the technical advice provided by the National Institute for Fisheries, specifies internal waters and foreshore areas for collecting or harvesting broodstock, larvae, post-larvae, hatcheries, eggs, seeds, fry and other biological status, harvesting periods and volumes. Those who undertake harvesting activities must also

conduct stock enhancement activities. Also on the advice of the National Institute for Fisheries, the Sub-secretariat for Fisheries regulates and authorises the introduction of species in aquatic areas under federal jurisdiction, defines technical and sanitary standards, and checks whether technical measures and preventive measures are being adopted in the area of aquaculture health. The National Fisheries Chart 2000 encourages the cultivation of native aquaculture species and the avoidance of movements of species outside their natural distribution range, though non-native species of shrimp are widely cultivated. An authorisation is required to introduce alien species to a local habitat in waters under federal jurisdiction. It is necessary to prove that the specimens are free of parasites and disease. In addition, the introduction, into waters under federal jurisdiction and management, of species or biological substances which cause damage, or alter or endanger the conservation of fisheries resources, is specifically sanctioned. There is a diagnosis network and a national program for aquaculture health. Fish farmers must provide records and information annually with respect to these matters and related wastes. The Sub-secretariat for Fisheries is responsible for making aquaculture related sanitary rules concerning diagnosis, prevention and control of disease and it may issue, directly or through official accredited laboratories, health certificates of aquatic organisms and aquaculture facilities; for determining the medicines, feed, hormones and other ingredients or substances which are prohibited in aquaculture; and for producing quarantine rules. Notwithstanding the latter, the Directorate General for Aquaculture must elaborate, supervise and implement guidelines or directives on aquaculture health, make available control and diagnosis services to producers, grant health certificates with respect to living organisms and help the authorities competent in water quality and health matters relating to aquaculture products. However, it is understood that, as a result of recent institutional arrangements, health and disease issues will become the responsibility of the National Fisheries Institute with the exception of administrative issues such as the issuing of permits. It is also understood that a recent regulatory initiative imposes restrictions upon shrimp movements to avoid the spread of disease, encourages the provision of information on disease, allows the imposition of quarantine requirements on imported shrimp and requires measures to prevent the spread of disease into wild populations.

The introduction and export from **Nicaragua** of any animal species, whether native or not, requires an authorisation from the authorities. The Law relating to Animal Health provides for powers of the Ministry of Agriculture and Livestock (currently the Ministry of Agriculture and Forestry) in relation to: epidemiological prevention, diagnosis, research and control; quarantine; the register and control of aquaculture, fisheries, forestry and agro-forestry inputs; a genealogical register; the inspection of products and sub-products of animal origin; incentives for disease programmes and campaigns for the management, control and eradication of diseases; sanitary emergency systems; certification of professionals and companies; and health programmes for national and international harmonisation and co-ordination. There are specific references to prevention of diseases in aquaculture, the regulation of the use, management, production, storage, import, export, re-export, and quality and residues of chemical substances, bio-pharmaceutical and related products, as well as of the equipment to be used in aquaculture; to notification of the health conditions in aquaculture facilities; implementation of measures to prevent and avoid diseases and avoid dissemination; rules including, prohibition and restrictions on transfer, export and import of aquaculture products and sub-products; and approval of aquaculture health programmes. Publicity concerning aquaculture chemicals must inform the user of the kinds of risks to which use may give rise. There are different sanctions in cases of non compliance with these rules, varying

in accordance with the gravity of the infringement. However, apparently, these systems are not presently operational with respect to shrimp aquaculture because there are no existing notification systems regarding disease outbreaks, and there are no rules which require health certification of shrimps nor any quarantine system.

In **Panama** the relevant authority must determine which species which may be imported for the purposes of aquaculture, though no information has been provided as to the detailed implications of this requirement.

5.11 Genetically Modified Organisms

The particular concerns which are raised by the use of genetically modified organisms in shrimp aquaculture are, in much national legislation, addressed by the general mechanisms which exist in relation to the control of shrimp movements or more general environmental licensing systems. However, a few examples may be seen of nations where the distinctive aspects of genetic modification, and special environmental and ecological concerns to which these give rise, have been specifically recognised in legislation and administrative procedures.

The relevant authorities in **Colombia** have been given powers to regulate and avoid the introduction and dissemination of species which may be ecologically harmful, whether or not the introduced species are genetically modified. Import of foreign species requires the authorisation of the National Institute for Fisheries and Fish Culture. This Institute must comply with the legal requirements including the rules adopted by the Ministry of Environment. In any case, the possibility of introducing genetically modified organisms is an aspect which must be taken into account when an environmental license is issued and when the commencement of an activity is authorised.

One of the powers conferred upon the Environmental Authority in **Ecuador** is to regulate, in accordance with biosafety requirements, the propagation, experimentation, use, commercialisation and import of genetically modified organisms. The production of genetically modified aquatic species in laboratories is regulated and requires authorisation. The laboratories must be provided with all the technical, sanitary and physical means to ensure that the environment is not contaminated. In order to prevent the introduction of pathogenic agents, parasites and other harmful organisms, sanitary certification from the origin country as well as quarantine are required. Moreover, a treatment of the waters used in the laboratory, before being returned to the sea must be also established. Authorised installations are bound to use systems that prevent contamination and to facilitate the inspection of such systems. The State is the holder of the ownership rights over the species that comprise biodiversity and these are considered national goods for public use. The exploitation of such species may be subject to regulations that the President of the Republic may issue.

In **El Salvador** fish culture species may only be imported under permission of the Ministry of Agriculture and Livestock, and a prior report from the General Directorate for Fisheries Development is required. The powers conferred to this Directorate allow the regulation of import of fish species including species that are genetically modified.

The Ministry of Agriculture in **Guatemala** has general powers to issue dispositions and carry out functions to preserve the animal health of the country. Amongst these powers, it is thought that there exists the capacity to control genetically modified organisms.

In **Honduras** there are no specific rules to restrict the use of genetically modified organisms.

In **Mexico** authorisation is required from the Sub-secretariat for Fisheries, and based upon the advice of the National Fisheries Institute, for the introduction of any species in federal jurisdiction waters either genetically modified or not. Introduction of species that may cause the extinction of the native species and those that may provoke public health problems is forbidden.

According to general rules which apply in **Nicaragua**, the transfer of any animal species (native or not) in and out the country requires authorisation from the relevant Authority. Germplasms of any native species are patented and registered in favour of the State of Nicaragua.

5.12 Chemical Use Restrictions

A wide overlap is to be seen between the control of chemicals used in shrimp aquaculture and other mechanisms for the protection of water quality such as discharge licensing and regulation by means of general environmental licences. However, there are a number of instances where the approach of chemical-specific regulation has been pursued nationally to impose controls upon particular chemicals which are regarded as particularly hazardous to water quality or the aquatic environment. In many respects the use of chemicals in shrimp aquaculture is subsumed to broader systems of regulation concerned with the use of chemicals in agriculture generally or to secure public health requirements.

The National Fisheries and Aquaculture Institute in **Colombia** is the competent authority to exercise technical control and to adopt necessary measures for preventing chemical risks. With respect to agriculture in general, the responsible institution in this matter is the Ministry of Agriculture and Rural Development. However, consideration will also be given to the control of chemicals when an environment licence is issued and when aquaculture operations commence. It is reported that the controls and requirements set by countries for the import of shrimp aquaculture products has contributed to the development of good management practices in reducing the possibilities of chemical contamination of shrimp products.

As already mentioned, in **Ecuador** it is prohibited to alter the physical and chemical properties of the soils and for laboratories of living aquatic species to discharge used and waste waters without prior treatment. The competent authorities are responsible for setting the maximum permissible standards with respect to toxic substances and for ensuring implementation of necessary treatments.

In **El Salvador** an environmental permit is required for the use, production, collection, storage, re-use, trade, transport, manufacture and disposal of dangerous substances, residues and waste. The distribution, transport and storage of dangerous substances requires an authorisation from the Ministry of Environment and Natural Resources, in co-ordination with the Public Health Ministry and other bodies. In addition to environmental provisions, the

Law Relating to Fisheries Activities prohibits the discharge of chemical substances in marine and fresh waters, and the causing of any form of contamination of beaches, seabed, foreshore, lakes, rivers, riverbed, natural and artificial aquatic areas. The Fisheries Law also requires fish farmers to use recommended equipment or systems for the purposes of avoiding environmental contamination and to have a technical management plan of the complete production process. There are no guidelines on the use of antibiotics.

In **Guatemala** the following activities are regulated by a regulation and a law of 1974 (adopted a month after the regulation was issued) on the import, manufacture, storage, transport, sale and use of pesticides in agriculture: the import, manufacture, storage, transport, sale and use of pesticides, the protection and safety of users of pesticides, of people in general and of fauna and the environment. Both legislative texts deal with pesticides in the agriculture sector but do not refer specifically to fisheries or aquaculture. However, the term “products” includes substances of chemical origin or those having similar effect or a similar toxicological impact when in use. Also encompassed within the meaning of “products” are all products or elements of products used to combat pests. Competent authorities are the Ministry of Agriculture, Livestock and Food and the Ministry of Health and their relevant services which are responsible for regulating, authorising, prohibiting, and refusing the import, manufacture, storage, transport, sale and use of pesticides; for undertaking inspections; for issuing technical standards; of providing extension services; for maintaining registers; for setting tolerance limits for residues; implementing sanctions; and resolving all matters concerning pesticides which are not otherwise provided for. There are further rules relating to the use of antibiotics in shrimp aquaculture. It is also prohibited to deposit plant substances or chemicals, wastes and residues from agriculture and industrial activities in rivers, streams, springs and lakes which are noxious for fisheries, livestock or the health of inhabitants.

There are rules in **Honduras** concerning chemical tolerance limits in water and the implementation of protection measures when and where appropriate. To a large extent, prevention measures against the excessive use of chemicals are thought to be consistent with the international standards and the permissible levels are controlled by the Centre for the Evaluation and Control of Contaminating Substances and the Laboratory for the Quality of Water. The manufacture, import, sale, storage and use of medicines for animals, whether preventive or curative, are under the sanitary control of the Secretariat of Natural Resources and Environment which, together with the Secretariat for Public Health must authorise the production, storage, import, sale, transport and use of agricultural chemicals and toxic substances. The different institutions must co-ordinate their activities, for protecting health and environment, with respect to the import, production, storage, transport, management, trade and disposal of dangerous substances such as pesticides, insecticides, herbicides, rat-poison and others. To this end, they must implement a special regulation for the registration, import, manufacture, storage, transport, management, and sale of pesticides and further general measures.

The competent authority in relation to chemical control in **Mexico** is the Health Secretariat which has to collaborate with other relevant competent federal authorities to organise sanitary control; to determine the classification and the characteristics of pesticides and toxic or dangerous substances; to authorise products which include particular substances; to authorise solvents, the materials used and their transportation; to authorise processes, and establish

formal measures specifying the manufacturing, labelling, packaging, transport, storage, sale and application conditions, with a view to protection of public health.

The import, export, distribution, sale and management of pesticides, toxic, dangerous or similar substances in **Nicaragua** is subject to a special licence. The Ministry of Agriculture and Forestry is responsible for keeping a register of these substances and it is also responsible for implementing the basic legislation on pesticides. However, the Ministry of Environment has also powers in this regard, and is responsible for exercising surveillance and control over contamination generated by these products, for authorising particular uses and issuing environmental permits. Further to this, the Ministry of Health, amongst others, sets the standards for the use, the acceptable maximum limits in the environment, and permissible effluent limits for pesticides. The municipalities and other ministries have also certain competencies with respect to pesticides, in co-ordination with the National Commission for Pesticides, Toxic, Dangerous and Similar Substances and subject to the advice of the National Information and Documentation Centre for Pesticides, Toxic, Dangerous and Similar Substances. Prohibitions are imposed upon the national introduction of processes and contaminating products where these are prohibited in the country of origin. The manufacture and storage of such substances cannot take place within an area of 2000 meters from watercourses. There are no official guidelines for the use of antibiotics in shrimp aquaculture.

5.13 Feed Sources and Utilisation

Although the details are rather thin in some instances, there appears to be fairly extensive use made of provisions regulating the composition of shrimp feed in the countries surveyed. However, in most countries, the underlying concern seems to be the avoidance of food ingredients that are potentially harmful to farmed shrimp stocks and consumers of shrimp products. In only a few examples does the environment impact of unsatisfactory shrimp feed and poor feeding practice appear to be a matter of concern, though in some responses the information was so thin that confident conclusions as to the environment and ecological regulation of shrimp feed were difficult to draw.

The National Institute for Fisheries and Aquaculture in **Colombia** is the competent authority for adopting controls upon substances which may or may not be used as feed for shrimp, whether natural or concentrated, in national or imported feed. The Institute is also responsible for setting restrictions for avoiding bad feeding practices and minimising impacts on the environment. General responsibilities for regulating the use of chemical and biological substances belong to the Ministry of Environment and the institutions to which it has delegated powers in this matter. Specifically in relation to aquaculture, the responsibility is that of the National Institute for Fisheries and Aquaculture and the Ministry of Agriculture and Rural Development. Feed is also an issue which may be taken into consideration when applications for shrimp aquaculture authorisations are considered.

Licence holders for breeding and cultivation of aquatic species in **Ecuador** are generally obliged to use the systems established by the competent organisations in order to avoid pollution of the environment and damage to local ecology. They also have the duty to employ adequate technical methods to prevent environmental and ecological harm.

Shrimp farmers in **El Salvador** are generally obliged to use the most technically suitable equipment or systems in order to avoid pollution, and technically to manage production processes to avoid pollution. The environment and fishery authorities have joint responsibility for control.

The Ministry of Agriculture in **Guatemala** is responsible, in coordination with other competent bodies, for setting quality regulations for agricultural and livestock inputs and it is understood that this encompasses shrimp feed.

The Secretariat of Natural Resources and Environment in **Honduras** is responsible for establishing preventive measures and determining permitted levels of environmental impact caused by feed used in shrimp aquaculture. Since 1969, the Government has been authorised, through the Secretariat of Natural Resources, to control the processing, stocking, supply and sale of concentrated food for animal usage, and the supervision and registration of feeds is the responsibility of, the Secretariat of Agriculture. In addition, labelling rules have been established and the minimum levels of ingredients and elements for each feed formula have been authorised according to its particular use.

