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TRADE AND AGRICULTURE DIRECTORATE
FISHERIES COMMITTEE

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ECONOMICS OF FISHERIES AND AQUACULTURE CERTIFICATION

REVISION

This document is presented for DISCUSSION and GUIDANCE to the 106th Session of the Committee for Fisheries 25-27 October 2010, under item 5. i).

Delegates are specifically requested to provide further guidance and direction on the development of Parts 3 and 4. See the Note by the Secretariat.

For further information, please contact:
Nicole FRANZ (Email: nicole.franz@oecd.org)

English - Or. English

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NOTE BY THE SECRETARIAT

This paper is a revised and extended version of the Draft Chapter on Economics of Eco-labels [TAD/FI(2009)18] presented at the 104th Session and version [TAD/FI(2010)5] presented at the 105th Session of the Committee for Fisheries. The paper will be a part of the final Report on Fisheries and Aquaculture Certification which is a major output of the project on Fisheries and Aquaculture Certification.

Part 1 of the present paper is the introductory section of the final Report. It recalls the origin and scope of the overall project, introduces the approach for the Report and spells out some key concepts.

Part 2 of the present paper contains the revised version of the Draft Chapter on Economics of Eco-labels. In light of the discussions during the 104th and 105th Session, Part 2 covers the two main certification categories: (i) privately initiated certification schemes and (ii) government initiated certification schemes. For both categories, the economics and the role of government, in particular with regard to accountability and governance, are at the core of the analysis.

In response to a specific request, Part 3 "Unifying issues" and Part 4 "Messages to policy makers" are already presented in draft form in the this document (and not to the 107th COFI session, as initially scheduled). Both chapters are therefore early drafts. It would be helpful if, at the 106th Session, Delegates have a substantial policy discussion of the issues that eco-labelling in fisheries and aquaculture gives rise to with a view to sharpen the messages to policy makers emanating from the Study. This may allow for an early finalisation of the project. Delegates are specifically requested to provide further guidance and direction on the development of Part 3 and 4.

This paper is presented to the 106th Session for DISCUSSION and GUIDANCE.

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PART 1 – INTRODUCTION

1.1 Origin and scope

1. *Fisheries and Aquaculture Certification* is one project of the current OECD Committee for Fisheries' Programme of Work. The overall purpose of the project is:

- to demystify fisheries and aquaculture certification through increased transparency;
- an improved understanding of the economics of certification in fisheries and aquaculture and
- to support policy-makers in their decisions regarding fisheries and aquaculture certification.

2. The apparent proliferation of certification schemes referring to a multitude of process and product attributes confirms the timeliness of the project. Increased awareness is needed to ensure that all players along the value chain, in particular policy makers, fully realize the costs and benefits of certification and are in a position to prevent potential harm.

3. The above refers primarily to privately driven certification schemes which clearly established the market for eco-labels in fisheries and aquaculture. Governments have been slow in recognizing the importance of this phenomenon: sustainability-related certification is by now an irreversible element of the fisheries and aquaculture industry. As such certification is not an unusual phenomenon in other markets, but private eco-labelling raises potential questions in capture fisheries: the market assumes the authority to 'judge' the appropriateness of public fisheries management systems and outcomes.

4. In June 2009 the OECD Council adopted the 'Declaration on Green Growth' which includes the commitment to *'…work towards establishing appropriate regulations and policies to ensure clear and long-term price signals encouraging efficient environmental outcomes'* and to '*encourage green investment and sustainable management of natural resources.'* The Declaration explicitly invites non-OECD economies, private sector, civil society and other International Organizations to closely cooperate with the OECD on working towards Green Growth.

5. The present paper has been developed in the spirit of this Declaration which will also influence the preparation of the outstanding parts of the final report.

1.2 Approach

6. This paper targets primarily policy makers as it informs about the potential role(s) of governments in fisheries and aquaculture certification with a focus on private eco-labelling. However, it also presents a case for that role which so far has often be overlooked or not clearly understood by all parties involved in the dynamic process of sustainability certification.

7. The envisaged final report[1] will be based on an extensive literature review as well as on an inventory of standards that was developed with support from the OECD member countries and non-member economies. Results of another major component of the *Fisheries and Aquaculture Certification* project, i.e. the *OECD/FAO Round Table on Eco-labeling and Certification in Fisheries held in The Hague in April 2009*, have been incorporated in this paper and will be further reflected in the final report.

8. The final report will consist of four parts and two annexes:

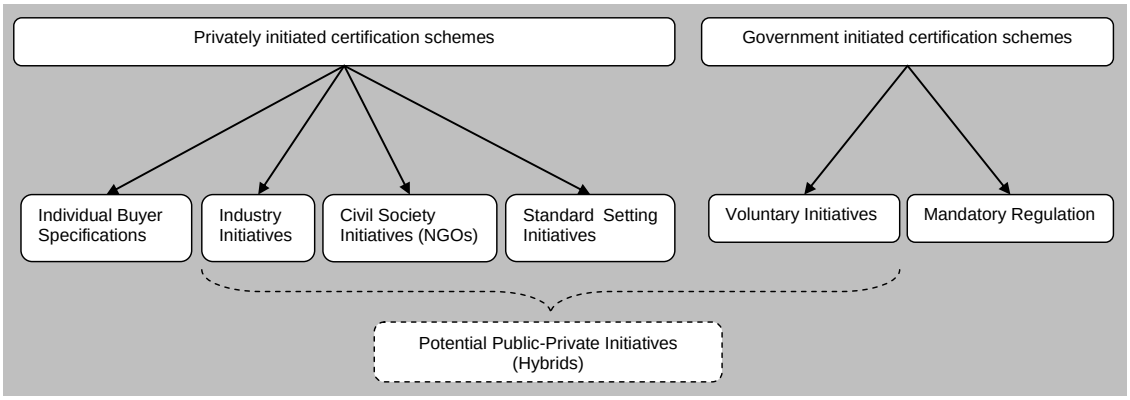
- Part 1 - Introduction
- Part 2 – Economics of Certification Schemes
- Part 3 – Unifying Issues
- Part 4 – Messages to Policy Makers.

9. Annex I provides key definitions related to certification. Annex II will be added to the final draft of this Report to illustrate cost-benefit distribution in eco-labelling based on case studies prepared by Nimmo and Macfadyen (2010) for the OECD.

10. Part 1 (i) provides the origin and scope of the overall report, (ii) describes the approach and (iii) clarifies some key concepts.

11. Part 2 introduces the organising framework for certification schemes and identifies relevant economic and policy dimensions for the two identified key categories, privately initiated and government initiated certification schemes. Figure 1 illustrates this differentiation.

Figure 1. Certification initiatives



12. For the organizing framework the information is presented in a way that allows for the identification of certification categories and related processes and patterns. This organising framework maps the different attributes and objectives and serves as a tool for policy makers and other interested stakeholders to better understand the features of the schemes according to this typology.

1 . The complete draft final report will be presented at the 107th Session of the Committee for Fisheries.

13. For the section on privately initiated certification schemes, a key objective is to articulate and understand the role of the public authorities in private eco-labelling schemes which are at the core of the study. This is complemented by an overview of the recent development of government initiated standards and certification schemes for fisheries and certification, in particular in relation to food quality (in the sense of food safety and hygiene) and to legality.

14. Part 3 focus on unifying issues which apply to the two certification scheme categories, namely (i) the credibility of certification schemes, (ii) policy coherence and (iii) integrated traceability. Part 4 distills key messages from the analysis which require additional policy consideration.

1.3 Some key concepts

15. Terms like 'standard', 'certification' and 'label' are used in a rather in-discriminate manner. A lack of commonly accepted definitions and of agreement on concepts makes it challenging to develop a comprehensive and shared taxonomy. One aim of the present paper is to contribute to the clarification of the terminology.

16. *Capture fisheries* and *aquaculture* are production methods with some common and some very distinct features. While capture fisheries can be compared to hunting, production in aquaculture systems resembles farming of the soil. Moving along the value chain, the policy challenges associated with the post-harvest stages are similar for both production systems. It is the primary production phase that raises completely different policy issues in terms of sustainability, food quality and legality. The following will thus distinguish the specific implications for capture fisheries and aquaculture as appropriate.

17. According to the Codex Alimentarius, *certification* is a procedure by which official certification bodies, or officially recognized certification bodies, provide written or equivalent assurance that food or food control systems conform to requirements. Certification can be considered as a form of quality signaling that can be used to signal specific attributes to the user or consumer of the product along the value chain. A *requirement* is a provision that conveys criteria to be fulfilled (ISO/IEC, 2004). According to the WTO Technical Barriers to Trade (TBT) Agreement, a *standard*[2] is a document approved by a recognized body that provides, for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods. It may also include or deal exclusively with terminology, symbols, packaging, marking or labeling requirements as they apply to a product, process or production method. It can hence be stated that standards provide requirements. It should be noted that in the TBT terminology a standard as such is not mandatory.

18. A standard, the application of which is made compulsory by virtue of a general law or exclusive reference in a regulation, is a mandatory standard (ISO/IEC, 2004). When a standard is declared mandatory it becomes a technical regulation (UNCTAD/WTO, 2002). Generally, a *technical regulation* is a document which lays down product characteristics or their related processes and production methods, including the applicable administrative provisions, with which compliance is mandatory (WTO, 1979).