Various technical provisions covering balanced foods and their components are in operation in **Mexico**, and the authorities have sufficient power to pass any regulations which are required.

General legislation on pollution of natural resources and residual waste in water are applied in **Nicaragua** to address problems of shrimp food utilisation.

5.14 Product Quality Controls

Almost all of the countries surveyed have addressed shrimp product quality control issues through food safety control systems of various kinds. This is particularly evident where controls are imposed for the purpose of meeting requirements imposed by countries to which shrimp products are to be exported. Where product quality is a matter of national concern, there are several examples of control mechanisms which appear to be specifically designed for shrimp or aquaculture products. Where these have not been indicated, the marketing of shrimp products may still be subject to general laws on environmental health and consumer safety, though not all countries have stated whether there are more general laws governing public health in relation to food products which would also apply to shrimp products.

In **Colombia** sanitary certification of aquaculture products for human consumption is the responsibility of the National Institute of Surveillance of Medicine and Food, which also supervises production. This is without prejudice of the authority of the National Institute for Fisheries and Aquaculture for the supervision of aquaculture and issuing of rules to govern its practice. Countries importing shrimp products carry out their own quality controls, for instance, those carried out through the Veterinary Commission of the European Union.

Fish processing enterprises in **Ecuador** must give production details to the General Directorate of Fisheries and to the National Institute for Fisheries, which has to coordinate its activities with the National Institute of Ecuador for Standardisation in order to determine the requirements which products, and production, have to meet to obtain certificates of quality and suitability for human consumption. Certificates are issued by the Institute according to

national and international quality requirements and, without certification, a shrimp product may not be sold. The National Institute for Fisheries also carries out analyses of sanitation and hygiene in relation to fisheries products, undertakes their food-chemical, biochemical and toxicological control, as well as participating in drafting technical regulations related to products, containers and packaging, and undertakes surveys of overall product quality and the additives and contaminants present. The Ministry of Public Health also maintains and circulates a sanitary register of approved processed foods, additives, natural products, drugs and medical and livestock products, pesticides and other related products, whether processed in Ecuador or imported.

Quality control measures have not been established in **El Salvador** and no sanitary certification is required for shrimp products. The General Directorate for Fisheries Development is responsible for establishing and ensuring the application of production rules, in coordination with the competent bodies. The Ministry of the Economy is the competent body for the regulation of domestic sales of fisheries products, and those involved in this activity have to use adequate means for distribution and conservation, and are not allowed to trade in illegal products or products of a smaller size than authorised. Green Stamps and Eco-labels are recognised to provide incentives to producers, and the Ministry of the Environment is responsible for granting authorisation and registration of bodies which may certify environmentally desirable products and those produced as a result of sustainable exploitation of natural resources.

Sanitary certification for products from shrimp aquaculture is required in **Guatemala**, though no details of the mechanisms for this have been ascertained.

The National Service of Animal and Vegetable Health in **Honduras** carries out sanitary controls, but the standards have to meet international requirements because of market demand, especially the requirements set by the United States Food and Drugs Agency which supervises food products imported into the United States.

Guidance programmes exist in **Mexico**, along with a wide range of regulations on hygiene and production, quality and sales supervision of aquaculture products, with each relevant authority being empowered to set necessary technical rules.

The Ministry of Health in **Nicaragua** issues regulations, supervises and controls the adherence to sanitary rules on food, hygiene and environmental health. Consequently it controls food production hygiene and commerce, administering the issue of licenses, certificates and health registers on matters including shrimp products.

5.15 Internationalisation of Standards

As has previously been noted, the need for shrimp products to meet requirements imposed by importing countries is a matter of prominent concern. In the Latin American countries surveyed, the general picture is that quality standards for shrimp products have gradually been standardised, with the help of development policies implemented by the relevant authorities. This has taken place as a consequence of requirements imposed for access to overseas markets and because of the economic incentive of better prices which may be obtained in such markets.

The authorities of **Ecuador**, when defining the requirements which shrimp products must meet, and the procedures for obtaining quality certification that products are suitable for human consumption, have to consider international quality requirements. In practice, producers have adopted the standards of the United States Food and Drug Agency as a requirement to enter into that market. In **Mexico**, regulations and other rules, also seek to ensure that product quality requirements are in accordance with internationally accepted standards, though issues related to health and disease are also reported to comply with standards set by international organisations. The position is thought to be similar in other producing countries where meeting European Community or United States requirements for shrimp products and production processes is a matter of commercial necessity where export is made subject to the product and process quality requirements of importing countries.

5.16 Guidance and Producers' Organisations

Although evidence of the adoption of nationally formulated codes of guidance on shrimp aquaculture is rather sparse, a number of countries have accepted the Global Aquaculture Alliance' *Codes of Practice* which elaborate guiding principles for responsible aquaculture based upon the provisions concerning aquaculture in the Food and Agriculture Organization's *Code of Conduct for Responsible Fisheries* (1995). In principle, adherence to the Global Aquaculture Alliance's codes of practice is to be welcomed. However, it is less clear what particular mechanisms have been adopted to secure adherence to the international code within particular countries.

It is also encouraging to see that, in a number of countries, shrimp producer's organisations have been established, and membership by producers is quite substantial in some cases. However, limited information has been provided as to the status and role of such organisations and the contributions which they make to the development of shrimp aquaculture legislation and practice. Hopefully, those governments who have expressly accepted a responsibility to encourage the development of shrimp aquaculture will see producer's organisations as a channel through which supportive initiatives may be directed. On the information which has been provided, however, it is not apparent what degree of participation producers' organisations actually have in policy formulation and implementation and in relation to various other matters in which they might usefully fulfil an important role in the development of shrimp aquaculture.

In **Colombia** it is the duty of the government to promote the development of aquaculture. The National Institute of Fisheries and Aquaculture must give assistance to producers and has authority to promote aquaculture through publishing guidelines, handbooks and other useful documents to encourage good practices. Amongst its competences, the Institute develops training programmes, and the National Programme of Fishery Development encompasses these activities. However, transferring technology and providing technical assistance for protection of natural resource management and protection is also among the competences of the Autonomous Regional Corporations. There are also several sectoral bodies involved in the development and improvement of shrimp aquaculture, and tax exemptions and import rights on embryonic eggs, equipment and accessories for aquaculture, are established in relation to such bodies.

The National Fisheries Institute for **Ecuador** must give scientific and technical support to the private sector in areas within its competence. For instance, it must give assistance and technical advice on the determination, development and dissemination of cultivation methods and production systems, new production systems, management techniques, conservation and species repopulation; and other related matters. It has been estimated that 85% of producers are members of associations. Amongst these, the National Chamber of Aquaculture, was created by law but with voluntary membership, this body gives advice and various services to its members and has accepted the Codes of Practice of the Global Aquaculture Alliance. Despite many tax exceptions being removed in 1989, the State has an official policy of encouraging shrimp aquaculture. Hence, it has awarded various benefits in relation to certain rights; fiscal stamps and taxes related to company constitution acts; constitution act reforms, relating to certain share operations and to economic capitals, import of materials and raw materials; total exoneration from taxes on exports of certain fishery products; specific benefits for fishery industries classified as “special”, which involve exoneration from taxes on land and ship transfer; exoneration, during the first five years, from all taxes and local, provincial, additional and fiscal stamp duties; and, from the sixth year, exoneration from all custom duties on machines, equipment and spare parts.

The General Directorate for Fishery Development in **El Salvador** has responsibility for research and the promotion of fishery and related activities, and also for giving technical assistance and advice to all those engaged in these activities. Although 50% of producers are grouped in cooperatives, there are no recommended practical guidelines, nor codes of conduct, or similar non-compulsory handbooks to complement legislation. The Ministries of the Economy, Treasury and Environment are responsible for elaborating programmes of incentives and environmental disincentives, in order to facilitate restructuring of activities involving excessive or inefficient natural resource use.

Approximately 30% of producers in **Guatemala** belong to a producers’ organisation. Although government finances research on the better management of shrimp aquaculture, the funds invested are much less important than those invested by the private sector. In 1980 the Ministry of Agriculture, Livestock and Food launched a programme for the construction of fish farming ponds for family and local use. Various texts from Mexico, Honduras and other countries are used as non-compulsory guidelines and handbooks. The Ministry of Agriculture is responsible for the promotion of fish farming through the Technical Directorate of Fisheries and Aquaculture. Legislation allows the possibility of granting aquaculture farms full or partial duty-free allowances, for five years (renewable), to import materials, equipment, lubricants and fuel. Guatemala signed, together with Costa Rica, Honduras, Mexico, Panama, Peru and Venezuela, the agreement for the constitution of the Technical Committee for the Execution of the Project System of Centres of Research on Aquaculture.

Although **Honduras** does not have a code of practice for shrimp aquaculture, the National Association of Aquaculture of Honduras has adopted the Code of Practice for Responsible Aquaculture of the Global Aquaculture Alliance. This country has also signed the Constitutive Act of the Technical Committee for the Execution of the Project Systems of Centres of Research on Aquaculture.

The Sub-secretariat of Fisheries in **Mexico** is responsible for carrying out aquaculture development activities, providing advice and training to fishery production cooperatives and

fish farmers generally, promoting financial support programmes, and the construction of aquaculture parks and laboratories. The States and the Federation of Mexico have the duty to develop and apply economic instruments aimed at encouraging the accomplishment of environmental policy objectives, promoting behavioural change, and utilising economic, financial and market instruments. Laws specifically allow producers to develop voluntary processes of environmental self-regulation and entrust the Secretariat of Environment and Natural Resources and the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food with the responsibility to encourage and guide the development of adequate and environmentally-friendly production methods. The Directorate General of Aquaculture is responsible for promotional actions, such as encouraging investments and information exchange. The National Institute of Fisheries has to support and promote the transfer of technology generated by the Institute and other research institutions to aquaculture producers. The Fisheries and Aquaculture Programme 1995-2000 includes sub-programmes for the regulation of aquaculture development; the consolidation and diversification of aquaculture in continental waters; the modernisation of shrimp aquaculture; the promotion of sea farming; rural aquaculture; the repopulation of fresh and sea waters; aquaculture health; and for the modernisation of fisheries derived from aquaculture. Mexico also signed the Constitutional Act of the Technical Committee for the Execution of the Project System of Centres of Aquaculture Research.

About 80% of shrimp producers in **Nicaragua** belong to a shrimp producers' organisation, according to government estimates. The Fund for the Development of Traditional Fisheries and Aquaculture was created in 1987, under the administration of the Central Bank, with objectives encompassing the support of aquaculture cooperatives in the setting up of production infrastructure works and equipment acquisition. Measures directed towards the promotion of exports were subsequently established. Subject to a certificate issued by the Ministry of Environment and Natural Resources, import taxes are exonerated on equipment and machinery considered to be "clean technology". The National Association of Aquaculture has adopted the Codes of Practice for the Responsible Aquaculture of the Global Aquaculture Alliance.

Panama participates in the Technical Committee for the Execution of the Project System of Centres of Research on Aquaculture.

5.17 Enforcement Issues

As previously observed, the practical enforcement of shrimp aquaculture law is difficult to evaluate with any confidence. In relation to the Latin American countries surveyed, fairly detailed information has been given confirming the widespread availability of legal sanctions for infringements of various kinds. Some information has also been provided as to the allocation of regulatory responsibility for monitoring of activities and the initiation of enforcement proceedings against offenders. However, the difficulty remains that the relationship between the formal powers to initiate proceedings and to impose penalties, and the *actual* use which is made of these, remains a matter of speculation.

In **Colombia** various sanctions are directly relevant to the obligations and restrictions related to shrimp aquaculture. Hence, following infringement, there is the possibility of a fine, suspension of registration, or a licence, franchise, permission or authorisation. Additionally,

sanctions provide for the temporary or final closure of an installation, the demolition of facilities at the offender's expense and confiscation of equipment. There are also preventive measures such as warnings, preventive confiscation and the carrying out of studies and evaluations within defined durations. In any case, the General Law of Fisheries defines an infraction to encompass any action or omission which represents an offence under its regulations or any other relevant legal regulation. The Law also creates a specialised body of Environmental and Natural Resources Police within the National Police. Young persons performing compulsory military service may join the Environmental Service to participate in environmental education activities, communal environmental organisation and assistance, and may control and supervise environment and natural resource use.

In **Ecuador** a significant problem exists in the absence of sanctions for some major infractions in shrimp aquaculture law, since the possibility of withdrawal or suspension of fiscal benefits was removed by the Law of Fiscal Performance (1989) and only a few offences are punishable by fines or custodial sentences. However, a great deal of shrimp aquaculture is carried out in mangrove swamp areas and these are extensively protected by regulations which envisage a wide range of infractions and penalties for tree felling, unauthorised construction, pollution and other damaging activities for the ecosystem, which may result in the loss of licences and permissions, and the confiscation of goods. Any natural or legal person who is responsible for environmental damage is obliged to inform the authorities and will risk a fine or penalty through the failure to do so. Trials for environmental protection are public legal actions, and every interested individual may be heard, in civil, penal or administrative cases. In the case of wrongful administrative actions by civil servants, any individual may report infractions to the civil servant's hierarchical superior to initiate the corresponding administrative process.

Infractions to the general law of fishery activities in **El Salvador** depend upon the seriousness of the offence involved. Accordingly, the sanctions available depend upon the kind of process which is followed, but include fines, suspension or termination of permissions and licences, and confiscation of equipment, depending upon the seriousness of the infraction. Amongst the reasons for revocation of environmental authorisations for natural resources exploitation is the refusal by the holder to observe conditions established in the permission or the infringement of technical regulations on environmental quality and rational and sustainable exploitation of resources. Environmental infractions can vary greatly in their seriousness and amongst them there are: starting projects without environmental permission; giving false information in environmental impact studies; failure to comply with the obligations defined in the environmental permit; authorising activities, works, projects, or concessions which do not have environmental permission; holders' refusal to mitigate environmental impact; offending environmental quality technical regulations; obstructing or making difficult inspections and environmental audits; dumping pollutants contrary to legislation; and failure to give warning in the case of an emission which constitutes a threat to life or human health. Any person, including State bodies, who causes risk or damage to the environment by action or omission, affecting ecological processes or human life quality, is obliged to restore the damaged ecosystem, or pay corresponding compensation. Special courts have been created to consider environmental infractions, for instance the First Degree Agro-environmental Courts and the Second Degree Agro-environmental Courts.