19. *Sanitary or phytosanitary measures* include all relevant laws, decrees, regulations, requirements and procedures including, *inter alia*, end product criteria; processes and production methods; testing, inspection, certification and approval procedures; quarantine treatments including relevant requirements associated with the transport of animals or plants, or with the materials necessary for their survival during

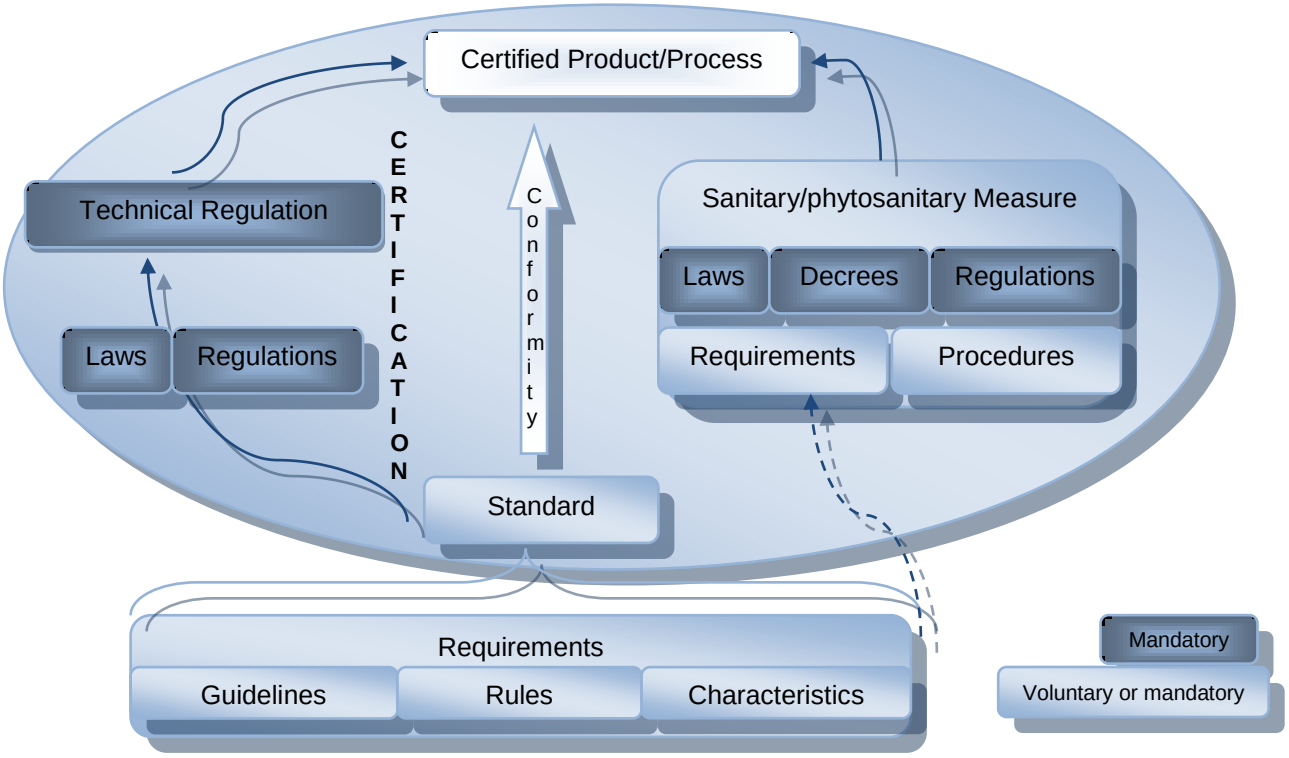
2 . European Commission: In the EU exists three recognized bodies for the drawing up of standards and the EU definition of a standard is given in article 1.6 of Directive 98/34/EC. The present paper however uses the term 'standard' in a less legally binding manner, as explained in the respective paragraphs.

transport; provisions on relevant statistical methods, sampling procedures and methods of risk assessment; and packaging and labeling requirements directly related to food safety (WTO, 1995).

20. In the following the term 'certification scheme' is used in a broad sense to refer to the set of possible combinations of requirements, standards, regulations, sanitary/phytosanitary measures and related verification processes and labels in the seafood sector which are the object of this paper.

21. Box 1 provides a summary of the relationships between the above mentioned key components related to certification.

Box 1. Relations between key components related to certification



Source: OECD

PART 2 – ECONOMICS OF CERTIFICATION SCHEMES

2.1 Introduction

2.1.1 The theoretical framework

22. The economic literature about standards and certification stems from the neo-classical concept of a "market failure" that arises due to asymmetric information and has its origin in particular the work of Akerlof, Stigler and Stiglitz on the economics of information. The economic concept of asymmetric information refers to a situation where one party to a transaction has more or better information than others. This creates an imbalance of power in transactions and adds transaction costs, both of which can negatively affect the efficient allocation of resources. Standards, certification and labeling are potential instruments to increase efficiency in complex imperfect markets and hence correct the market failure.

23. According to economic theory, in a situation of perfect information (on price and quality attributes such as eco-friendliness, food safety or nutritional value) buyers select exactly the desired price-attribute combination in the market or does not buy if none of the offerings is desirable. A precise match between buyer and seller does not occur if information is imperfect.

24. In the presence of information asymmetries, product properties which influence allocation decisions are not communicated properly and impede first best solutions. Attributes of a product can be of three types:

- search (ascertainable prior to purchase),
- experience (ascertainable only after purchase), or
- credence (not ascertainable even after purchase and use).

25. Asymmetric information affects in particular the credence attributes of a good. A credence attribute is a product characteristic which is impossible to ascertain by the buyer/consumer. In fisheries, a typical credence attribute is, for example, sustainable production methods, which cannot be easily verified by the buyer (Cho and Hooker, 2002; Roe and Sheldon, 2007). By disclosing relevant information, standards contribute to the achievement of more efficient market transactions: they enable buyers to make informed choices based on their preferences. Standards are often complemented by certification programs with a view to enhance the credibility and visibility of standard compliance.

26. Buyers have different levels of information and motivations to learn about attributes. Price is usually much easier to determine than quality; price is easy to understand and measure while quality attributes (e.g. taste) may be difficult for the buyer to value. In addition, obtaining information about attributes takes time and effort and hence involves search costs (Nelson, 1970, 1974). The opportunity cost of searching is among other a function of the buyers' socio-economic and demographic profile. As a result, willingness to pay for information and the marginal cost of obtaining it will differ between buyers. Standards, certification and labelling can correct market failures caused by imperfect information.

Standards, certification and labelling in fisheries and aquaculture are a vehicle for conveying information about desirable credence attributes of the product and/or the process. Only if buyers value these attributes they will direct their purchasing behaviour towards these products (Bui, 2005). This expected change in purchasing behaviour is in fact the mechanism that provides the economic incentive behind engaging in eco-labelling.

27. The present paper uses this neo-classical framework as an entry point but combines it with broader political economy analysis to better gauge the incentive structure that determines the behavior of each stakeholder group in the market for fisheries and aquaculture certification.

2.1.2 Political economy analysis

28. The concept of political economy evolved over time from its original definition as *'…a branch of the science of a statesman or legislator'* (Smith, 1776). For the purpose of the present paper, political economy analysis is concerned with *the interaction of political and economic processes in a society: the distribution of power and wealth between different groups and individuals, and the processes that create, sustain and transform these relationships over time* (ODI, 2003). The political economy analytical approach will help to uncover the incentive structures of stakeholders involved in fisheries and aquaculture production, markets and consumers and hence inform how policies are developed and implemented.

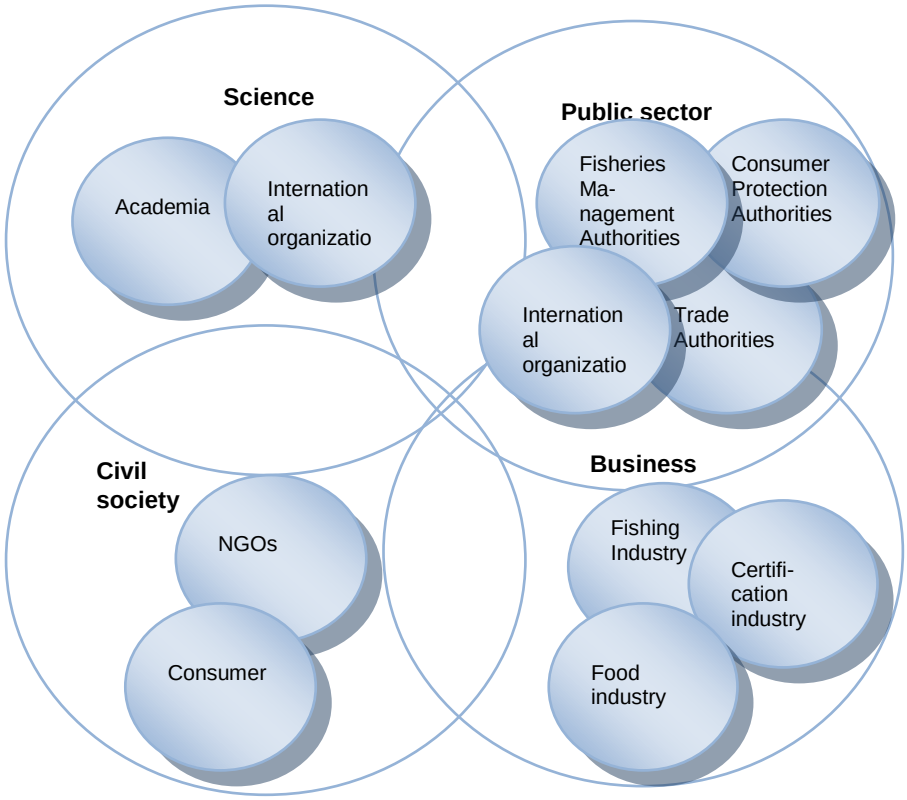
29. Each certification scheme category has specific characteristics and is hence analysed within an appropriate adaptation of the economic framework. Stakeholder analysis is the proposed methodology for this analysis. Originating in business management, this technique is now widely used to identify key interested parties and map their relationships and their influence over economic and policy processes. As stated in Reed *et al.* (2009) *'…stakeholder analysis may serve instrumental ends if it leads to the transformation of relationships and the development of trust and understanding between participants'*.

30. The analytical categorisation of the stakeholders through a Venn diagram identifies the main stakeholders involved in fisheries and aquaculture certification. These stakeholders belong to three major groups: the public sector, business and civil society (Box 2).

31. Institutions are understood as the formal and informal rules of conduct that govern relationships between the different stakeholders. As pointed out by Douglas North in his Nobel Prize Lecture, 'institutions form the incentive structure of a society and the political and economic institutions, in consequence, are the underlying determinant of economic performance' (North, 1993). It is thus important to understand these institutions and their change over time.

32. Relevant stakeholder groups can be broken down as appropriate and their inter-linkages, including power balances, are captured in actor-linkage maps. This descriptive approach supports the analysis of the interaction of these stakeholder groups. Based on the stakeholder analysis, the public-private interface section in each chapter will highlight the roles of public and private players.

Box 2. Key stakeholder groups in fisheries and aquaculture certification



Source: OECD

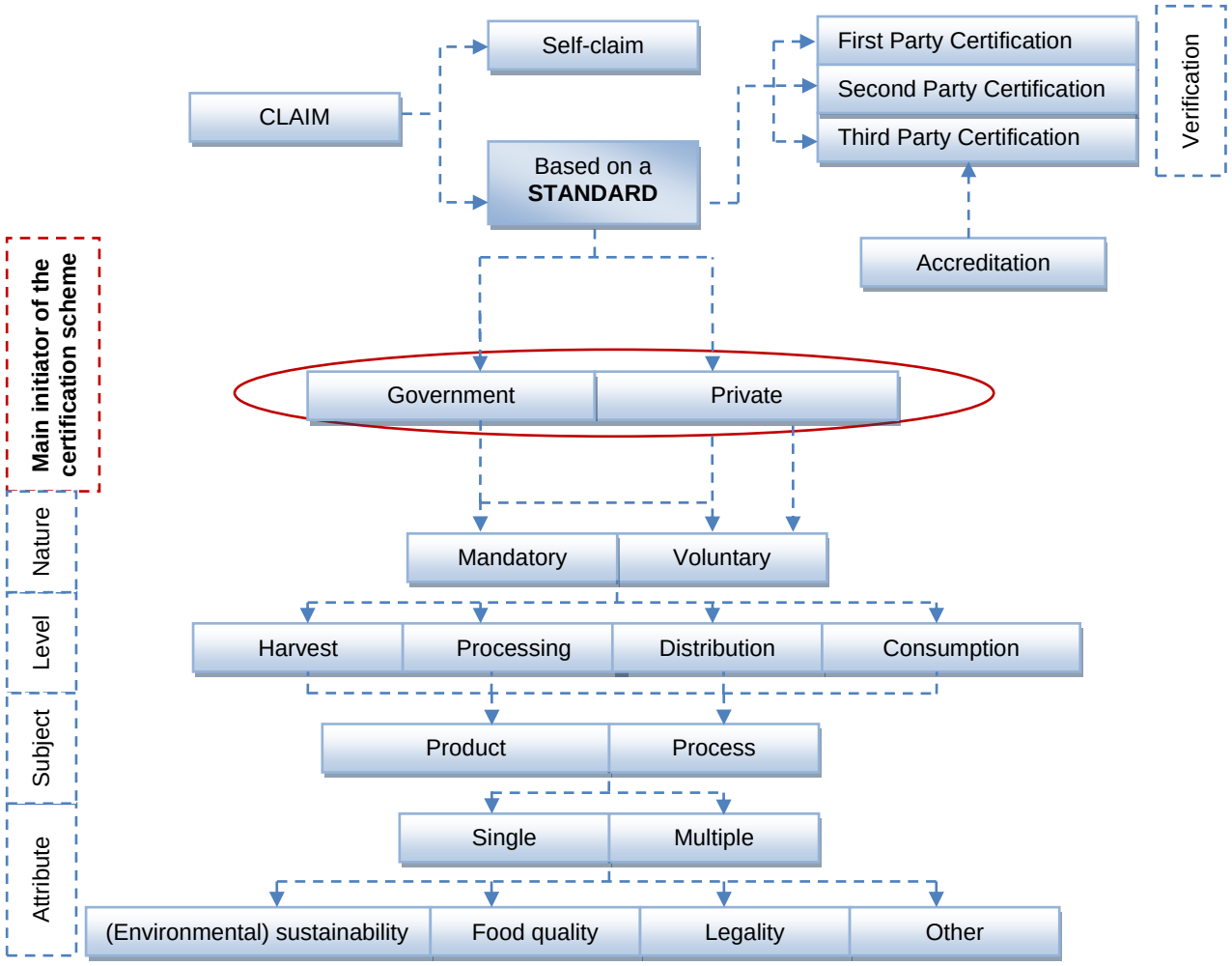
2.1.3 Organisational framework of certification schemes

33. Certification scheme categories have a set of common dimensions which are summarized in the following box (Box 3). The proposed organizational framework is an attempt to structure the existing certification schemes in fisheries and aquaculture as an entry point for a clearer mapping of the situation.

34. The entry point of the schema in Box 3 is a *claim* made by a producer, processor or distributer (wholesale or retail). A claim is basically the assertion of an attribute as a fact. Statements, labels or logos on products, packaging or promotion materials not backed by a standard and a process of verification are considered self-claims.

35. The owner or initiator of a certification scheme can be a government, a public body or a private entity with a specific interest in the fisheries and aquaculture market. The main initiator of a certification scheme is chosen as the key qualifier for this organisational framework and the analysis in section 2. This choice is motivated by the fact that the public-private interface with respect to certification schemes is increasingly dynamic and the understanding of the different roles and responsibilities has important implications for policy making. The distinction between privately-initiated and government initiated certification schemes is complemented by the main attribute that the scheme refers to. However, these schemes move along a continuum and often overlap with respect to the proposed categories. In fact, it is often the case that public and private schemes are closely interrelated, complementary or even reinforcing.

Box 3. Overview of common certification scheme dimensions



Source: OECD

36. The growing interest in certification provides a platform for shaping new relationships between the different stakeholders with an interest in fisheries and aquaculture. For example, the development of the Marine Stewardship Council was the result of an initiative of a private company, Unilever, and an international NGO, WWF. More generally, both private and public institutions can be involved in the certification scheme development and implementation process, in the phases of testing, certification (if applicable) and enforcement.

37. Meanwhile, it is likely that public certification schemes are less responsive to changing conditions than private ones. This is partly because the cost of public scheme development and enforcement is usually borne by the public while private schemes are generally financed directly by the market players, which can more readily react to changing market conditions.

38. The distinction between the mandatory and voluntary *nature* of schemes is important but may have become blurred in recent years due to the nature of some certification schemes in fisheries and aquaculture and developments in the market place. Private schemes are by definition voluntary, but in fisheries certification, some schemes have become *de facto* mandatory. Public schemes can be voluntary or mandatory.

39. Box 3 also illustrates that a scheme may be directed toward a specific stage/level of the value chain, or be applicable through the entire chain. For example, the scheme may focus on the harvesting stage, like in the case of requirements relating to legality, or on the processing and distribution (import/export, wholesale, retail) stage in the case of schemes relating to food quality. Other schemes may be important for the entire value chain communicating an attribute that is valued by all stakeholders, e.g. sustainability.

40. The *subject* of the certification scheme can be a product or a process. Product certification schemes focus on one or more key aspects of the final product (e.g. country of origin). Process certification schemes refer to a particular segment within the value chain but may be extended to cover the entire production process from harvest to consumption i.e. through a life-cycle approach. (e.g. ISO 14000 International Standard series regulating environmental management – Life cycle assessment). There seems to be an overall trend towards process certification or 'meta-systems', often condensed in Codes of Conducts, Best Practices and system management- or life cycle assessment-approach standards (OECD, 2007). As stated in Ponte (2008) this trend bears the risk that 'conformity to systems performance and specific rules becomes more important than achieving the stated objectives of 'sustainability', safe food or fair trade'.

41. Independently from targeting a product or a process, a certification scheme can refer to a single *attribute* or multiple attributes. An attribute is a particular characteristic of a product or a process i.e. the subject of the certification scheme which the seller is keen to promote, and, presumably the buyer is interested in. Most common attributes in fisheries and aquaculture are related to (environmental) sustainability, legality and food quality. Box 4 provides a selection of common fisheries products attributes.