Fish farming and fishery law in **Guatemala** generally includes sanctions for infractions, such as prison sentences, fines, confiscation and loss of licence, even where the offences are not specifically associated with shrimp farming. For example, the law regulates situations where a person establishes an installation for the production of sea food on the coast without title deeds or a concession. In such a case, the offender will be subject to confiscation of possessions and will be allowed only a limited time to remove personal belongings. As far as aquaculture is concerned, the Ministry of Agriculture, Livestock and Food may apply sanctions involving the provisional suspension of activities, fines, and, in case of repeated offences, it may cancel any previous authorisation where operations involve contamination, species damage or where the production activities do not comply with regulations.

Infractions of fishery law in **Honduras** are punished with fines and prison sentences, depending on the seriousness of the offence, so that a person causing environmental damage is punished with fines or payment of compensation. The Law of the Environment allows the intervention of the Environmental Attorney's Office and a wider variety of sanctions: fines, total or partial closure; provisional suspension of activities; equipment confiscation and compensation to the State or to a third party. Environmental regulations also establish some environmental crimes which may arise in relation to shrimp aquaculture. Municipalities may also carry out environmental pollution control measures in relation to shrimp aquaculture activities.

Fishery legislation and regulations in **Mexico** establish a wide variety of sanctions for infractions concerning aquaculture and other fishery activities. Sanctions include suspension and revocation of authorisations, permissions and concessions, the confiscation of goods and the imposition of fines. The Authority responsible for inspection and compliance is the Federal Attorney for Environmental Protection within the Secretariat of Environment and Natural Resources. However, other federal, state and municipal authorities have competence in relation to enforcement and may request aid from the security corps if necessary. Any person may report environmental violations to the Federal Attorney's Office for Environmental Protection. The General Directorates of Industrial Inspection; of Environmental Legislation Verification; of Forests and Wild Flora and Fauna Inspection and Control; and of Fishery and Sea Resources, may, within their respective fields of competence, initiate inspection and control measures, order safety measures and impose punishments.

In **Nicaragua** exploitation licences, allowing shrimp aquaculture activities, may be withdrawn where there has been a failure to comply with the law of the environment and other special laws in force. There is also the possibility of initiating an administrative procedure for the application of sanctions including confiscation, closure, suspension or cancellation of a licence and the imposition of fines. Any person may be held civilly responsible for any damage caused, by action or omission, and a civil servant whose action or omission has allowed the damage to arise will be jointly responsible. Administrative infractions are divided into slight, serious and very serious and they cover a wide range of offences and often correspond to prohibitions and restrictions concerning shrimp aquaculture. The Attorney's Office for the Protection of Natural Resources is responsible for commencing the corresponding legal process and for representing and defending the interests of the State and society in the environmental field.

Chapter 6 General Commentary on the National Legislation

6.1 Introduction

The purpose of this chapter is to offer general commentary on the national shrimp aquaculture legislation described in the previous three chapters. Comparative commentary on laws drawn from different countries needs to be offered cautiously, since taking legislation out of national contexts, and particularly developmental contexts, is capable of misleading. Nonetheless, there are some clear general themes to be drawn out from the description of national laws in the preceding chapters and some useful examples of good regulatory practice which deserve to be highlighted.

6.2 Sustainable Development

Although the concept of sustainable development has been recognised to be of fundamental and overriding importance in the development and conduct of shrimp aquaculture, the challenges which are involved in reinterpreting this imperative in national and local contexts and applying to a range of different shrimp aquaculture activities have been noted (see 2.2 above). These challenges are genuine, in that there can be no standard formula for interpreting and applying sustainable development. Each country, and perhaps each particular area, needs to weigh up the environmental costs of shrimp aquaculture against the developmental benefits that will be produced and, not least important, this needs to be done in a way which takes account of the particular needs of countries and localities which are at markedly different stages of economic development.

The difficulties in interpreting and applying sustainable development to shrimp aquaculture are apparent from the different national legislative responses that have been surveyed. With a only a few exceptions, the task of reinterpreting sustainable development has not progressed very far, though there are some indications of imminent developments. Although there are some instances of sustainable development being reinterpreted for use in national development planning policy generally, and many examples of measures such as environmental assessment which are admirably consistent with the requirements of sustainable development, there is scant evidence of the implications of sustainable development being explicitly identified specifically for aquaculture or shrimp aquaculture.

The further stage of actually using sustainable development in legislation is not directly illustrated in any of the examples of national legislative practice that have been surveyed. With no criticism of sustainable development, much work remains to be done in applying the concept as a direct basis for allocating binding legal rights and duties in shrimp aquaculture and related environmental contexts.

More remarkably perhaps, the valuable international reinterpretation of sustainable development which is provided by the FAO *Code of Conduct for Responsible Fisheries* (1995) might have been more readily used as a 'stepping stone' for national authorities in seeking to ascertain the implications of the concept for shrimp aquaculture in national circumstances. Admittedly, the *Code* is formulated at an international level, and some reconsideration of its content is necessary to take proper account of the stages of development

at which particular countries are placed. Nevertheless, the apparent reluctance of governments to make greater use of the *Code* as a general guide to what sustainable development *might* require of national shrimp aquaculture policy and legislation may be seen as regrettable.

6.3 Legislation

As has been previously noted (see 2.3 above) considerable importance is attached to a clear regulatory structure which allows shrimp farmers clearly to ascertain what legislation governs their activities. One way of achieving this would be to have shrimp aquaculture governed by a single legal enactment or code which made comprehensive regulatory provision for all the different environmental impacts to which it may give rise. On the other hand, it has been recognised that particular areas, such as public health, genetically modified organisms and perhaps land use, which raise issues of broader compass than shrimp aquaculture alone and are, therefore, better made the subject of separate legislation. The essential task is that of establishing legislation which is as comprehensive as possible whilst recognising that shrimp aquaculture may need to be subsumed to other legislative regimes where broader policy objectives need to be pursued.

The evidence from the survey indicates that relatively little use has been made of specialised shrimp aquaculture legislation and in almost all instances the activity is largely governed by legislation which is concerned with fishery resources in general. The practical explanation for this is that, in most countries, shrimp aquaculture has only become established over a relatively recent period of time and, frequently, since the enactment of more general fisheries legislation. It has also been noted that, in some jurisdictions, a considerable amount of environmental legislation has recently been enacted, often following technical assistance projects and thus "after" the boom of major shrimp aquaculture developments. By comparison, the development of aquaculture and shrimp aquaculture law has lagged behind and failed to keep pace with developments in practice.

For almost all the countries surveyed, the pressing issue for the future is that of modernising or replacing outdated fisheries legislation to recognise the distinctive nature of shrimp aquaculture activities and better to facilitate the development of the industry and to improve the standards to which it operates. In many instances, this might be best achieved through the enactment of specialised and comprehensive legislation to bring about some degree of consolidation of, and consistency between, the different legal controls that are needed. It is good to see that, in several jurisdictions, work on legislation of this kind is in progress.

6.4 Institutional Responsibilities

The development and the efficient and responsible operation of a shrimp aquaculture industry is dependent upon a range of functions being properly exercised by appropriate bodies or authorities: policy formulation; the enactment of primary and secondary legislation; the authorisation of land and water use; the exercise of environmental and ecological controls; the control of public health; and the supervision of controls upon specialised matters such as shrimp movements, introductions and disease controls. Additional matters, such as the provision of various forms of developmental support, encompassing research and training

input and financial incentives, are also critical to the economic success and environmental performance of the shrimp aquaculture industry.

In each case, the body or authority with responsibility for exercising a particular function has to be clearly identified and properly empowered and resourced to discharge its function. The difficulty, which has been noted in relation to several jurisdictions, is that particular functions are not clearly allocated, or coordination between the different bodies is unsatisfactory. A consequence of this is that prospective shrimp farmers are forced to confront excessively bureaucratic obstacles involving a compounding of the paperwork and procedures which are required to be followed for no good reason or practical benefit. Ideally, the number of institutions that are needed should be kept to a minimum. However, recognising that there may be good reasons why some of the functions that have been listed should be discharged by different bodies, an effective mechanism, such as a 'lead agency', should exist to secure the maximum degree of coordination between the different bodies involved and the minimum degree of unnecessary bureaucracy for shrimp farmers.

However institutional responsibilities are allocated, transparency of operation is a guiding value to be sought in all bodies with shrimp aquaculture responsibilities. It was noted that in one jurisdiction the relevant ministry is required to publish an annual report on the performance of the fisheries sector indicating matters such as social well-being indicators for those engaged in fisheries. This is an example generally to be followed and developed by bodies and authorities with shrimp aquaculture responsibilities. The provision of information to the public about the development of shrimp aquaculture is to be encouraged. Similarly, information which allows the effectiveness of bodies and authorities with responsibility for the shrimp aquaculture industry to be evaluated should be made generally available as a spur to continuing improvement in regulatory performance.

A range of supervisory functions need, almost unavoidably, to be exercised by governments in respect of the general policy and functioning of shrimp aquaculture. In most countries these matters are actually retained as responsibilities of central government, especially where matters of national policy and primary legislation is concerned. In other respects, however, there are functions which are capable of being discharged by bodies that are established at regional or local level or established specifically for the purpose of making specialised determinations about matters which impact upon shrimp aquaculture, such as the circumstances in which non-native or genetically modified species may be lawfully introduced for shrimp aquaculture purposes. In each respect, however, the institutional and administrative structures need to be clearly identified through explicit statements as to the functions, powers and duties of each body. Additionally, relevant bodies need to be able to administer, implement and, where necessary, enforce legal requirements effectively and efficiently. Hence, as a practical matter, administrative bodies need to be properly resourced and staffed by personnel who are appropriately qualified and have sufficient expertise to discharge the responsibilities with which they are entrusted.

The national legislation surveyed generally demonstrated an allocation of powers and duties to identified public bodies with appropriately defined functions, though the concerns about over-regulation and bureaucracy in some jurisdictions have been noted. The strong tendency was for central government to retain responsibility for national policy formulation and implementation, and for the enactment of primary legislation. However, there were numerous

examples of devolved legislative powers being used in relation to aquaculture, and of the allocation of responsibilities for a range of licensing and authorising powers being given to regional and local authorities (see 6.5 below, on devolution of control).

However, it was also apparent from the countries surveyed that no example existed of a single government department or specialised body having comprehensive responsibility for all matters relating to shrimp aquaculture. It was also commonplace to find key functions relating to shrimp aquaculture located outside the Ministry relating to fisheries. Examples of this were to be found in public bodies concerned with funding for aquaculture development; land use planning; environmental quality and ecological matters; introductions of non-native species and genetically modified organisms; and public health and food safety. Specialist bodies with non-governmental status were also commonly identified as having responsibilities for matters such as aquaculture research.

The general picture, therefore, is of policy making, legislative, administrative and enforcement responsibilities being spread across a fairly wide range of bodies and institutions with little attempt having been made to consolidate these under the jurisdiction of a single authority with overall responsibility for shrimp aquaculture. In itself, the dispersal of responsibilities that is commonly found may not be problematic, providing that the responsible bodies for each aspect of shrimp aquaculture are clearly identified and the boundaries of the different bodies are clearly defined to avoid overlaps of responsibility or matters that fall outside the responsibilities of any of the responsible bodies. The danger remains that a wide distribution of responsibilities between bodies without clearly defined responsibilities is capable of creating bureaucratic obstacles to the development of shrimp aquaculture or inefficiency in the discharge of essential functions and the effective implementation of primary and secondary legislation.. If a central authority for shrimp aquaculture is not established, then a high degree of coordination between the different bodies concerned must be maintained.

6.5 Devolution of Controls

In part, the geographical level at which shrimp aquaculture responsibilities need to be allocated and discharged has been addressed in the previous discussion of institutions with responsibility for shrimp aquaculture. Devolution of policy making, legislative, administrative and enforcement powers may serve a useful purpose insofar as it allows these matters to be determined at a level which is close as possible to those upon whom they impact. This may be a matter of particular concern in areas where communities of indigenous people are in need of special protection for the purpose of protecting cultural traditions from the potential threats posed by inappropriate development. In such situations, it may be necessary to establish specialised authorities to ensure that account is taken of the needs of indigenous peoples where decision-making affecting them is involved. Hence, in some jurisdictions, and for some purposes, the exercise of controls by central government may be regarded as too remote and insufficiently responsive to regional or local circumstances.

Although devolution of controls seems intrinsically attractive in allowing the often remote areas in which shrimp aquaculture is commonly undertaken to be responsible to local circumstances, it also raises problems. A key difficulty is that the allocation of powers and duties to local bodies and authorities tends to assume that they will have the expertise and

resources to discharge these functions effectively. In reality, this may frequently not be the case, with isolated rural communities being placed under strong economic and developmental pressures and not possessed of the institutional capacity to ensure the planned and responsible development of a shrimp aquaculture industry. Arguably, there is a vicious circle, whereby, lack of devolution means that rural areas are starved of resources and lack of resources means that powers are not appropriately devolved. Greater political will is clearly needed to ensure that devolution, where desirable, is accompanied by the central support and funding that is needed to ensure that local bodies are properly resourced to fulfil their functions effectively.

In relation to policy making and the exercise of legislative powers, the information from the survey indicated that degrees of devolution were closely related to the extent of federalism which operated with the constitutions of different countries under consideration. Consequently, the general constitutional order, influenced by geographical, political and other factors, was reflected in the degree to which States place shrimp aquaculture regulatory powers outside the competence of central government. In a number of cases the strongly federalist character of government resulted in a fairly clear division of competences and an allocation of law-making powers in relation to shrimp aquaculture being allocated to regional governments. A number of examples of federal legislation of this kind were given. At the level of administration and enforcement responsibilities, there are numerous instances of powers being allocated to regional or local authorities to exercise a wide range of responsibilities over matters relating to the development or conduct of shrimp aquaculture.

Clearly, the task for each jurisdiction is that of drawing an appropriate balance between the allocation of devolved and central responsibilities. Devolution and the potential for local fragmentation of controls needs to be balanced against remoteness and inappropriateness arising from over-centrality. However, there was no evidence provided by the survey of either of these extremes proving to be significantly problematic, but the desirability of local communities having control over their circumstances has been noted and the need for central support to facilitate this has been emphasised.