Box 4. Attribute space for fisheries products

Environmental/sustainability
- Organic/Environmental Impact
- Animal Welfare[1]
- Authenticity of Process/Place of Origin
- Biotechnology/Biochemistry

Legal process attributes
- Legality of Production Practices
- Traceability

Food safety attributes
- Foodborne Pathogens
- Heavy Metals and Toxins
- Pesticide or Drug Residues
- Soil and Water Contaminants
- Food Additives, Preservatives
- Physical Hazards
- Spoilage and Botulism
- Irradiation and Fumigation
- Other

Nutrition attributes
- Calories
- Fat and Cholesterol Content
- Sodium and Minerals
- Carbohydrates and Fiber Content
- Protein
- Vitamins
- Other

Value/function attributes
- Compositional Integrity
- Size
- Style
- Preparation/Convenience
- Package Materials
- Keepability
- Other

Sensory/organoleptic attributes
- Taste and Tenderness
- Color
- Appearance/Blemishes
- Freshness
- Softness
- Smell/Aroma
- Other

1. There are different opinions weather animal welfare should be included among environmental/sustainability attributes or not

Source : elaborated from Anders and Caswell 2009

42. The information revealed through a certification scheme can have one or more *addressees*: business partners (business to business standard - B2B), investors (shareholders, financial institutions) and/or the final consumer (business to consumer standards – B2C). B2B schemes are not necessarily communicated to the final consumer and may only be communicated between business partners, thus outside public scrutiny.

43. Table 1 summarizes key features of the proposed certification scheme categories which are analysed in detail in the next sections.

Table 1. Categorization of certification schemes

	Privately-initiated schemes			Government-initiated schemes	
	Eco-labels	**Individual buyer specifications (IBS)**	**Guides**	**Relating to food quality**	**Relating to legality**
Main purpose	(Environmental) sustainability	Sustainability and quality	Consumer behaviour	Food safety and hygiene	IUU fishing reduction
Single/multiple attribute	Both	Both	Single	Both	Single
Subject	Product, process	Product, process	Product	Product, process	Product, process
Nature	Voluntary	Voluntary[1]	Voluntary	Mandatory, voluntary	Mandatory
Certification[2]	1,2,3	Usually 1 or 2	-	1,2,3	X
Labelling	x	possible	-	possible	less common
Main addressee	Consumers, B2B, Investors (CSR)	Consumers, Investors (CSR)	Consumer	B2B, Consumers	Importers, B2B

1. Individual buying specifications as such are voluntary. However, for suppliers of the buyer they actually are mandatory as non compliance will result in the interruption/impossibility to start business relations.

[2] 1,2,3 = First, second or third party certification: *First party certification:* self-declaration of conformity with self-set standards by the company making the claim; *Second party certification:* verification through an affiliated body, e.g. an industry/trade/consumer association, usually against standards established by these bodies or by peers; *Third party certification:* conformity assessment and audit by an independent inspection body/individual, preferably an accredited auditing body, but potentially also by other external entities against a standard.

2.2 Privately initiated certification schemes: eco-labelling

44. Privately-initiated certification schemes in fisheries and aquaculture potentially cover a broad range of product and process quality attributes (*e.g*. sustainability, organic production, origin). Given the primary importance of sustainability-related private certification in fisheries and aquaculture, this chapter will focus only on eco-labelling.

2.2.1 What it is about

45. The current financial and economic crisis has intensified the critical discussion of dominating economic theories. Current models assume profit-maximizing individuals with 'more is better' preferences. Progress in these models is normally associated with economic growth and measured usually in terms of monetary income indicators like the GDP. This approach, however, has shortcomings as it neglects among others the cost of the depletion of natural resources and externalities to society. The basic economic assumption of utility maximization is not necessarily challenged as such in the current debate but the variables included in individual and societal preference functions are changing, as is presently the case in the OECD debate on how to ensure green growth.

46. Markets based on natural resources are particularly affected by the paradigm modification as individual and public awareness of unsustainable production and consumption practices, in particular in terms of environmental implications, is growing. Economic concepts like 'existence value' and 'bequest value' linked to the non-use of resources are examples of the trend to attribute monetary value to environmental variables which were previously excluded from economic models.

47. In 1991 the OECD defined "environmental labeling" as 'the voluntary granting of labels by a private or public body in order to inform consumers and thereby promote consumer products which are determined to be environmentally more friendly than other functionally and competitively similar products'. In 1992, the UN Conference on Environment and Development (UNCED) incorporated the concept of eco-labelling in the Agenda 21, an instrument developed during that conference. Agenda 21 includes one chapter dedicated specifically to 'Changing consumption patterns' which invites governments to 'encourage [the] expansion of environmental labelling and other environmentally related product information programmes designed to assist consumers to make informed choices'(UN 1993).

48. Private certification in fisheries and aquaculture through eco-labeling is a direct result – or better, a driver - of this trend as it promotes and values sustainable production and consumption patterns in times of growing concern about over-fishing and the loss of biodiversity. In addition, such label connects producers to consumers. A recent survey[3] shows that in 2008, 13% of 1 352 new launched fish products had an environmental or ethical claim – compared to an average of only 5% of all new food and drink products covered by the survey.

49. Figures 2 and 3 illustrate the growth of the two main private fisheries eco-labels, Marine Stewardship Council (MSC) and Friend of the Sea (FoS).

3 . Seafood International, February 2009, page 18

Figure 2. Volume of MSC certified fisheries

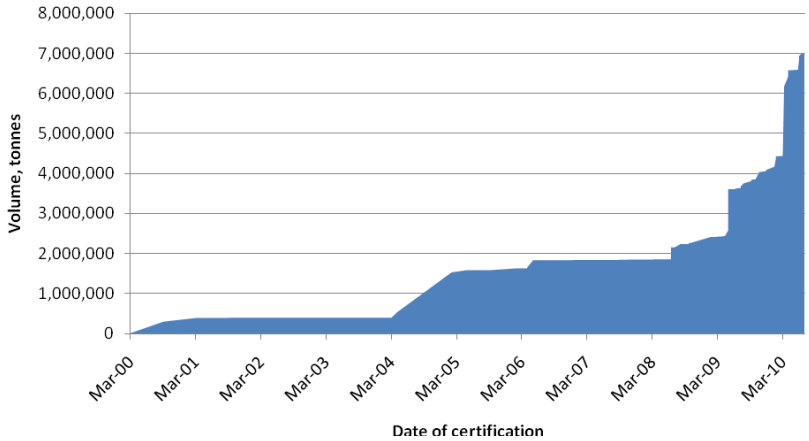
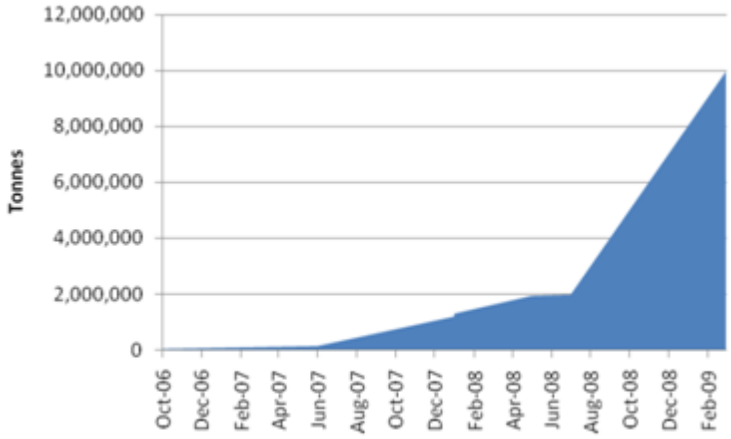


Figure 3. Volume of FoS certified fisheries



Source: Nimmo, F. and Macfadyen, G. (2010)

50. In the latter part of 1990s, NGOs started producing sustainable seafood consumer guide[4], eco-labels and certification schemes - primarily as a response to the perception that public mechanisms were failing to adequately address the resource management challenge. The overall objective of these efforts is to steer market demand towards sustainability.

4 . These guides often come as pocket booklets with the intention to guide consumers in their daily seafood purchases. They are regional or local in scope but global guides are also available. These guides are not included in the following analysis as they are usually not backed by specific standards. They usually build on a 'punishment approach' by providing black lists rather than generating incentives for improvements in fisheries management and/or production (Roheim and Sutinen 2006). However, it has to be recognized that they play a role in consumer education and the shaping of purchasing decisions. The developers of buyer guides use innovative communication methods to reach out to consumers: just to name two, the Monterey Bay Aquarium and the Environmental Defense Fund guides are available as free iPhone applications while the Blue Oceans Institute has an on-demand text message service which provides timely information on the sustainability of fish species.

51. Since then, however, sustainability has turned from an NGO-buzz word to a key sourcing requirement for companies in the fishing and aquaculture industry and has triggered a large amount of different interpretations by competing certification scheme initiators. The absence of an internationally agreed definition of sustainability facilitates an agenda-driven use of the term by NGOs, certification schemes, industry players and other stakeholders.

52. At the same time, despite increasingly engaging with NGOs or industry associations in developing seafood certification schemes, retailers, processors and distributors complain about 'eco-label noise'[5] as this has potential cost implications.

53. Concerning specific sustainability certification in fisheries it should however be noted that there are currently very few internationally operating schemes and that the perception of 'noise' is likely to be caused by the overall wealth of labels and claims – often based on single issues - applying to fisheries and aquaculture products.

54. In its original sense, sustainability refers to the capacity to endure. It is a concept that refers to long-term dynamics i.e. development that meets the needs of the present generations without compromising the ability of future generations to meet their own needs (Brundlandt, 1987). This definition, which is embraced by the OECD, includes three dimensions of sustainability: economic, environmental and social sustainability. Applied to fisheries and aquaculture, the focus of sustainability is primarily on environmental sustainability: protecting the resource itself (fish, mollusks, aquatic animals and plants etc.) and managing negative impacts on the surrounding eco-system (e.g. reduction in biodiversity, destruction of marine habitats). Meanwhile, and with a view to promote a certain level playing field across the variety of label schemes, the FAO has developed voluntary *Guidelines on Eco-labelling of Marine Fishery Products* as a key reference for standard developers. It remains, however, that there is no agreed definition of sustainability with regard to fisheries and aquaculture. As a result, it is difficult to compare the various eco-labels that are in use for fish and fish products.

55. Private certification schemes in fisheries and aquaculture eco-labelling are mostly public whereas schemes dealing with food quality (safety and hygiene) or legality are primarily public.

56. While capture fisheries and aquaculture production both have environmental impacts that can become the focus of certification, the nature of the two production systems is fundamentally different. Private eco-labelling in capture fisheries raises a set of questions related to the common pool resources managed by public authorities. Aquaculture production on the other hand is a private activity based on private property, like agriculture, but with externalities that impact public goods, e.g. water bodies.

57. As mentioned before, eco-labelling in the seafood sector started in the capture fisheries sector as a response of the private sector to the perceived failure of fisheries management. Driven by the increasing importance of the concept of sustainability in the seafood sector, the concept of eco-labelling eventually spilled over to the aquaculture sector. However, while the focus of eco-labelling in capture fisheries is mainly on stock conservation, the aquaculture eco-labelling focus on the potential negative externalities generated by aquaculture production. Increasingly, social and animal welfare aspects are also included in aquaculture sustainability schemes. As a consequence, aquaculture certification schemes promote a different 'sustainability' than in capture fisheries, thus adding a new layer of confusion in the market.

58. Some NGOs have developed standards and labelling schemes for organic aquaculture of certain species. However, these have remained rather limited in terms of application (Franz, 2005). At the global level, two major certification efforts are currently consolidating their position, the Best Aquaculture

5 . OECD 2009[a]

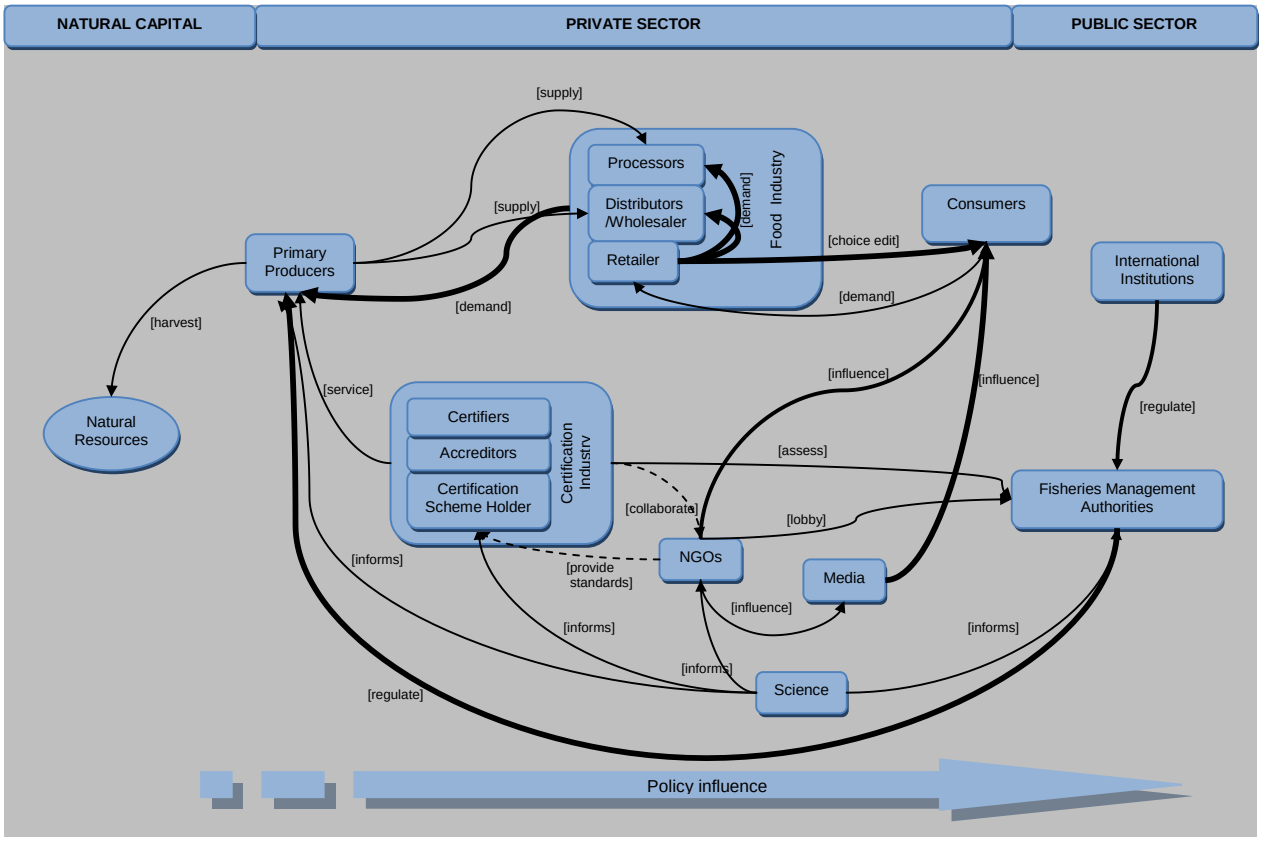
Practices of the Global Aquaculture Alliance and the WWF Aquaculture Dialogues. In addition, inspired by the model of the Marine Stewardship Council for capture fisheries, the Aquaculture Stewardship Council will be operative in 2011. Concurrently, the FAO is currently developing Guidelines for Aquaculture Certification, which should provide a level-playing field for existing and future certification schemes.

2.2.2 Economic aspects of eco-labelling

2.2.2.1 Key stakeholders in the market for eco-labelling

59. The following paragraphs provide a stakeholder analysis to better understand the different incentives behind eco-labelling in fisheries and aquaculture. The role of the public sector is dealt with in section 2.2.3. Figure 4 maps key relationships between the different players.

Figure 4. Actor-linkage map: Eco-labelling in fisheries



Consumers

60. With regard to the demand side, a number of studies on hypothetic and contingent[6] seafood markets show that, on average, final consumers express a preference for eco-labelled seafood (Roheim, 2008; Roheim and Sutinen, 2006). It should be noted, however, that the understanding and knowledge of seafood sustainability issues among consumers is usually rather limited. The sensibility towards these issues is a function of socio-economic variables such as the level of education and income.

61. However, other studies reveal that actual consumer purchasing behaviour in the marketplace is not always coherent with stated preferences in surveys and with theoretical findings (Vermeir and Verbeke, 2008). As cost transmission of eco-labelling is imperfect, the industry therefore has to build affordability into the equation of sustainable sourcing policies as prime premiums are not guaranteed. Price remains a major criterion in purchase decision making and the large number of product claims generates confusion rather than information for the final consumer. Consumer education remains an important issue for all stakeholders: the public sector, NGOs as well as for the fishing industry itself to reap potential market benefits.

62. As seen before, certification stems from resolving the market failure arising from information asymmetry. It should allow consumer to make informed choices. This ideal of closing the information gap and letting supply and demand adjust accordingly must be balanced against the cost of the confusion that has arisen due to the large number of labels and campaign which generate 'market noise'.

The food industry: retailer, distributors, wholesalers, processors

63. Confronted with an overload of information, consumers are generally subject to a pre-selection process by the food industry, in particular retailers, with respect to product quality attributes, *i.e*. so-called 'choice editing'. Choice editing endows processors, distributors and retailers a high level of power in the supply chain. *Individual Buyer Specification* (IBS) as a sub-category of privately initiated certification schemes, is closely tied to the choice editing function of the modern food processing and retail sectors.

64. Major agro-industry players have introduced *de facto* standards for key commodities. To cope with increasingly stronger competition, the seafood sector is catching up with this phenomenon and patterns and requirements in national and international fisheries trade systems are changing accordingly.

65. While some companies simply include certified products from existing eco-labelling schemes in their purchasing policies, others develop their own individual buyer specifications. One justification for the development of IBS is the lack of sufficient supplies of certified seafood. The procurement requirements of an individual company can consist of in-house developed product/process requirements or build on existing certification schemes – or a combination of both. They hand down the demand for certification along the chain, from the retailer to distributers and processors and to the primary producers who have to ultimately provide the sustainability proof.