6.6 Acquisition of Land Rights

Although it is unavoidable that a prospective shrimp farmer must acquire the necessary land rights to commence operations at the desired location, the survey provided some good insights into the widely contrasting legal possibilities involved. At one extreme, the acquisition of land rights is a matter which is determined by private law, so that if the prospective shrimp farmer has the necessary ownership or sufficient interest in land, such as a lease or permission to use the land, then shrimp aquaculture activities may be commenced without legal impediment. Situations governed purely by private law raise various potential environmental difficulties if there is no licensing or other legal mechanism to prevent shrimp aquaculture at inappropriate locations, but in some instances there seemed to be little by way of a public mechanism for control of undesirable development of private land for shrimp aquaculture purposes.

At the other extreme, there were several jurisdictions where land ownership seemed to be placed entirely in the public domain by means of constitutional statements to the effect that land ownership is vested in the state so that, theoretically, private land ownership does not exist. Nonetheless, state ownership always seemed to involve mechanisms by which land

could be allocated for productive use and, in some respects, state encouragement was given for the development of particular zones or locations for shrimp aquaculture purposes. Despite such land remaining state property following its allocation to a prospective shrimp farmer for development, the rights of that farmer to use the land for its allocated purpose, and to exclude others from the land, were protected. The fact that the land remained owned by the state did not prevent a sufficient degree of security of interest in the land arising and may, in practical terms, be not dissimilar from private ownership.

However, where shrimp aquaculture is undertaken on state land issues were raised about the form of the lease, concession or authorisation which was most appropriately used. Fairly wide variations were seen in the durations of leases that were commonly granted, the conditions that were imposed in relation to renewal and transfer, and the corporate or individual status of the person to whom a lease could be granted. In respect of durations, benefits may arise through allowing longer periods or renewal as this would encourage shrimp farmers, and those providing financial support, to think of their projects in long-term and to have regard to the dangers of unsustainable practices. Examples exist, in different countries, of shrimp farms that have been abandoned after only a few years where pollution or disease problems have caused farms to 'crash'. Avoiding short-term profitability, at the expense of longer-term sustainability, might be better achieved by giving farmers an interest of greater duration in the land.

In respect of conditions in leases of state land, great variability was seen in the extent to which social and environmental impacts were taken into account. In some jurisdictions, for example, the special status of indigenous peoples were taken into account through consultation processes or requirements that representatives of indigenous people should give approval for projects in their areas. In other jurisdictions, however, the special status of indigenous people appeared not to be recognised. Similarly, the use of ecological protection areas was unevenly provided for, though the need for protection of mangrove areas, either as a legal requirement or otherwise, seemed to be quite widespread. More generally, leases tended to be unclear or inconsistent in identifying the circumstances in which infringement of conditions or general legislation would result in withdrawal or suspension of the lease, and perhaps the imposition of fines or other penalties. In some instances, the relationship between a lease to use land for shrimp aquaculture and further licences that might be required for particular activities seemed unclear.

More generally, in relation to the use of state land for shrimp aquaculture, the issue arose as to the extent to which land development is state-led or developer-led. There were a number of examples of state initiatives in directing shrimp aquaculture towards particularly suitable areas through zoning and similar mechanisms, or making development conditional upon requirements such as environmental assessment which should reveal the inappropriateness of a particular proposed location. However, the stronger tendency seemed to be for shrimp aquaculture development to be led by individual developers deciding where they wished to establish farms and the kinds of activities that were to be undertaken. In some cases, this was clearly problematic since the interests of the developers did not correspond with those of the local community. In areas which developers saw as particularly attractive for shrimp aquaculture there was also a tendency for too many shrimp farms to be concentrated in too small an area, with consequent problems of pollution and disease transfer. Although, clearly the state and developers need to work in partnership in determining appropriate locations for

shrimp aquaculture development, the indications were that, for most jurisdictions, more state leadership was needed.

The common issue, across the spectrum of private and public models of land acquisition illustrated by the national legislation within the survey, was the extent to which land ownership or landholding was regulated to prevent unsuitable shrimp aquaculture development. In relation to private ownership it may be noted that a key mechanism for the imposition of controls of this kind is through a development licensing or planning control system, and this is considered in the following section. Where development licensing is not required, however, other constraints upon private land use are important and it is significant that there were several examples of jurisdictions where these did not appear to exist.

In relation to those countries where land is publicly owned, the mechanisms which are used to allocate land for individual or communal use are of corresponding importance in allowing land use to be restricted or made conditional upon various public interest requirements such as environmental protection. Whilst the survey provided illustrations of a number of jurisdictions where the land allocation mechanism was effectively used to impose environmental requirements, there were also several illustrations where no indication was given that land holding would be subject to such requirements. However, because the information provided was often incomplete or ambivalent in relation to this key issue, it is difficult to be sure how widespread the unrestricted allocation of land use is.

As a general observation, it may be concluded that most jurisdictions do seek to restrain shrimp aquaculture land use for environmental, ecological and perhaps social reasons and this must be seen as highly desirable. However, the fact remains that this does not appear to be done in a significant number of instances, and this raises inevitable concerns about whether the mechanisms for protection of public interests are satisfactory.

6.7 Land Development Licensing for the Establishment of Shrimp Farms

Insofar as restrains upon unsatisfactory development, or development in appropriate locations, are already provided for in the mechanisms for the allocation of public land to shrimp farmers, the need for further control mechanism may not be necessary. However, if these control mechanisms do not operate when public land is allocated, or where the right to develop land for shrimp aquaculture purposes is determined by possession of sufficient private ownership rights in the land, then a legal mechanism for the control of unacceptable land development is needed.

In this report, “development licensing” has been used as general term to identify any system of land use control which requires the owner or holder of any private or public land to secure specific authorisation for the development or change of use of land for a particular purpose. The implication that development of land without the necessary licence will result in the imposition of a sanction of some kind for unauthorised development or require the removal of a structure that has been constructed without the necessary permission. Development licensing also allows particular licences to be issued subject to conditions and, most importantly, may be used to require a shrimp aquaculture proposal to be subject to environmental impact assessment so that potential adverse impacts can be identified and mitigated through the imposition of appropriate conditions in a development licence.

The national legislation relating to these matters which has been surveyed, demonstrates a wide spectrum of responses. Some countries appear to have quite sophisticated systems of development control law which seems comprehensive in requiring licences or authorisations for all kinds of development. However, some ambivalence is shown in particular countries as to whether development licensing should be applied to agricultural activities and whether shrimp aquaculture falls within those categories of activity which are granted exemption from control. Regrettably, there are a number of countries where no system of development licensing seems to be in place, though in some of these there may be other mechanisms which, by another route, meet many of the objectives of development licensing. In other countries there is uncertainty as to how development licences for the establishment of a shrimp farm relates to the other forms of continuing control which need to regulate ongoing activities. Clearly, the authorisation to establish a shrimp farm should not be regarded as a permission to do anything whatsoever, and the contrasts between initial development and ongoing operation should be unambiguously emphasised.

In some jurisdictions, two kinds of initial licence need to be secured before a shrimp farm may be established, even where the prospective shrimp farmer has already secured the necessary lease or concession for the use of the state land involved. An "installation" licence is granted, usually, by the national fisheries authority and sometimes on the basis of a technical report on the project. This needs to be supplemented by an environmental licence, issued by the relevant environmental authority, requiring environmental clearance to be shown, usually by the project having been subject to environmental impact assessment. However, the concerns which have been previously expressed about over-regulation and bureaucracy may well be pertinent here and the apparent duplication or overlap between the procedures raises the question as to whether consolidation of the licensing procedures might be beneficial particularly where relatively small scale projects are involved.

Fairly widespread use is made of environmental impact assessment in relation to shrimp aquaculture, though the scope of this, and the legal mechanism by which it is required, are extremely diverse. In several instances, environmental impact assessment appears to be required independently of any general system of development licensing. Although there is a general appreciation that the nature, size and location of a shrimp aquaculture development may activate an environmental assessment requirement, there are wide variations, for example, in the size of the projects for which environmental assessment will be required. In some cases, particular kinds of area, such as mangroves, are employed as a decisive factor in determining where environmental assessment will be required, but in other instances the determination is made on a more *ad hoc* basis through the application of screening and scoping procedures. It is recognised that different national circumstances and concerns may justifiably be reflected in the variety of circumstances in which environmental assessment is required, but the question is also raised as to whether these disparities are so great that more uniformity in procedures and requirements is needed.

Regrettably, there seem to be a number of jurisdictions where environmental assessment has not yet been established as a formal requirement. This must be regarded as unsatisfactory insofar as it prevents satisfactory evaluation of the environmental detriments against developmental gains and, as the point has previously made, prevents progress towards greater sustainability in aquaculture development.

6.8 Continuing Controls upon Shrimp Aquaculture Activities

The potential benefits of general licensing of shrimp aquaculture to allow control over all continuing activities which may have adverse environmental impacts have been noted, however, the practical difficulties which are involved in establishing general operational licences have also been acknowledged. Given the potential complexity of a licence covering a wide range of matters, it is not surprising that the survey of national legislation revealed that this approach had not been widely pursued. Indeed, only one possible example of a general license to operate an aquaculture system was found and this did not seem to be comprehensive in the sense that further licensing requirements were also required.

In some countries, there is a blurring of the distinction between authorisations for the initial establishment of a shrimp farm and authorisations for subsequent activities which are conducted on that farm. Hence, environmental impact assessment requirements may extend to encompass an assessment of the kinds of activity which are actually to be conducted post-establishment on a particular shrimp farm. There are difficulties in seeking to use environmental assessment to regulate ongoing activities, as opposed to one-off developments, and the limitations of environmental assessment as a means of controlling day-to-day activities must be recognised.

However, the lack of use of general licensing systems for shrimp aquaculture should not be seen as a significant cause for concern. Providing that the different kinds of environmental impacts to which shrimp aquaculture gives rise are satisfactorily regulated by distinct licensing systems for each particular purpose, then the same regulatory objectives are achieved. Indeed, the needs of practicality may actually make the use of different kinds of activity-specific licence preferable.

6.9 Fresh Water Use Licensing

Clearly, the supply of an adequate supply of water, of a sufficient quality, is an essential need of any shrimp farm. Equally, the need for this water is a matter which is capable of raising conflicts with other water users with competing needs to draw from the same supply. Potentially, therefore, the use of water for shrimp aquaculture purposes may need to be the subject of control and a means provided for reconciling and accommodating competing water demands.

In some jurisdictions, where water is regarded as state property, the abstraction of water for shrimp aquaculture is assimilated to the use of state land. Hence, leases or concessions for the use of land incorporate permissions to make any desired use of water on the land. Again, the contrast between the initial establishment and continuing activities on shrimp farms should be emphasised. Patterns of water use may change over time, both for shrimp aquaculture and for competing purposes, and a concession which is granted at the commencement of a farm may fail to take account of subsequent conflicts. This dynamic aspect of water use is, therefore, better dealt with by a mechanism which recognises the distinct character of claims upon water use and provides a transparent means by which these may be reconciled and provides a legal means of limiting the water that may be used by a shrimp farm, where necessary. A specific water use licensing system is likely to be the most effective way of achieving this.

However, the need for water use licensing is greatly dependent upon the degree of competition which exists for the use of water resources and in rural locations, where many shrimp farms are likely to be established, water supplies may be plentiful and the claims of competing water users not difficult to reconcile. This situation seems to be widely evidenced by the information on national legislation where the use of water use licensing is uncommon. There were a few jurisdictions where water use has been made subject to a particular licensing requirement, and others where water supply is a matter which is dealt with in authorising shrimp aquaculture to commence at a particular location, but for the majority of jurisdictions no specific water use licensing requirement apply.

In commenting on this, the practical need for water use licensing is the paramount concern. Where there are genuine disputes about water supplies, and no legal mechanism for resolving these, the state of the law must be regarded as deficient. From the information that was provided, however, it was not possible to assess the extent to which this was seriously problematic in practice.

6.10 Wastewater Discharge Licensing

The other water-related aspect of shrimp aquaculture concerns the potential adverse impacts that the activity may have upon water quality through the discharge of wastewater which may be contaminated by sediment and chemicals used in shrimp aquaculture. As has been noted, the discharge of poor quality effluent from a shrimp farm may have a damaging effect upon the quality of the receiving waters and the ecosystems that they support. Unsatisfactory effluent may also have a damaging impact upon other shrimp farms in the locality since there is the possibility that contamination or disease may be transmitted between farms. Although later consideration is given to the extent to which chemical-specific controls are properly applied to shrimp aquaculture (see 6.13 below), the present concern is the extent to which national legislation provides for more general licensing controls upon effluent which is discharged from shrimp farms.

The evidence of the survey demonstrated the fairly widespread existence of general environmental quality legislation which provided for controls upon the discharge of effluent of all kinds. Primarily, this kind of legislation seemed to have been enacted with the control of industrial activities in mind. Nonetheless, the legislation was sufficiently broadly drafted to allow the same system of controls to be applied to non-industrial forms of discharge such as those emanating from shrimp farms in most instances. However, in a small number of jurisdictions there was doubt about the capacity to use industrial wastewater discharge controls in relation to shrimp farms because of uncertainties as to whether this kind of non-industrial effluent was within the system of controls. In other jurisdictions this issue did not seem to be problematic.

In some countries the control mechanisms for effluent quality management were quite well developed in identifying particular contaminants and parameters for wastewater which should not be exceeded in shrimp farm discharges. In other instances, emphasis was placed upon the need for waste water to be previously treated before discharge and licences would only be granted if this was undertaken by the use of appropriate techniques. However, the practical reality should also be noted: that shrimp farms differ widely in terms of size, production

capacity and intensity of operation. Regulations which create operational requirements which are universally applied to all installations are capable of being excessive and unnecessary in the burden which they impose upon small low-intensity farms. Likewise, over-regulation of this kind may be unhelpful for regulatory authorities which are seeking to use their resources most cost-effectively by concentrating on those farms which genuinely result in the greatest negative impact upon water quality.

Notably also, some examples were given of the use of operational approaches to water quality control. In particular, requirements that shrimp farmers should install settling or stabilisation ponds for the collection of sediment are illustrative of this and may, in appropriate circumstances, provide an effective and practical means of securing effluent quality requirements independently of the existence of a discharge licensing scheme. However, collection of sludge does raise the question as to what controls apply to its safe disposal and this aspect of the use of settling ponds should be explicitly provided for. Again, the question also needs to be considered whether settlement ponds should be required as a universal requirement or only in relation to shrimp farms of a certain size or production capacity.

Despite the fairly widespread use of measures to ensure the quality of wastewater from shrimp farms, a few examples were provided of countries where no wastewater discharge controls were reported to be in existence. The absence of licensing control mechanisms, may reflect that other water quality protection mechanisms exist or that water quality from shrimp farms is simply not perceived as a problem. However, in all but the least intensive forms of shrimp aquaculture it is difficult to accept that effluent quality does not raise environmental and water use concerns. Increasing development and intensification of shrimp aquaculture is likely to mean that this is an issue which must be appropriately addressed by all jurisdictions in the future.

6.11 Shrimp Movement Licensing

The wide range of ecological concerns about introduction of non-native species, and the escape of stock from shrimp farms causing potential habitat competition and damage to genetic integrity of wild stocks, mean that, for almost all shrimp aquaculture, some means of movement controls upon live shrimp will be needed. However, a range of potential legal approaches have been identified ranging from prohibitions to permitting and licensing, and potentially encompassing a range of monitoring requirements to identify movements of stock which may be infected with disease.

The extent to which the ecological and disease controls are actually met by national legislation shows considerable variability. At one extreme, one country had adopted the *International Aquatic Animal Health Code* formulated by the Office International des Epizooties (most recently, 2000) as a national requirement. This requires, certification of all crustacean imports; guarantees to prevent their release into the natural environment; controls upon harvesting; certification of safe conduct and health certification for all transport of all fish products; power of authorities to impose quarantine provisions and safeguard measures; and reporting of specified diseases. A number of other countries have also established fairly sophisticated national mechanisms for restricting the collection of shrimp from the wild; evaluating and authorising proposed movements of shrimp stock, involving the establishment of expert bodies to consider applications for movement authorisations; extensive requirements

for records of movements to be maintained; and powers of officials to impose quarantine requirements or to order or undertake the confiscation or slaughter of diseased stock. The imposition of licensing requirements upon international imports of shrimp stock is fairly widespread. On the other hand, there is a tendency for shrimp movements to be regulated under legislation which was designed to protect animal health and may not be fully appropriate in relation to shrimp. Most remarkably, there were several examples of countries where there appear to be no legal controls which apply to importation of non-native species or the movement of shrimp between farms.

The extreme variability of the national responses to problems arising from shrimp movements may reflect corresponding differences in national circumstances and the kind of shrimp aquaculture activities that are actually undertaken. Where shrimp aquaculture is less extensively conducted and significant movements of stock not generally undertaken, the need for legal controls may be less pressing. Nonetheless, the gravity of the threat of disease outbreaks must mean that the need for effective preventative controls and the power to take action to contain disease outbreaks must be a matter of concern to all nations except where shrimp aquaculture is only conducted at anything beyond a self-sufficiency operation.

6.12 Genetically Modified Organisms

Although the use of genetically modified organisms is a fairly recent concern, and a concern extending well beyond the scope of shrimp aquaculture, the potential environmental, ecological and economic implications have rapidly given rise to extensive international controversy. Although genetically modified shrimp products might be controlled under general shrimp movement legislation, where it exists, and possibly under environmental licences, there is a general consensus that the whole range of issues arising from genetic modification need to be more specifically and strictly addressed given the degree of hazard that is involved and the need for a precautionary approach to be adopted.

In the countries that have been surveyed, specific information about controls over genetically modified organisms has been difficult to obtain, hence, it is difficult to draw firm conclusions as to whether this means that relevant legislation does not exist or whether it is not regarded as a matter of specific concern to fishery officials. Nonetheless, it is reassuring to see that a few countries have addressed the issue of controlling genetically modified organisms through general legislation and have recognised the need for a precautionary approach to be applied. In one instance, this has involved the establishment of a national committee of experts to evaluate the hazards which are involved in proposed introductions and to recommend measures to minimise risks. This model admirably recognises that introductions of genetically modified organisms raise wide-ranging environmental, ecological and economic issues which cannot be considered in the context of a particular sector, such as shrimp aquaculture, in isolation.

However, the general picture appears to be that no specific national legislation has been put in place to control introductions of genetically modified organism in the majority of the countries within the survey. To some extent the issue may be alternatively addressed by other mechanisms, nonetheless, it is difficult to avoid the conclusion that this issue is far from being adequately regulated. Some explanation for this is provided by the fact that, in practice, the use of genetically modified organisms in shrimp aquaculture has not yet become of significant

importance, but the apparent lack of more general legislation concerning genetically modified organisms is more difficult to excuse since in other areas such as agriculture the use of such organisms is feasibly undertaken. Clearly, this is an area which many jurisdictions will need to address in the near future.

6.13 Chemical Use Restrictions

Alongside the possibilities of controlling the emission of chemicals into the environment in waste water from shrimp farms, the direct control of pesticides, medicines and other chemicals that may be used in shrimp aquaculture may be more effective, particularly where substances are known to be seriously harmful to the environment or human health. Alternatively, the possibility exists that harmful chemicals may be controlled through the imposition of limits upon such substances as residues in shrimp products, but again this may be an unsatisfactorily indirect way of addressing the problem of chemical control.

A fair number of the countries surveyed possessed legislation for the control of chemicals, though in some instances this was legislation of a general character and not specific to aquaculture. Examples were identified of the use of import licensing controls, prohibitions, use registration requirements, the general control of chemicals as pesticides and as residues in food products, and the control of chemicals under codes of practice. However, the impression given was that the various kinds of control were applied in a rather *ad hoc* manner, in relation to chemicals that had proved to be problematic, rather than applying a more preventative approach of compiling a comprehensive list of those particular chemicals that were subject to control in advance. No examples were provided of mechanisms to control the marketing, distribution or sale of hazardous chemicals for use in shrimp aquaculture.

More remarkably, there were a significant number of countries that did not appear to have any legislation to control the use of chemicals in shrimp aquaculture. The previous observation about legislation reflecting actual national practice in shrimp aquaculture may be reiterated, in that low intensity aquaculture may make little or no use of chemicals, and in relation to one jurisdiction it was stated that this was actually the case. Nonetheless, the absence of means to control the use of potentially highly damaging chemicals on perhaps only a small number of shrimp farms is capable of having seriously damaging consequences for a national shrimp aquaculture industry as a whole. Therefore, the widespread lack of appropriate national control mechanisms does raise significant concerns.

6.14 Food Sources and Utilisation

Food sources and utilisation may have been already been indirectly addressed under previous issues. The possibility of food containing additives of various kinds raises potential problems of chemical misuse which have been previously noted. The generation of wastage from excessive food application also raises potential for adverse impacts on water quality which may have been addressed as an effluent quality problem. Environmental and ecological concerns about the sources of materials that are used in shrimp food, and that inappropriate food sources should not adversely impact upon local environments, may also be addressed by more general fishery and ecosystem protection legislation.

Nonetheless, questionnaire enquiries were made as to whether national legislation provided for specific controls in relation to the sources and utilisation of foods used in shrimp aquaculture. The responses confirmed that in only a small number of jurisdictions was the issue of shrimp food considered and in none of these was any detailed information provided as to the precise legal mechanisms that applied. The clear implication was that the issues raised were not regarded as a major legislative priority and were probably better provided for in guidance, if necessary. Again, the point may be made that excessive use of shrimp food is capable of being economically self-regulating, in that no farmer will purposefully use more feed than is necessary, and such misuse as does arise is more likely perceived as an educational or training problem rather than something needing regulation.

6.15 Product Quality Controls

Product quality, and particularly matters of food safety and public health, are perhaps the most comprehensively regulated issues in relation to shrimp aquaculture. Alongside matters which have been previously considered, such as the misuse of chemicals, almost all countries surveyed seemed to have national legislation concerning the contamination or wholesomeness of food, though this legislation took different forms.

The most common approach involved shrimp products being regulated in accordance with a general regime for food safety which applied to all food products and was administered by officials with specific responsibilities for inspection of premises and used in connection with the processing or sale of food to ensure that these were in a clean and sanitary condition. The implication, where not explicitly stated, was that the sale of foods where were unfit for human consumption was a punishable offence.

However, in nearly all cases, the relevant national legislation was formulated to apply to food products generally rather than shrimp products specifically. Only in a few instances was reference made to national legislation which imposed requirements which were of specific application to fishery products, despite the fact that requirements for post-harvesting facilities for fish, such as the maintenance of cool conditions, may not arise in relation to other kinds of food. The exception to this, however, where national fish processing requirements were imposed to meet export requirements imposed by importing countries. This issue is considered below as a matter concerning internationalisation of standards.

6.16 The Internationalisation of Standards

Although the opportunity was given for national responses to the questionnaire to encompass any matter on which national legislation had been influenced by international concerns of any kind, by far the most frequent issue raised was that of internationally imposed controls upon shrimp for export. As has been explained (see 2.16 above), the combination of the European Community Seafood Directive (91/493/EEC) and the United States Seafood (Hazard Analysis Critical Control Points) Regulation means that exporting most shrimp produce will be conditional upon the exporting country having national legislation which ensures that the post-harvesting activities are conducted in accordance with a range of specified requirements. Commercially, shrimp exporting countries are, therefore, left with little alternative but to enact national legislation to meet these requirements.

A small number of countries within the survey identified national legislation which appeared to be for the purpose of meeting international requirements for export of shrimp produce, or designated processing plants which operated in accordance with international requirements. However, it was most remarkable that a large number of countries made no reference to legislation for this purpose or other measures to ensure compliance with export requirements. This was remarkable because information from the European Commission concerning third countries that had secured compliance with the Community legislation included a number of countries within the scope of the survey but which provided no indication of having corresponding national legislation. The explanation for this discrepancy is elusive, but the likely situation is that these countries had failed to identify the relevant legislation, or other mechanisms by which compliance was secured, in the information provided for the survey. It is, therefore, suspected that national legislation to comply with Community requirements is actually more widespread than the survey has revealed.

Although the need for national legislation to meet export requirements is economically unavoidable for many shrimp exporting countries, evidence of other respects in which national legislation had sought to secure compliance with international measures was rather thin. As previously noted, one country had adopted the *International Aquatic Animal Health Code* formulated by Office international des Epizooties (most recently, 2000) as a national requirement in relation to shrimp movement control. Mention was made, by another country, of the need for the greater national implementation of the *FAO Code of Practice on Responsible Fisheries* and, in two other cases, references were made to movements towards a system of eco-labelling of shrimp products or the possibility of eco-labelling being available for shrimp products. Apart from these isolated instances, and other than on the issue of product export requirements, there was little evidence of national legislation being enacted as a response to international developments.

6.17 Guidance and Producers' Organisations

Codes of conduct and other forms of guidance on good practice in shrimp aquaculture fulfil a useful role in identifying various aspects of good practice and encouraging adherence to this. The scope of such guidance may of a general or specific kind and its status may be greatly influenced by the standing of the body propounding it. Nonetheless, non-mandatory guidance mechanisms to encourage the improvement of performance fulfil a useful function either as a support to legislative measures or to address matters which are not provided for in legislation.

Although the survey has shown that the use of guidance is not particularly widespread in national practice, there are some examples of it being used to good effect. In the most well developed instances a fairly comprehensive code of guidance for coastal aquaculture had been formulated by the appropriate government department which addressed all the key aspects of shrimp aquaculture capable of having significant adverse effects upon the environment. Other examples of guidance have tended to emphasise site selection issues and the need for protection of particular areas such as mangroves. Whilst there was at least one instance where a code of practice was in the process of preparation, it was notable, if regrettable, that guidance of various kinds was not more widely used.

Another non-legislative aspect of shrimp aquaculture organisation which has the potential for encouraging significant improvements in practice is the establishment of associations of those

engaged in shrimp aquaculture. Associations of this kind, if democratically run and fairly representative of the interests of their members, may provide a valuable function in influencing the formulation of shrimp aquaculture policy and legislation and bringing educational and training benefits to members, as well as facilitating collective initiatives on common issues such as distribution and marketing. In addition, a respected association is capable of exerting considerable influence over its members to secure environmental improvements and enhancement of product standards.

Given this range of potential benefits, it is regrettable to note that shrimp producers' associations are not thought to exist in many of the countries surveyed. Where associations did exist, the information that was provided about their activities was rather thin. It was noted in some instances that organisations had an active role in matters such as research, ensuring product standards and improving aquaculture and environmental performance. However, this was exceptional, since most countries were able to provide little or no information about the existence of associations or, if existent, what role they performed.

The fact that shrimp producers' associations rarely exist, and apparently have only vaguely defined roles where they do exist, raises the question whether this represents a legal failing or whether the problem lies elsewhere. The difficulty is that associations, of the kind that are envisaged, are essentially voluntary bodies which have a level of membership which tends to reflect the level of benefits which are brought through membership. Hence, associations are most likely to be successful where they are perceived to bring benefits to individual shrimp farmers and there are no significant obstacles, such as excessive cost, to membership. Because of this, legislation compelling shrimp aquaculture associations to be established is not a realistic or practicable option.

However, there are various ways in which governments may encourage, and provide incentives for, shrimp aquaculture associations which are likely to enhance their membership and usefulness. Financial incentives such as 'start-up' funding might be provided to assist fledgling associations with initial costs and to publicise their activities. Financial support for individual shrimp farmers might be made conditional upon membership of an appropriate association. Education and training provision might be supported through public funding and delivered through associations. Perhaps most importantly, governments should recognise relevant associations as providing a collective voice for the industry in negotiations on matters of national or local shrimp aquaculture policy. Therefore, a general duty upon governments to *encourage* the establishment of shrimp aquaculture associations, supported by tangible measures of this kind, should be a means of improving practice, productivity and environmental performance across the industry.

6.18 Enforcement

By itself, the existence of legislation on any of the preceding matters is no guarantee that actual practice will be changed without some mechanism for implementing and enforcing regulatory requirements on the ground. Arguably, legislation is only as good as its enforcement, since, where legislation is not enforced, its capacity to secure improvements in practice will be greatly undermined.