66. IBS represent a form of 'competitive disclosure' (Golan *et al*., 2000) to signal the additional commitment towards sustainability to consumers, business partners, investors and the public. They often belong to a broader set of corporate social sustainability commitments, which are displayed to the public in Corporate Social Responsibility (CSR) reports. In addition, one way for retailers to minimise their exposure to risks is through demanding certification from their suppliers. Details of sourcing requirements are, however, in most cases kept confidential. At a broader scale, it can be observed that retailers are

6 . Contingent valuation or stated preference modelling is an economic technique using surveys to evaluate non-market resources like environmental conservation. This method often uses willingness to pay as an assessment tool.

reacting to the proliferation of eco-labels for all types of products and rather develop own ecological brands. This can reduce compliance costs and buyer confusion if buyers trust the brand to embody the desired product qualities.

67. IBS can be very basic (e.g. exclusion of certain species in the product range, minimum sizes per species) or extremely complex which might, for example, also include specifications for labour conditions. The companies also decide on the type of compliance verification (first, second or third party certification) if this is not regulated as part of an existing standard that they apply. Some companies – and industry organizations (e.g. the US Food Marketing Institute) - have appointed dedicated 'seafood sustainability' managers or divisions, reflecting the long-term importance the industry attributes to the issue. In many cases, there are specific sections on sustainable seafood sourcing on the companies' website.

68. IBS should be distinguished from self-claims regarding seafood sourcing policies. For instance, statements like 'sustainably harvested' leave ample room for interpretation if not tied to a specific verifiable set of rules backing that claim.

Primary producers: fishers and fish famers

69. The primary producers in capture fisheries and aquaculture are thus heavily influenced by the processing and distributing industry. Primary producers are increasingly subject to compliance with the private standards to establish or maintain business relations, to an extent that in many cases they have become *de facto* mandatory for them. They are 'standard takers, while the industry together with NGOs, the industry and the certification industry are the 'standard makers'. The expected positive impacts of eco-labelling for primary producers in terms of access to new markets, price premiums or improved market position have not been confirmed yet through empirical research – even after more than 10 years of experience. Rather, primary producers have to provide certified products to the food industry if they want to stay in the market. The incentive for primary producers to adopt eco-labelling is hence primarily a reaction to changing supply chain arrangements towards more strategic relations. The existence of competing schemes with different assessment criteria and sustainability definitions gives primary producers the possibility to choose among them according to their needs.

NGOs

70. The development of eco-label standards in fisheries and aquaculture started in the private domain, in particular by environmental NGOs, with a view to influence consumer behaviour, put pressure on primary producers and on processor and distributor sourcing policies and thus ultimately seeking to induce changes in fisheries management policies. NGO campaigns on sustainable seafood sourcing combined with a growing public awareness of sustainability already succeeded in transforming the seafood purchasing policies of major retail chains. The media play an important role in amplifying the NGO messages.

71. There is pressure, mainly from NGO's, to broaden the scope of standards to include issues which go beyond fish stock sustainability. Topics like energy efficiency (e.g. carbon foot print, food miles), waste handling/product loss minimization, sustainable packaging (e.g. biodegradable or recyclable materials; space efficiency), animal welfare and social issues (e.g. fair trade) could be included in future multi-attribute standards for a sustainable fishing and aquaculture industry (Box 5). In this regard, carbon foot print labelling is likely to be the fastest growing area. In the meantime, the current debate centres on the conflict between broadening the scope of certification schemes/label vis-à-vis the information overload for consumers and the complexity of dealing with multi-attribute certification in the supply chain. Such further 'specificities' of the certification schemes may also serve to further promote the particular value sets of NGOs and make them more visible.

Box 5. Carbon footprint, food miles, water foot print, life cycle assessment - the next certification frontier?

Existing eco-labelling schemes in fisheries and aquaculture focus primarily on the status of the stocks (in capture fisheries) and on direct environmental implications. But the concepts of *carbon footprint* and *food miles*, which originate in the climate change debate, receive increasing attention in an increasingly integrated vision of evaluating fisheries and aquaculture sustainability.

The concept of carbon footprint relates to how much greenhouse gases are emitted for the production of a good or service through the combustion of fossil fuels. It builds on a life cycle assessment approach and is usually expressed in CO2/unit of product/service. In capture fisheries, fuel consumption for vessel propulsion and on-board processing and storage facilities, in particular (leakages of) cooling equipment, of the global fleet generates considerable greenhouse gas emissions. Declining stocks force vessels to go on longer trips for harvesting, increasing fuel consumption. Certain widely used fishing techniques like bottom and beam trawling and dredging are very fuel-intensive. Tyedmers *et al.* (2005) estimated that the global fleet accounted for 1.2% of total global oil consumption in 2000. In aquaculture, the use of fishmeal contributes heavily to the carbon footprint of the final product.

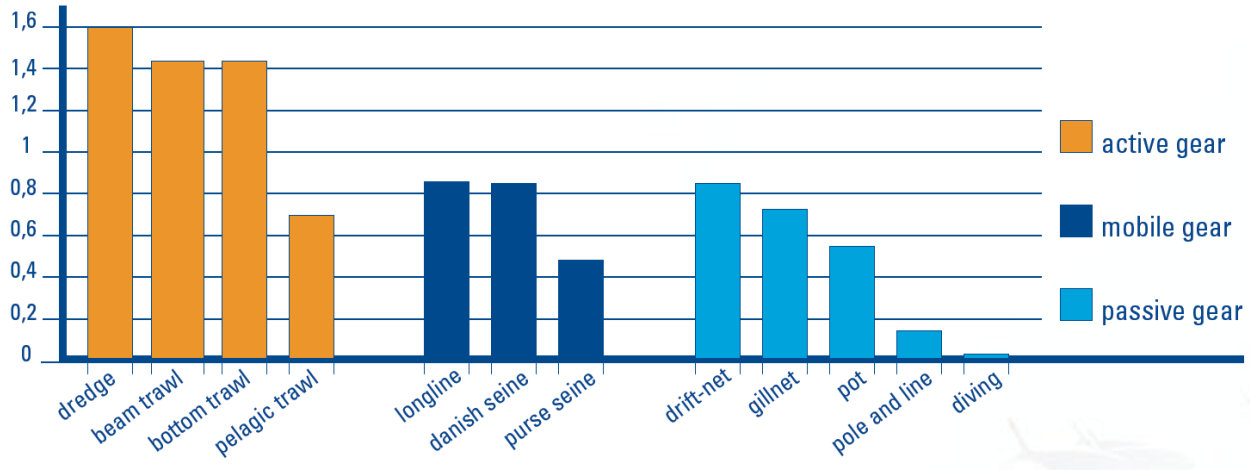
Transportation, in particular air freight, is another major contributor to the carbon footprint of highly traded fishery products. The environmental impact associated with the transport of food items from the producer to the final consumer is usually captured under the concept of *food miles*.

In 2007 Friends of the Sea has developed a *Seafood Carbon Footprint Calculator;* in 2008, DEFRA, BSI British Standards and the Carbon Trust launched *Specification for the assessment of the life cycle greenhouse gas emissions of goods and services (*PAS 2050) in the UK and first studies on the carbon footprint of seafood are available (*e.g*. a SINTEF study covering 22 Norwegian seafood products published in 2009).

A concern in addressing the emissions associated with fisheries and aquaculture is that other considerations (environmental or otherwise) are not overtaken by the single objective of reducing emissions. There is much potential for such a focus, especially when using simplistic indicators such as food-miles, to result in net negative environmental impacts. Life Cycle Assessments can take into consideration a wider set of impacts (environmental, social, economic) but may complex to implement and monitor.

Sustainability is an evolving, dynamic concept: for certain aquaculture production systems, the *water footprint* assessing water consumption could become another area under scrutiny. The *energy footprint* is another environmental impact concept that may enter the fisheries and aquaculture sustainability debate in the future.

Overall impact of gear: size and species selectivity, habitat impact, non-commercial by-catch and carbon emissions per kg of fish



Source : ICES (2006), Report of the ICES-FAO Working Group on Fishing Technology and Fish Behaviour

The certification industry

72. The certification industry also needs to be considered. This industry consists of three main elements: certification scheme holders, certifiers and accreditors. In many cases, standards are developed with broad stakeholder involvement or by other stakeholders (e.g. NGOs).

73. The concept of third-party certification should be briefly outlined here. Third-party certification refers to a procedure through which an independent third party provides written confirmation of compliance of a product with certain requirements. The capacity of a body that carries out the certification should be evaluated by an accreditation body – which can be a public body, a national or an international accreditation body or even the standard-setting body itself. International standards for auditing and accreditation exist (e.g ISO/IEC Guide 65:1996 – General requirements for bodies operating product certification systems). The accreditation of certifiers is usually the responsibility of independent accreditation bodies and standard owners have limited, if any, control over who actually carries out the audits.

74. The certification industry has an obvious interest in the broad presence of certified products. The absence of an internationally agreed benchmarking system for fisheries and aquaculture eco-labelling and unclear terminology (including a lack of an agreed definition of "sustainability") enables standard setting organizations to differentiate themselves and stay in the market while the overall stated goal for all schemes is 'sustainable' fisheries and aquaculture. As the definition of 'sustainability' varies from scheme to scheme there is a wide difference in the duration, extent and cost of the certification process among them. In essence this has allowed the development of several business models. Recent studies have reviewed the scope and criteria adopted by different private fisheries and aquaculture certification schemes which will therefore not be repeated within this report (*e.g.* Macfadyen and Huntington, 2007, 2008 and 2009).