It is unfortunate, therefore, that sufficiently detailed information about implementation of legislation, and particularly enforcement activities, has not been provided in any response to the questionnaire. Although some responses did provide information about the formal allocation of duties for implementation and enforcement of legislation, these tended to overlap with previous discussion of the respective role of institutions with responsibility for aquaculture, rather than providing any further information about actual enforcement practice where unlawful activities are suspected or identified. Other responses noted that various criminal offences were provided for, and noted the existence of specified penalties for offences, alongside details of the formal procedures which must be followed. However, this information falls well short of an assessment of the actual impact of shrimp aquaculture legislation in practice. Without a means of evaluating the impact of regulation upon shrimp aquaculture practice, the profound difficulty remains that there is no way of assessing how effective legislation is in achieving its objectives.

Despite its importance, it must be recognised that information about enforcement practice and regulatory impact is remarkably difficult to obtain from questionnaire enquiries of the type that were used in this survey. Meaningful comparisons and overall conclusions about the effectiveness of enforcement depend upon information about the staffing and resources of enforcement bodies and their capacity effectively to identify unlawful activities. Having identified an infringement of the law, the policy and practice of the enforcement body needs to be ascertained to establish the circumstances in which an infringement will give rise to legal proceedings and what consequences will follow from these. Perhaps most revealing is information about the degree of compliance with legislation though, again, this is tremendously difficult to gather with any degree of objectivity. Although the questionnaire sought insights into these matters by enquiring about the legal consequences of various kinds of offences which might arise in relation to shrimp aquaculture, the responses that were provided have been insufficiently detailed to support any useful conclusions on the issue of enforcement.

6.19 Other Issues

Although the questionnaire invited respondents to identify issues relating to the regulation of shrimp aquaculture which were not otherwise identified by the questionnaire, no additional matters were identified by any respondent.

Chapter 7 Suggestions for Good Regulatory Practice

7.1 Introduction

Previous chapters of this report, detailing the national legislation concerning shrimp aquaculture in Asian, African and Latin American countries, have provided illustrations of a spectrum of actual legal responses to a selection of key regulatory and environmental issues. General commentary upon the responses has been provided in the previous chapter. Finally, some inferences must be drawn as to which approaches from within the survey and discussion constitute good regulatory practice for shrimp aquaculture. Hence, this chapter seeks to offer suggestions as to what kinds of regulatory approach are most appropriate to shrimp aquaculture.

Although a distillation of a ‘general code of good regulatory and administrative practice for shrimp aquaculture’ from the best examples of actual national practice seems a theoretically attractive approach, the danger of this approach needs to be recognised. The hazard is that of seeking to formulate generally or universally applicable guidelines as to good legislative practice which are addressed to diverse national governments which are at widely different stages in the advancement of their respective shrimp aquaculture industries. Guidance which fails to take sufficient account of the national economic and developmental contexts in which shrimp aquaculture is undertaken will be perceived to be unreasonably idealistic by some countries to which it is addressed and, at the same time, seen as too pedestrian by other countries. Common regulatory guidance, addressed to governments of different countries at different stages of development should, therefore, be formulated and interpreted with some caution.

Because of these concerns, the following ‘suggestions’ for good regulatory practice in shrimp aquaculture have sought to strike a pragmatic balance between extremes. In many respects, particular proposals which are put forward reflect the actual regulatory practice in one or more of the jurisdictions that have been surveyed. In other respects, where a suitable example of good regulatory practice has not been identified from within the national legislation surveyed, the proposals offer a regulatory solution which attempts to reflect the gravity of the environmental or other problem that needs to be addressed and to suggest a proportionate and workable legal solution. Hence, the suggestions which are offered should be seen as a combination of actual and aspirational legal responses.

Nonetheless, the need for the suggestions to be fully considered in different developmental contexts is fully recognised, and the frequent use of the term “appropriate”, in relation to various matters, is intended to draw attention to this feature, and to avoid the impression of propounding categorical obligations where it is important that national circumstances should be taken into account. Sustainable and responsible shrimp aquaculture is the ultimate objective to be sought, and the value of the suggestions for regulation, must be measured against the extent to which they are conducive to the realisation of that objective for any particular nation or locality.

It has been noted that the content of guidance for the practice of shrimp aquaculture will depend upon who that guidance is addressed to (see 2.17 above). Similarly, insofar as these

“suggestions” may be seen as guidance on regulatory practice, the intended addressees should be identified. For the most part, the regulatory and administrative obligations and responsibilities that have been considered, such as the enactment of legislation and the establishment of administrative bodies, are responsibilities of national governments. National governments, therefore, must take primary responsibility for shrimp aquaculture activities that take place within their jurisdiction and the international implications of these activities. It follows that most of the regulatory and administrative suggestions to be outlined are matters that should be considered by governments. However, there are various situations where powers and duties may become the responsibility of devolved bodies and, insofar as such bodies are competent to act, some of the suggestions that are offered may be the responsibility of regional, local or specialised bodies which are placed outside central government. Also, some of the suggestions concern matters on which particular actions are desirable by private bodies and individuals, particularly by shrimp aquaculture associations and perhaps also by individual shrimp farmers.

7.2 The Purpose of Shrimp Aquaculture Regulation

The purpose of shrimp aquaculture regulation is to facilitate sustainable and responsible shrimp aquaculture. This involves a reconciliation of the different objectives that are sought by the various participants: governments, institutions, associations, local communities and individual shrimp farmers. The role of the law is to determine the formal allocation of rights and duties between the participants, to establish rules and procedures and to provide for sanctions against conduct which is unacceptable. Particular laws, therefore, should be conducive to the maximum realisation of national, local and individual economic goals, which is consistent with the imperative of sustainable development and the recognition of obligations towards present and future generations that it entails.

7.3 Sustainable Development

The application of sustainable development to shrimp aquaculture should be explicitly interpreted nationally, and sometimes in relation to local circumstances, so that an authoritative policy statement is available as a guide to the development and conduct of shrimp aquaculture. Where appropriate, sustainable development should also be explicitly interpreted and incorporated as a requirement in particular legislation governing shrimp aquaculture.

7.4 Legislation

It should be legally recognised that shrimp aquaculture is a distinctive and discrete activity requiring specialised legislation which gives appropriate emphasis to its individual characteristics. The most important controls upon shrimp aquaculture should be provided for in specialised legislation which, ideally, should be of a relatively specific character and focused upon shrimp aquaculture activities or, perhaps, coastal aquaculture.

However, the enactment of activity-specific legislation should not preclude shrimp aquaculture being subject to further regulation relating to matters such as land use, environmental and ecological quality, and food safety where these are best provided for within more general regulatory regimes.

The undesirability of over-regulation and the imposition of excessive administrative burdens upon shrimp farmers should be recognised. Mandatory legal requirements which are inappropriate, or disproportionate to their objectives, should be avoided, since these are capable of obstructing effective law enforcement and increasing the potential for corrupt practices.

In general, where mandatory and non-mandatory mechanisms are likely to be equally effective as means of securing a desired objective, the least coercive approach should be preferred. There may also be instances where the level of legal stringency should take account of the different activities being regulated, perhaps, by imposing less strict regulatory requirements on activities which take place on less intensive shrimp aquaculture installations.

Although legal change is desirable where it is needed to keep pace with changes in practice, and to reflect changing environmental and social concerns, all aspects of the legislative process should strive for the highest possible level of transparency. Hence, proposals for new legislation should be the subject of consultation with all interested parties being given the opportunity to make representations which are fully taken into account before any final law is enacted. Where new legislation is enacted, the legal changes and their practical impacts upon shrimp farmers, and others, should be widely publicised in a manner which is most likely to bring them to the attention of those affected. Reasonably sufficient time should be allowed for shrimp farmers to revise and regularise their activities to secure compliance with new legislation.

The enactment of legislation concerning shrimp aquaculture should not preclude the use of non-mandatory mechanisms for the encouragement of increasingly high standards of performance in all aspects of the industry. Moreover, the use of informal or incentive-based measures for the improvement of standards should be encouraged and supported by whatever means are appropriate, but should not be seen as a substitute for legislation on matters of paramount concern to the sustainable development of the industry.

7.5 Institutional Responsibilities

Institutional responsibilities for shrimp aquaculture need to be defined in legislation so that rights and duties relating to policy formulation and implementation, economic incentives, law enforcement, product quality control and the provision of support services concerning research, education and training are clearly allocated to appropriate bodies and authorities.

An unnecessary proliferation of agencies with licensing powers and other regulatory responsibilities over shrimp farmers should be avoided. Bureaucratic obstacles to the development or conduct of shrimp aquaculture are clearly undesirable in imposing unnecessary costs and/or delays upon farmers and undermining the efficiency of administration. Hence, overlaps between administrative responsibilities and procedures should be avoided, perhaps, by the designation of a 'lead agency', to whom all documentation should be submitted and with the power to grant all relevant authorisations after consultation with other bodies and authorities if this is necessary.

In each case, the allocation of shrimp aquaculture regulatory responsibilities needs to be a body or authority which is sufficiently resourced to ensure that its duties are effectively administered by a sufficient number of persons of appropriate expertise. Such bodies need to be empowered to operate at an appropriate level (national, regional or local) to ensure that the tasks allocated to them are effectively discharged.

Measures should be adopted to ensure the maximum level of transparency and accountability in the operation of all institutions. Particularly where regulatory functions such as licensing or enforcement are administered by an authority, it should be subject to a duty to publish a statement of the manner in which its functions will be exercised. Periodically, it should also provide factual and statistical information detailing the manner in which its functions have actually been exercised. Unless a good reason to the contrary exists, an institution should provide access to any information concerning shrimp aquaculture which is in its possession to any person or body requesting that information.

The role of 'interested parties' in the deliberations of institutions concerned with shrimp aquaculture is of great importance. Those engaged in shrimp aquaculture and those upon whom shrimp aquaculture impacts clearly have interests which should be taken into account at all levels: from the formulation of policy and the enactment of legislation to the implementation and enforcement of these at a local level in relation to particular installations. Therefore, institutions should make every effort to establish a 'culture of cooperative participation' whereby all relevant practices are seen to be the outcome of an explicit balancing of interests between the parties involved.

7.6 Devolution of Controls

The level at which legal controls upon shrimp aquaculture are formulated, and the geographical jurisdictions of bodies with relevant administrative responsibilities, are of considerable importance. Matters of primarily local concern may be most effectively addressed by the individuals and communities that are most directly affected, particularly where the special cultural needs of indigenous peoples need to be respected. Hence, in each instance, consideration needs to be given to an appropriate degree of devolution in legislation, the allocation of administrative powers and enforcement responsibilities.

7.7 Acquisition of Land Rights

An appropriate balance between private and public concerns needs to be reached in the allocation and use of land for shrimp aquaculture purposes.

Where the use of land for shrimp aquaculture is primarily determined by possession of appropriate private rights over the land, there needs to be an effective mechanism to ensure that such use does not detract from public interests in the protection of the environment and ecosystems, and that there is no unacceptable intrusion upon the competing rights of others to make use of land.

Where land which is to be used for shrimp aquaculture is within the public domain, there needs to be a mechanism for ensuring that shrimp aquaculture is appropriately undertaken at a proposed location and that the authorisation to conduct shrimp aquaculture at that location is

subject to whatever conditions are necessary to ensure the protection of environmental, ecological, social and other public interests. Hence, where no system of development licensing exists, the mechanisms for allocation of public land should address the same issues as are considered below as development licensing requirements.

The need for public interest protection is particularly prominent where a shrimp aquaculture project, on either private or public land, seeks to benefit from government financial support. The range of public interests which may conflict with shrimp aquaculture development is open ended, but the interference with public rights of access to land or water are capable of being particularly problematic. Where such support is provided, appropriate environmental, ecological and other public-interest conditions should be imposed along with effective mechanisms to ensure continuing compliance with such conditions.

7.8 Development Licensing for the Establishment of Shrimp Farms

Although not distinguished in some jurisdictions, a useful contrast is drawn between the acquisition of land rights for shrimp aquaculture and the need for an authorisation to allow the activity actually to be commenced at a particular location. Where the same objectives are not met by other means, the use of aquaculture development licensing should be encouraged to enable the commencement of shrimp aquaculture activities to be regulated, particularly where they are to be conducted on private land.

Development licensing is particularly important as a means of requiring prospective shrimp farmers to anticipate the potential adverse environmental, ecological and social impacts of the project that is envisaged.

In particular, the authority with responsibility for the determination of development licences should be empowered to consider a licence application in the context of

- (1) National, regional and local policy objectives for the development of shrimp aquaculture and the management of the coastal zone;
- (2) the particular environmental, ecological and cultural characteristics of the locality in which an installation is proposed;
- (3) the representations of relevant interest groups, such as indigenous communities, and members of the public generally, as to the beneficial or adverse impacts of the proposal; and
- (4) the need for environmental impact assessment to ascertain the likely impact of the venture upon the local environment and ecosystem, and consideration of the findings of any such assessment which has been undertaken.

In respect of the last of these, it is highly desirable that the circumstances where environmental assessment is a mandatory requirement in development licensing for shrimp farms should be set out, as precisely as possible, as formal regulatory requirements.

In the final resort, where potential adverse environmental, ecological or social impacts cannot be satisfactorily accommodated by the imposition of appropriate conditions, a development licensing requirement should be used to prevent the commencement of shrimp aquaculture activities in unsuitable locations or to prevent the establishment of an excessive concentration of farms in particular areas.

It should be a legal requirement that, where a development licence is required for a specified kind or size of shrimp farm, or a shrimp farm in a particular area, commencement of shrimp aquaculture in breach of licensing requirements should be subject to a penalty and, perhaps, powers to remove an unlawfully established shrimp farm and to restore the site to its former state.

7.9 Continuing Controls upon Shrimp Aquaculture Activities

Although aquaculture development licensing is an effective means of preventing the initial establishment of shrimp farms at inappropriate locations, it is not always a sufficient means of regulating the various continuing activities that take place at shrimp farms, even where these have been established in accordance with development licensing requirements.

Accordingly, there are a range of further licensing requirements which may need to be imposed to address the day-to-day activities which are capable of giving rise to environmental, ecological and social concerns. These are considered in more detail in the following sections.

Although the proliferation of different licensing requirements that may apply to shrimp aquaculture has regrettably bureaucratic implications, the need for multiple licensing may be justified by the distinct purposes for which different licensing systems need to be imposed. Nonetheless, there is potential for the different licensing systems to be consolidated in a single 'shrimp aquaculture operation licence' which would encompass all the different matters which are relevant to the continuing operation of a shrimp aquaculture installation. This would also offer potential advantages in relation to implementation and enforcement of regulatory requirements insofar as these matters would become the responsibility of a single regulatory authority, rather than being the concerns of a range of separate, and sometimes uncoordinated, regulators. Hence, the need to reduce the administrative complexity generated by multiple licensing should be recognised and the feasibility of consolidating licences systems or adopting a single licence approach should be considered.