International organizations

75. International organizations can provide a level playing field for fisheries certification harmonization. The FAO *Guidelines for the Ecolabelling of Fish and Fisheries Products from Marine Capture Fisheries* have been developed in response to the emergence of private certification schemes. They provide a set of voluntary minimum requirements and criteria, including procedural and institutional aspects.

76. A missing piece in the fisheries and aquaculture eco-labelling landscape is a benchmarking system for eco-labelling schemes. During the last sub-COFI meeting on Trade in 2010 FAO was asked to develop a benchmarking framework to assess the conformity of eco-labelling schemes with the Guidelines.

77. The FAO continues its effort to provide internationally agreed guidelines for eco-labelling as a reference point for standard development and for standard evaluation and comparison. Technical guidelines for aquaculture certification are expected to be approved in late 2010 and guidelines for the eco-labelling of fish and fishery products from inland capture fisheries are under development. Amendments to the Guidelines for the Ecolabelling of Fish and Fishery Products from Marine and Capture Fisheries were adopted in 2009.

78. Table 2 provides a short summary of some features of the main stakeholders with respect to eco-labelling.

Table 2. Stakeholder groups: Eco-labelling

	Public sector	Fisheries and aquaculture industry	Consumers	Certification industry	NGOs
Incentive for eco-labelling and sustainability (Stake)	Resource conservation, consumer protection, food security, sector maintenance for employment	Sustainable supply, marketing advantage, brand protection	Environmental and health considerations	Main business activity	Environmental, animal welfare and health considerations
Potential alliances with other groups	Yes	Yes	Yes	Yes	Yes
Dominant time horizon	Long (but potentially subject to election cycles)	Short	Short	Short	Long
Ability to affect the policy process through power or relationship	High	Relatively high	Medium	Modest	Relatively high

2.2.2.2 Equity of certification: cost-benefit distribution and market access

79. Current private eco-labelling schemes for capture fisheries are more affordable for already well-managed and large-scale fisheries, which can benefit from economies of scale and have data collection and management systems in place. Small-scale and data poor capture fisheries on the other hand may have difficulties to comply with certification requirements. The specific implications of certification for developing countries will be summarized in Chapter 3, but the overall question that raises is how governments should prioritise resource allocation (if they decide to engage in certification): should they help smaller operators to allow them to compete and thus create a level playing field? And should transitional fisheries be eligible for certification? Should support go primarily to poorly performing fisheries where the need for improvement is greatest?

80. These considerations are closely linked to the potential implications of private certification on market access, in particular for developing countries. The WTO has realized the growing power of private eco-label schemes. In 2009 the WTO established a dispute settlement panel to examine the WTO compatibility of voluntary product labelling in the USA-Mexico tuna-dolphin dispute, a first of its kind. During the OECD/FAO Round Table on Eco-labelling and Certification in the Fisheries Sector (The Hague, April 2009) it was also questioned whether public sector financial support for eco-labelling certification could be considered a "subsidy" and/or notifiable in the context of WTO mechanisms. In the same vein, delegates raised a number of questions:

- When governments pay outright for certification is that a subsidy?
- If it leads to a trade advantage or improved market access, should it be WTO notifiable?
- Can such an allocation of public funds and a subsequent certification be defended in the presence of fuel subsidies and fleet overcapacity?

81. Should private certification become *de facto* mandatory for suppliers it represents an additional 'cost of doing business' in international seafood markets. Major cost items related to eco-labelling are initial assessment costs, potential adjustment costs and regular licence/logo fees and inspection costs. The

cost of certification depends on the certification requirements of the scheme and is widely different but is, as a rule of thumb, proportionate to the robustness of the scheme. While the unit of certification in capture fisheries is usually based on a gear type, a fleet segment or a specific stock, it is usually a farm or a cluster of farms for aquaculture.

82. Eco-labelling shifts most of the cost burden of providing and transmitting information to the initial stages of the supply chain. The distribution of (monetary and non-monetary) costs and benefits within the private sector is critical; primary producers often feel disproportionally burdened by additional or more stringent regulations that may be a consequence of certification. Benefits, at least in the short term, on the other hand are more likely to accrue to players at the other end of the value chain, in particular to the retail industry. The expected long-term benefit of healthy stocks is supposed to benefit all players along the value chain: the primary producers in terms of reduced production costs due to stable stocks, the industry in terms of stable supply and the public sector in terms of resource conservation goals. Also, it is likely that benefits are diffuse and spread while those burdened by costs are more easily identified and concentrated on fewer producers.

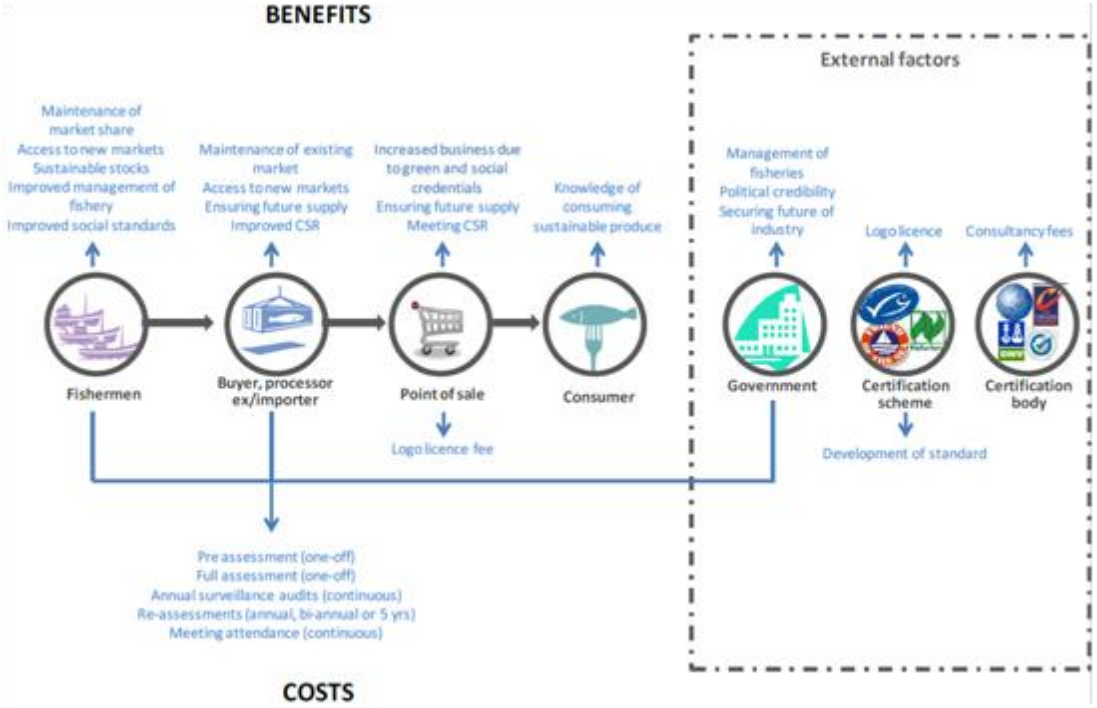
83. Initial assessment costs and potential adjustment costs in the case of capture fisheries[7] are likely to burden, at least partly, public budgets. This will in particular be the case if the certification requires changes to the management system (or e.g. collection of additional data/information). If fisheries seeking certification fail because the assessment process reveals deficiencies in the overall public management of fisheries - a government responsibility - should governments foot the bill? Is it possible to develop a formula whereby industry pays the component of certification that relates to private benefits (e.g. price premiums, market access and consolidation), and government pays the component that relates to its responsibilities to manage marine resources.

84. The OECD/FAO Round Table identified the need for further research into the cost and benefits of fisheries certification with a particular focus on *who pays for what and which benefits accrue to whom?* Costs and benefits of capture fisheries certification are not well understood, primarily due to the difficulty in obtaining commercially sensitive economic data at each stage of the product life cycle. This can in turn generate policy limitations and create uncertainty over the net benefits of certification to different stakeholders, and which approaches to certification might be appropriate for different fisheries. In a paper on the cost-benefit distribution and transmission in environmental certification of capture fisheries Nimmo and Macfadyen (2010)[8] further investigated these issues. Figure 5 provides a schematic presentation of the benefits and costs of certification.

7 . In aquaculture the uneven power balance between producers and processors/distributers seems slightly more balanced even though the amount of environmental standards for aquaculture production is increasing.

8 . Paper presented to the 106th Session of the Committee for Fisheries – TAD/FI(2010)15

Figure 5. Schematic representation of costs and benefits of certification to different stakeholders



Source: Nimmo, F. and Macfadyen, G. (2010)

85. Case studies[9] by Nimmo and Mafadyen (2010) show that there are not set rules as to who should pay for which cost of certification. The cost distribution depends on the scale and costs of certification, the relative interest of different stakeholders grouped in supporting certification and the ability to pay, all of which may differ significantly depending on the particular fishery situation including the scale of the fishery and whether it is in a developing or a developed country.