7.10 Fresh Water Use Licensing

Where competing demands for water supplies exist, these are most effectively addressed and reconciled by the establishment of a water use licensing system which requires a shrimp farmer to obtain a licence for water use and not to exceed the authorised amount of use or to contravene any conditions to which water use is subject.

As with other licensing systems, the greatest possible degree of transparency in the operation of the water use licensing system is desirable. The licensing authority should be required to make particular licensing determinations against explicit criteria as to how competing demands for water from agriculture, industry and water consumers are to be reconciled against the needs of shrimp aquaculture. Individual licensing determinations should also be the outcome of a participative process which incorporates channels for representations to be made from the different individuals and interest groups involved. These representations should be fully and fairly considered in making any particular licensing determination.

7.11 Wastewater Discharge Licensing

The discharge of wastewater and sediment from shrimp farms is capable of having significant adverse effects upon the quality of receiving waters and the ecosystems which they support. In addition, wastewater discharges are capable of spreading contamination and disease to other shrimp farms which are dependent upon the same receiving waters as a source of water supply. In relation to all but the least intensive forms of shrimp aquaculture, these matters need to be addressed in legislation.

Where the quality of waste water is a matter of concern, the problem may be most effectively addressed by the imposition of a licensing requirement upon waste water discharges from shrimp farms.

Taking proper account of the need for transparency and participation of interested parties in licensing determinations, a suitably empowered authority should be entitled to impose conditions upon the quality of effluent that may be discharged from a shrimp farm, and/or to require alternative methods of effluent treatment such as the installation of sediment collection ponds.

The failure of a shrimp farmer to meet the conditions of a waste water discharge licence should be subject to a penalty, and perhaps a requirement that specific measures are taken to ensure that future effluent quality is satisfactory.

Shrimp aquaculture is entirely dependent upon good water quality and is particularly vulnerable to contamination of water supplies by other activities. Hence, essentially similar regulatory requirements should apply to installations other than shrimp farms, which discharge industrial, sewage and other effluent which is capable of adversely affecting the quality of water which is used by shrimp farms. Where effluent quality parameters from such discharges are exceeded, environmental regulatory authorities should initiate proceedings against the responsible discharger and, where possible, seek compensation for harm caused to shrimp farms.

7.12 Shrimp Movement Licensing

The unrestricted collection and movement of shrimp, potentially over large distances and between different countries, raises various concerns relating to the impact that the collection of stock and the introduction of non-native stock may have upon local ecosystems. Appropriate legal mechanisms are needed to address these concerns and these may take the form of prohibitions, restrictions or licensing measures to regulate the collection of stock from the wild and to control the introduction of non-native stock into shrimp farms.

The introduction of non-native stock is usefully made the subject of prohibition and a licensing requirement so that an appropriately qualified authority may determine whether a specific introduction is capable of having any significant ecological or disease-transmission implications.

The movement of infected stock between shrimp aquaculture installations enables the transmission of disease with potentially devastating consequences for the industry. In all but

the lowest intensity shrimp farms, this concern needs to be addressed by the imposition of licensing requirements over the movement of shrimp stock.

Insofar as shrimp movements are concerned, it is necessary that licensing conditions should require such movements to be fully recorded so that sources of disease may be identified and disease-prevention measures, such as the isolation or destruction of stocks, taken to prevent further transmission of disease. Information of this kind may also be needed to trace the international movements of diseased stock and to report to countries that may be affected or to relevant international bodies.

It must be recognised that the effective imposition and enforcement of disease control requirements imposed under movement licences will require the establishment of a regulatory authority with an especially high level of technical and veterinary expertise, given the specialised nature of the of the issues that need to be addressed.

7.13 Genetically Modified Organisms

The possibility of practical use being made of genetically modified organisms in shrimp aquaculture, outside secure laboratory conditions, is a matter which raises a range of environmental, ecological and commercial concerns which require a strongly precautionary legislative approach.

Whilst legislation governing the use of genetically modified organisms in shrimp aquaculture is rapidly becoming a necessity, given the potential implications of genetic modification across all aspects of agriculture and fisheries, it may be preferable for this issue to be addressed under more broadly-based legislative instruments which regulate the use of genetically modified organisms generally.

Similarly, the breadth and complexity of the issues that are raised may justify the allocation of administrative responsibilities, at national level, to an expert scientific body with the capacity to evaluate applications for the use of genetically modified organisms in shrimp aquaculture in a manner which is consistent with other determinations about the use of other genetically modified organisms generally.

7.14 Chemical Use Restrictions

In addition to the use of waste water discharge controls, the potentially harmful effects of various chemicals used in shrimp aquaculture, in relation to both the environment and the consumers of shrimp products, may be more effectively regulated by the formulation of product standards and use controls for chemicals.

A legal mechanism should exist to prohibit or restrict the use in shrimp aquaculture of chemicals that are seriously harmful to the environment, ecosystems or human health. Where necessary, further similar controls should be applied to prohibit or restrict the import, manufacture, distribution and sale of relevant substances where these activities are engaged in for purposes connected with shrimp aquaculture.

Where pesticides, veterinary medicines, food additives or other chemicals are lawfully used in shrimp aquaculture, further measures should be established to monitor the presence of these chemicals in the broader aquatic environment and to ensure that they are not present in excessive concentrations in shrimp products.

7.15 Food Sources and Utilisation

Sources of food used in shrimp aquaculture should be selected to minimise adverse impacts upon the environment and the use of feeds should be conducted so as to secure minimum feed wastage and nutrient loss to, and contamination of, the environment.

It may be appropriate for legal powers to be provided to national authorities to certify commercial shrimp feed to confirm that undesirable constituents are absent or only present in allowable quantities.

Although the misuse of shrimp feed at the farm level may be effectively regulated by waste water discharge controls, the need for appropriate use of feed may be best addressed within non-mandatory codes of practice addressed to shrimp farmers.

7.16 Product Quality Controls

Shrimp, as a food product, must be subject to a system of public health certification whereby processing, distribution and sale is regulated to ensure the safety of consumers.

Public health and food safety are clearly matters which extend beyond shrimp products, and it is sensible, therefore, that this area should apply consistent regulatory principles to all food products, and be enforced by a food inspectorate equipped with the specialised expertise to ensure that no contaminated product is allowed to enter any part of the food chain.

Initially, public health and food safety should be provided for as a matter of national law, but insofar as shrimp products are intended for export they will also have to satisfy the public health and consumer safety requirements of those countries to which shrimp products are exported.

7.17 The Internationalisation of Standards

In respect of food safety, it will be necessary for those countries that produce shrimp for export to meet whatever agreed international standards are required by the importing countries. Where this necessitates the enactment of national legislation to ensure that such requirements are met, this legislation must ensure that the requirements of the importing country are fully implemented and enforced.

Progressively, the *FAO Code of Conduct on Responsible Fisheries* should become influential in determining the scope and content of national legislation and, as soon as the opportunity arises, countries should give careful consideration to the need to amend national legislation to give effect to the *Code* and, particularly where shrimp aquaculture is concerned, those provisions which have specific application to this activity.

Increasingly, other international measures will need to be implemented in national legislation. The movement of living aquatic animals within and across national boundaries, for example, should be regulated consistently with international standards as provided for in the Office of International Epizooties *International Animal Health Code* and the World Trade Organization's *Agreement on the Application of Sanitary and Phytosanitary Measures*. Also, it is likely that progress in reaching agreements on eco-labels and organic certification standards for shrimp products will mean that national legislation will be required to ensure that the benefits of quality recognition facilities are secured by national shrimp producers.

7.18 Guidance and Producers' Organisations

An important distinction must be drawn between, first, those aspects of shrimp aquaculture which are of such importance that they must be addressed by the imposition of mandatory legislative controls and, second, those aspects of shrimp aquaculture which are desirable as good practice but do not justify regulatory intervention. Where a matter falls into the second category, it is valuable that it should be addressed by non-regulatory means and made the subject of education and training and, perhaps, economic incentives.

Guidelines and codes of practice addressed to shrimp farmers perform an important role in identifying good practice and encouraging adherence to this whilst avoiding the potential adverse effects of unnecessary legal formality. Nonetheless, to be effective, guidance has to have a widely recognised status. This will usually be acquired by it having been promulgated by a body that is acknowledged to have recognised technical expertise and the capacity to formulate principles of conduct which are generally endorsed as being in the best interests of the industry and its participants.

In the first place, the appropriate government department is usually best placed to produce and disseminate guidance on shrimp aquaculture and should in every case give careful consideration to the benefits which may be secured by the establishment of an appropriate code to encourage standards to be raised beyond the minimum required by regulatory provisions.

Alternatively, associations of those involved in shrimp aquaculture have an important collective interest in the quality of the product that they produce and in enhancing the public perception of the industry as being committed to high environmental and ecological standards. Hence, where a shrimp aquaculture association exists, it is capable of performing an important educational and quality enhancement role and influencing its members to maintain the highest possible standards. Accordingly, where no government guidance for shrimp aquaculture has been formulated, a shrimp aquaculture association should establish a code of practice and exert its influence over its members to encourage adherence to that code.

Providing that they are democratically managed and generally representative of their members interests, shrimp producers' associations have the capacity to bring a range of improvements to the practices adopted by their members. However, the relatively small number of such associations which actually exist needs to be addressed by greater governmental encouragement and support through the provision of resources. Although this is primarily an economic issue, it is also important that properly constituted associations are afforded an appropriate legal status. Hence, representatives of producers' organisations should be

consulted in relation to the formulation of shrimp aquaculture policy and invited to express opinions on legislative proposals, and full account should be taken of any views which are expressed in the final policy or legislation.

7.19 Enforcement

Where the enactment of national legislation involves a commitment to expenditure, or the provision of resources for the implementation and enforcement of the legislation, it is the responsibility of the government to ensure that mechanisms are put in place to ensure that the necessary expenditure or resources will be forthcoming.

The enactment of shrimp aquaculture legislation without providing an adequate mechanism for law enforcement is not satisfactory. Moreover, given the specialised nature of shrimp aquaculture, and the corresponding level of technical expertise that must be possessed by those who have the regulatory responsibility for it, the cost of enforcing this legislation is capable of being considerable. Nonetheless, governments must recognise that the potential cost of not enforcing the legislation, or enforcing it inadequately, may be greater still both in environmental terms and in terms of the economic damage to the shrimp aquaculture industry.

Insofar as shrimp aquaculture is the subject of relatively specific legislation, that legislation must be implemented and enforced by authorities which are staffed by a sufficient number of appropriately qualified staff, and provided with adequate resources, to ensure that the legislation is effectively and efficiently resourced. As with other shrimp aquaculture institutions, transparency of operation and accountability of regulatory authorities are vitally important, and authorities must be required to publish information about their policies and practices.

As has been recognised, there are aspects of shrimp aquaculture regulation which are likely to fall under other, more general, systems of regulatory control particularly where matters such as land use, environmental quality requirements and public health are primarily at issue. Each of these areas of regulatory control must be implemented by an inspectorate which has a sufficient number of appropriately qualified staff to ensure that the relevant legislation is effectively and efficiently enforced.

In relation to all practical aspects of regulatory enforcement a key goal should be that of transparency. Enforcement bodies should provide public statements as to the staffing and resources available for enforcement purposes, and uses which will be made of discretion in exercising regulatory powers, such as the circumstances in which prosecution proceedings will be initiated. Public reports should be periodically provided by enforcement bodies documenting the manner in which regulatory powers have actually been exercised and including details of specific legal proceedings that have been brought and the outcome of these.

Appendix 1 : Questionnaire on the regulation of the interaction between shrimp aquaculture and the environment

1. Background

The Food and Agriculture Organization of the United Nations (FAO) *Code of Conduct for Responsible Fisheries* originated at the International Conference on Responsible Fishing, held in May 1992 in Cancun, Mexico, and was adopted during the 28th Session of the FAO Conference on 31 October 1995. The Code covers major aspects of aquaculture within its Article 9 on "Aquaculture Development". In addition, there are also significant provisions in other sections of the Code which have an important bearing on aquaculture and its general developmental context.

The Bangkok FAO Technical Consultation on Policies for Sustainable Shrimp Culture, in 1997, was convened by the FAO Fisheries Department, in support of the implementation of the *Code of Conduct for Responsible Fisheries*, with the purpose of developing guidelines on appropriate legal, institutional, regulatory and economic policies for sustainable shrimp culture. The Consultation produced "a consensus that sustainable shrimp culture is practised and is a desirable and achievable goal which should be pursued. It recognized that effective government policy and regulations, as well as the co-operation of industry in utilizing sound technology were essential for achieving sustainable shrimp culture." The Consultation recommended a number of specific areas for research and, in particular, it advised that FAO undertake, as follow up action, a technical consultation on the legal and regulatory framework for coastal aquaculture.

2. Objectives of the Survey

Against this background, FAO is presently seeking to improve its understanding of how, most effectively, to address various problems generated by the development of shrimp culture in different countries and to assist in facilitating good practice. Pursuant to this, the Legal Office of FAO is currently undertaking a comparative survey of national laws and regulations governing shrimp culture. The purpose of the study is to examine and compare relevant national legislation, particularly legal requirements concerning the environmental impacts of shrimp culture activities and measures applicable in relation to the development of shrimp farming installations, continuing operational controls, legal requirements which apply on the cessation of activities and issues relating to the enforcement of relevant legislation.

Initial indications are that national legislation has been enacted to provide for a range of control techniques including the following:

- ~ The use of environmental impact assessment procedures for watershed management, shrimp pond siting, design and operation;
- ~ The implementation of coastal land use zoning techniques, buffer zones and authorisations involving costing of land or wetland;
- ~ Mangrove management and conservation techniques;
- ~ Environmental quality objectives, environmental quality standards and effluent standards;
- ~ Limited access rights for water and seed (capture of post larvae) shrimp and limits upon introductions of exotic species;

- ~ Pond effluent control techniques involving feed control rations, limited use of drugs, antibiotics and other chemicals;
- ~ The use of trade-related techniques such as product certification schemes;
- ~ Development of user groups agreements, to avoid use conflicts and to allow for effective area management;
- ~ Development of best management practices through codes of conduct and practice; and
- ~ Control over disease transmission through alert warning systems.

It is recognised that this list is not exhaustive and there may be further approaches that have been adopted to address potential adverse environmental impacts which arise from shrimp farming activities.

The countries within the scope of the survey are those that have experienced most rapid growth in the shrimp culture industry in Latin America, East Africa and Asia.

Hence, the purpose of this questionnaire is to ascertain the present state of national regulatory requirements governing shrimp culture in countries within the scope of the survey. This information needs to be gathered in a form which allows comparisons to be drawn between the legislation operative in different countries and enhance understanding of good practice. For this purpose, the following headings have been used for the purpose of identifying key environmental issues which are likely to be addressed in national legislation. In each case, a “general assumption” is made about the broad issue which particular laws may be seeking to address. However, it is also appreciated that different countries involved in shrimp culture have different environmental priorities and perceptions as to which issues need to be most immediately and strictly addressed. Because of this, no particular priority is assumed between the issues that are covered in the questionnaire. Indeed, a final section invites respondents to identify further issues that have not been raised in the body of the questionnaire.

In relation to each section, it would be helpful for respondents to provide a response as to whether the “general assumption” represents a fair assessment of a key environmental issue needing to be addressed. Alternatively, if it is not appropriate, it would be helpful for the respondents to provide a restatement of the issue as it is perceived nationally, or a statement that it is not regarded as a significant national concern. In relation to each question, it would be helpful to receive fairly detailed legal responses identifying the relevant legislation and specific provisions which are directly relevant to the issue raised so that reasonably precise comparisons between different national approaches may be made.

It would finally also be helpful if respondents could point out whether national laws and regulations are available in electronic form, or on line (indicating website).

3. Sustainable Development

A *general assumption* is that all developmental activities, including aquaculture and shrimp farming, are to be assessed according to the imperative of sustainable development.

(1) to what extent has 'sustainable development' been interpreted and applied nationally, in legislation, policy or guidance, with specific reference to shrimp farming or to coastal aquaculture in general?

4. Legislation

A *general assumption* is that the most important controls upon shrimp farming should be provided for in legislation (though this does not preclude other important matters such as information and guidance being provided for outside the regulatory context) and that in some jurisdictions it may be appropriate for specialised legislation to be enacted.

(1) to what extent is aquaculture regulated :

(a) by specific legislation concerning shrimp culture and/or coastal aquaculture (that is, legislation which is separate from that governing related areas such as capture fisheries and other aquaculture activities) ?

(b) under a general fisheries law and associated regulations?

(c) under more general laws concerned with matters such as land use and environmental control ?

(2) to what extent is legislation governing shrimp farming enacted at a local or regional level ? (as opposed to legislation which is of national application).

5. Institutional Responsibilities

A *general assumption* is that an efficient and environmentally acceptable shrimp farming sector needs to be the subject of regulation and that responsibility for this needs to be allocated at different levels depending upon the breadth and character of the issues being addressed and the expertise and objectives of the regulatory bodies involved.

Explain the legal role of the following in relation to shrimp farming in your national circumstances:

- (1) national government,
- (2) federal state government;
- (3) regional or local government,
- (4) specialised regulatory or research bodies, for example, concerned with environmental protection or veterinary medicine,
- (5) producers organisations,
- (6) consumers organisations, and
- (7) international organisations.

(8) insofar as not already addressed, what body(s) has policy responsibility for the development of the shrimp farming sector and what non-legislative mechanisms does it have to realise policy objectives ? (for example, incentive or information-based mechanisms such as funding powers, research facilities, and educational and training provisions).

6. Devolution of Controls

The *general assumption* is that legal and institutional arrangements will progressively support the management of private and local shrimp culture and coastal aquaculture projects under arrangements involving the devolution of leasing and management to local communities and user-groups.

(1) Explain whether such devolutionary mechanisms exist and, if so, their objectives, scope, membership, rules, etc.

7. Acquisition of Land Rights

A *general assumption* is that a person seeking to establish a shrimp farm would need to acquire the necessary land to do so and that this would be a matter of leasing the land from public authorities, buying the land, or a sufficient interest in the land, to establish the venture.

(1) is the acquisition of land upon which to establish a shrimp farm essentially a matter of an individual prospective shrimp farmer acquiring rights to use land for this purpose ?

(2) alternatively, is the acquisition of land for shrimp farming purposes supported by Government or other bodies or organisations with public funds to distribute for this purpose ? (if so, explain what financial grants or other support mechanisms exist to assist prospective shrimp farmers).

(3) is support for the establishment of shrimp farms given by Government or other bodies, if any, made subject to environmental conditions of any kind ? (if so, explain what mechanisms exist to ensure compliance with conditions imposed upon the establishment of shrimp farms).

8. Location Licensing for the Establishment of Shrimp Farms

A *general assumption* is that, after having obtained the necessary land rights to establish a shrimp farm, the actual commencement of shrimp farming activities at a particular location will be dependent upon the obtaining of a licence or authorisation which allows the development of land for this purpose

(1) is a licence is required for the establishment of a shrimp farm at a particular location ?

(2) to what body or person must the application for permission to commence shrimp farming be made ?

(3) what criteria are applied by the licensing body in determining an application for permission to commence shrimp farming activities ?

(4) what mechanism does the licensing body apply to prevent the commencement of shrimp farming activities in inappropriate locations or to prevent the establishment of an excessive concentration of farms in a particular location ? (for example, the use of coastal zone planning

to identify appropriate areas or hydrological planning to ascertain a maximum shrimp farm concentration for a particular watercourse or area of coastal waters).

(5) are special restrictions imposed upon the commencement of shrimp farming in areas that are identified as of particular importance for ecological reasons (such as natural sanctuaries of preservation areas), archaeological reasons or other environmental or cultural reasons ?

(6) what mechanisms are provided for to allow interest groups, or members of the public generally, to comment upon a proposal to establish a shrimp culture installation and what duty is imposed upon the body determining a licence application to consider representations of this kind ?

(7) are any explicit strategic mechanisms provided as a means of resolving conflicts between prospective shrimp farms and other water (including freshwater) users concerned with activities such as capture fisheries, navigation, tourism and industrial and domestic water abstraction ? (if so, what mechanisms exist for the allocation of priorities between different water (including freshwater) and land users ?).

(8) under what circumstances, if any, will a proposal to establish a shrimp farm be subject to environmental assessment to ascertain the impact of the venture upon the local environment ? (if so, what legislation requires this and factors will be taken into account in the assessment ?).

(9) what legal mechanisms exist requiring account to be taken of the social impact of establishing a shrimp farm in a particular location ? (for example, where that location is of importance to indigenous peoples or the common use of local communities).

(10) does a licence to establish a shrimp farm impose any requirements for the restoration of the land to its former state upon cessation of shrimp farming activities ? (or is this otherwise provided for in national legislation ?)

9. Continuing Controls upon Shrimp Farming Activities

Following the establishment of a shrimp farm at a particular location, the *general assumption* is that a range of different kinds of continuing controls will apply to the activities taking place at the shrimp farm and to the quality of the products that it produces. Typically continuing controls of this kind will related to water use licensing, water discharge licensing and shrimp-movement licensing. These are discussed in the following sections.

10. Fresh Water Use Licensing

A *general assumption* is that a person seeking to utilise a source of water for shrimp farming purposes will need a licence to authorise water use for this purpose.

(1) is the abstraction, taking or use of water for shrimp farming activities the subject of licensing control ?

(2) what requirements are likely to apply to a permission to take water for shrimp farming purposes and how is this use reconciled with competing demands for water uses from agriculture, industry and water consumers ?

(3) how are water use licensing systems enforced ?

11. Wastewater Discharge Licensing

A *general assumption* is that discharge of wastewater from significant shrimp farms will be subject to licensing controls, amongst other things, to prevent the contamination of receiving waters.

(1) is the discharge of wastewater from shrimp farming activities the subject of licensing or other control ?

(2) what controls are imposed upon the discharge of wastewater from fish farms (particularly where such discharges may contain sediment or other contaminants which are capable of impacting adversely upon other fish farmers, other water users and the aquatic environment) ?

(3) how are discharge licensing systems, and related water-quality conditions, enforced ?

12. Shrimp Movement Licensing

A *general assumption* is that the unrestricted taking of shrimp from the wild and the escape of non-native cultivated stock into the wild have potentially serious adverse ecological impacts, either through the direct depletion of wild resources or the indirect damage to such resources by disease transfer or the introduction of non-native species which give rise to undesirable ecological competition.

(1) what restrictions or requirements are imposed upon the taking of shrimp or the spawn of shrimp from the wild ?

(2) what restrictions or requirements are imposed upon the movement of shrimp, for farming purposes, in order to prevent the transfer of disease to shrimp farms or the wild and to prevent the escape of non-native species into the wild ?

(3) what requirements are imposed with relation to the maintenance of records of movements of shrimp into and out of shrimp farms and the monitoring of farm stock for the identification of disease.

(4) in the event of the identification of disease at a shrimp farm, what powers exist to require the quarantine or slaughter of diseased stock to prevent the spread of disease ?

(5) what regulatory authority has power to compel such quarantine or slaughter of stock and in what circumstances, if any, will compensation be payable to a shrimp farmer whose farm has been subject to a quarantine or slaughter order and/or related decontamination measures ?

13. Genetically Modified Organisms

A *general assumption* is that the ecological harms previously referred to, which may arise through the uncontrolled movement of stock used in shrimp farming generally, may arise in a most extreme form where there is any possibility that genetically modified organisms used in shrimp farming are present in anything less than the most secure laboratory conditions and, consequently, a strongly precautionary approach is needed in relation to introductions of this kind.

(1) is national legislation in place to prohibit or restrict the use of genetically modified organisms in (non-laboratory) aquaculture practice ?

14. Chemical Use Restrictions

A *general assumption* is that, in some instances, the harmful effects of various chemicals used in aquaculture, in relation to both the environment and the consumers of shrimp products, may be more effectively regulated by product standards and use controls, rather than the regulation of chemical characteristics of wastewater originating from shrimp farms.

(1) what mechanisms exist for the restriction or total prohibition of chemicals from use in aquaculture?

(2) what special measures are applied to prevent or limit pesticides, medicines and other chemicals lawfully used in aquaculture from entering the broader aquatic environment or from becoming present in excessive concentrations in shrimp products ?

15. Food Sources and Utilisation

A *general assumption* is that shrimp feeding practices should involve food sources that minimise impact upon the natural environment and involve minimum feed wastage and nutrient loss to, and contamination of, the environment.

(1) do any controls exist within your jurisdiction as to the substances which may be used as shrimp food and are any restrictions imposed for the purpose of minimising impacts upon the environment due to inappropriate feeding practices ?

16. Product Quality Controls

A *general assumption* is that shrimp, as a food product, will be subject to a system of public health certification whereby movements for marketing and consumption will be regulated for the purpose of preventing hazards to human health and ensuring the safety of consumers. These matters may be provided for as a matter of national public health law, but increasingly they will also be necessary to regulate shrimp production to meet the public health and consumer safety requirements of those countries to which shrimp products are exported.

(1) what system of public health controls apply to the farming of shrimp and the confirmation that shrimp products meet relevant consumer safety requirements as these arise under national law or are imposed to meet international requirements of countries to which shrimp products are exported?

17. The Internationalisation of Standards

The *general assumption* is that shrimp production is increasingly subject to international requirements and standards imposed either to meet international environmental obligations, which must be applied within the producer country, or by way of product standards which must be met to satisfy requirements imposed by particular importing countries or international requirements of general application.

(1) what examples exist of legislation governing shrimp farming which have been introduced for the purpose of meeting international requirements ?

(2) to what extent has national shrimp farming practice been modified in response to international trade concerns or other perceived concerns of this kind ?

18. Guidance and Producers' Organisations

A *general assumption* is that non-mandatory and self-imposed controls adopted by way of guidance or codes of practice may be effective in encouraging those engaged in shrimp farming to improve environmental practice in relation to matters which are not otherwise provided for in legislation.

(1) do any examples exist of non-mandatory guidance or codes of practice relating to shrimp farming which have been provided for in your jurisdiction ? (if so, please give details, such as title, authors, objective(s), scope, etc.).

(2) Assuming the existence of a code of practice or code of conduct:

- (a) what formal administrative mechanisms exist to secure compliance ?
- (b) what incentives exist for compliance ?
- (c) what sanctions or other consequences follow from non-compliance ?
- (d) is any link or reference made between the relevant code and legislation applying to aquaculture ?
- (e) has the code been considered in judicial proceedings, for example, to define good management practice or to identify misconduct ?

(3) to what extent have producers' organisations been established in the national shrimp farming industry and what are perceived to be the role(s) of such organisations ? (for example, educational, research co-ordination, ensuring product standards, improving environmental performance etc.).

19 Enforcement

The *general assumption* is that enforcement is an important element in the legal framework and that legislation should provide for appropriate sanctions in any instance of transgression of laws and regulations.

(1) To the extent which enforcement has not already been covered in responses to previous questions, explain what specific offences and related sanctions (fines, seizures, suspension or termination or authorisations) are relevant to shrimp culture, and indicate what legal consequences follow in relation to infringements of rules concerning the following:

- ~ (a) land rights (for example, illegal acquisition and occupation of coastal lands for shrimp culture purposes);
- ~ (b) unlawful water use (for example, unauthorised water extraction for shrimp culture purposes);
- ~ (c) unlawful waste water discharge (for example, unauthorised water discharge for shrimp culture purposes);
- ~ (d) unlawful collection of fry from the wild;
- ~ (e) unauthorised movement of shrimp between shrimp farms;
- ~ (f) failure to observe reporting requirements;
- ~ (g) prohibited use of genetically modified organisms;
- ~ (h) prohibited use of chemicals; and
- ~ (i) failure to meet product quality requirements ?

(2) What incentives are provided for legal compliance or the realisation of performance standards of any kind (for example, economic incentives such as tax exemption or alleviation or facilitated access to export where environmental or product quality objectives are met) ?

20. Other Issues

Whilst every effort has been made to identify a broad range of issues of relevance to the regulation of shrimp culture, it is recognised that national priorities may differ and that the subjects identified above may not comprehensively cover the range of issues addressed by legislation in all jurisdictions.

Are there other issues relating to the regulation of shrimp farming in your jurisdiction which have not been addressed in the previous sections ? (if so, please give details).

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