86. As the case studies illustrate, Naturland and FOS assessments are predominately paid for by the food industry (e.g. processers and/or importers/exporters), while MSC certification in OECD countries is generally paid for by the producers themselves (or by processors). Of the MSC case studies examined only one fishery completely paid for the certification without seeking external funding sources. Others sought part or full funding from sources such as the European Fisheries Fund (EEF). In the case of Hastings Dover sole funding was first secured for a Policy Officer within the Local Authority who then worked to secure both European fisheries funding (both FIFG and EFF across their respective time periods) and local government funding. The Danish approach has seen a Project Officer employed by the Danish Fishermen's Producer Organisation (DFPO) to apply for EFF funding and co-ordinate the contractual agreements with certification bodies to undertake MSC assessments. The exception, in the case of the DFPO, has been 50% funding from a processor in the case of Danish Eastern Baltic cod.

87. The approach of seeking certification for national fleets may require a higher degree of data to inform the assessment and a potential increase in the risk that the fishery may not pass the assessment process (particularly with respect to wider environmental criteria); it does, nevertheless, present an economy of scale. This is of most relevance for stock assessment and management regimes, while wider environmental impacts will obviously be assessed on a gear type by gear type basis. This provides some

9 . These case studies will be made available in full form in Annex 2 of the final Report

incentive to seek wider assessments covering as many units of certification as possible. Units of certification are normally defined in terms of gear type, fleet segment or management regime. Through reviewing certified fisheries and those under assessment it is clearly becoming common practice to enter more than one gear type into one assessment process.

88. It is clear that a large proportion of funding is sought from EFF (in the case of European fisheries) and so it is the EU and member states that are effectively paying for the certification. In that case the question must therefore be how best to deliver this funding to the fishers, *i.e*. via a project officer coordinating at a local or national scale (as with DFPO and Hastings) or via a Government coordinated system (as with Netherlands).

89. With respect to chain of custody certification costs, these are typically borne by businesses in the value-chain between the point of landing and the consumer.

90. The increasing demand for certified product in OECD countries also raises the issue of sourcing sustainable seafood from capture fisheries in developing countries. It is clear that costs of certification in developing countries are often beyond the reach of developing country producers, especially where fisheries are small-scale in nature. In such cases, costs are normally borne by the processors, importers or exporters and not the producers, and/or supported through donors and NGOs. This is the case for the majority of FOS and Naturland certified fisheries.

2.2.3 Is there a role for governments in eco-labelling?

91. The issue of private certification schemes has in some cases opened a discussion about sovereignty, accountability and governance. Fisheries is a common pool resource and fisheries management falls in the public domain. Government regulators face considerable challenges in overseeing and guiding the development of sustainable fisheries. A major step for public authorities is to delineate which – if any - policy goals (e.g. improved fisheries management, ecological conservation, supply chain functioning or consumer protection and information) could more efficiently be pursued through private and/or public systems of eco-labelling. The ultimate effectiveness of eco-labelling in achieving the objective of sustainable fisheries and aquaculture will then depend on the appropriate design and use of this tool.

92. The FAO Guidelines for the eco-labelling of fish and fishery productions from marine capture fisheries state in the General Considerations that 'Bearing in mind that eco-labelling schemes relate to fisheries management, and rights and duties of States, it is recognized that the involvement of States in eco-labelling schemes is desirable and should be encouraged.'(FAO 2005, p. 2).

93. The public sector in fact increasingly explores eco-labelling in fisheries and aquaculture as a market-based mechanism, primarily to achieve additional incentives for resource conservation. However, certification cost-benefit considerations – including distributional issues - are more complex for governments than for private companies. Fisheries seeking certification put pressure on governments to allocate resources to areas or activities that may not be entirely consistent with existing policy frameworks and trajectories. In line with article 37 of the FAO Guidelines, the question for public authorities is hence the level of engagement with eco-labelling within the regulatory framework for fisheries: which could be from direct intervention to a situation of total laissez-faire with the only public function of overseeing truth in advertising and claims (Box 6). Government engagement can take a range of forms spanning from financial, administrative (e.g. providing data, creating new data streams, conducting scientific research) to direct policy setting.

Box 6. Continuum of policy options for eco-labelling

Source: adapted from Anders and Caswell (2009)

94. Given the potential benefits of certification, 'non intervention' could appear to forego an opportunity for governments to provide support for a market-based tool with considerable potential to generate fisheries management benefits (and environmental improvements), i.e. a public good, or to provide support for market benefits arising from certification to those in the supply chain, i.e. a private good.

95. Self-regulation through the private sector is currently the *status quo* in many countries, with the public sector in a rather passive observer position.

96. Information and education initiatives by the public sector appear to be useful in terms of enabling consumers to make informed choices and leaving the private sector to take decisions about establishing schemes and accessing the net benefits arising from different certification schemes and therefore whether to proceed with assessments.

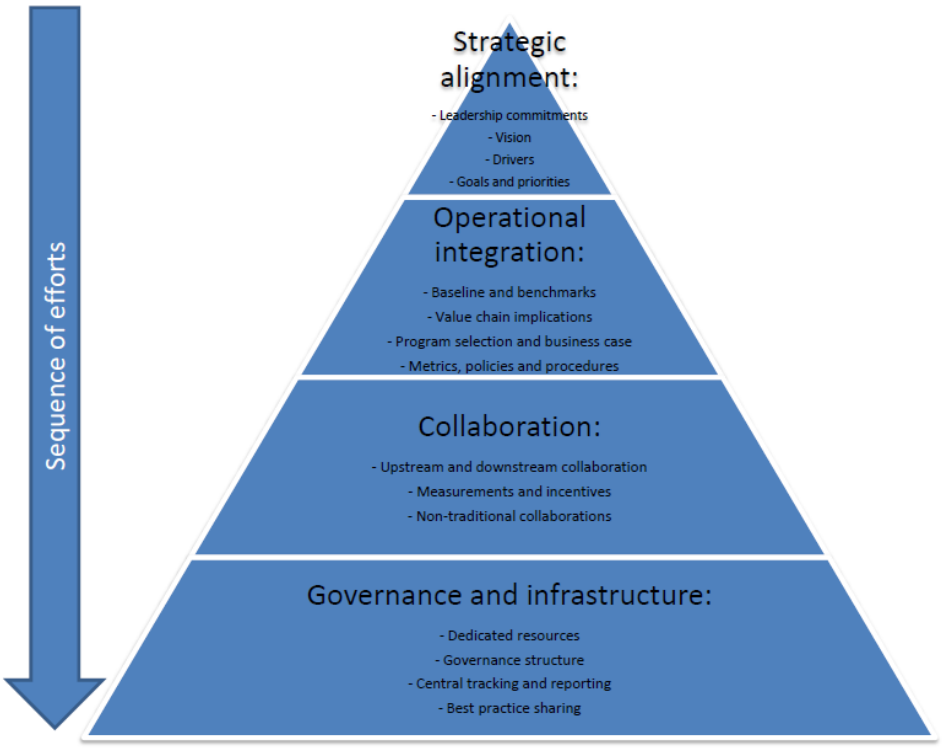
97. Co-regulation and incentive based structures are more complex options. Co-regulation may take long time to develop as private and public interests need to be aligned and responsibilities negotiated. But ideally, co-regulation has the strength to combine broader societal objectives with private market interests, providing for a flexible regulation.

98. In fisheries and aquaculture new forms of private-public interaction to align incentives towards the common goal of sustainable fishing are already emerging. Deliberative theories of democracy consider discourse among stakeholders the most appropriate tool to assess social value of the issue under debate. According to these theories, deliberations ideally imply the exposure to different perspectives over a topic, allowing for better solutions from a societal point of view as social benefits and costs may prevail over individual preferences (Dietz *et al*., 2009). This approach confirms the importance to include actors with central network positions as vectors of change. The pooling of knowledge and resources can support a trend beyond short-term behaviour; reduce costs and enable value chain integration. Better integration of private schemes with international organizations contributes to harmonization and equivalency.

99. To contribute to the green growth agenda, current business models in fisheries and aquaculture supply chains need to be reviewed to enable the rebalance of economic and environmental benefits. The

alignment of business and sustainability strategies is crucial for long term change and commitment of all chain elements. A shared 'sustainability vision' is needed (Figure 6). This may require non-traditional ways of collaboration and alliances between the different stakeholders – *e.g.* a more direct involvement of the industry (through associations) with the primary producers – to ensure equitable cost-benefit distributions and develop a sense of sector-wide product stewardship. This also includes common efforts in terms of consumer education and information as knowledge building is important at all levels of the chain.

Figure 6. Structured approach to implementing sustainability



Source: Deloitte, 2007

100. With respect to incentive based structures it can be argued that if certification results in private sector benefits, then the private sector should be supporting certification without any need for direct government (financial, human, technical, administrative) support. However, given the wider societal benefits of certification, and recognition of the fact that governments may be able to take a long-term view and provide incentives for the private sector to act, provision of funding or other forms of incentives may be justified. The approach taken by the EU per EFF funding, whereby Governments make a *contribution* to funding, rather than paying for all assessment costs is one example for this approach.

101. Direct regulation has some merits, but also some drawbacks. Costs of establishing schemes with credible standards and with a market awareness (important in terms of generating market benefits) are significant, and assessment costs of government schemes may be no lower than for private certification schemes. The exception may be if consumers find it easier to identify with national certification schemes than with global private sector ones. Government initiated certification schemes may also be able tailor their assessment criteria to the specific needs of a country's fisheries. However, on balance, government funding for public certification schemes may be questionable in terms of value for money.

102. In any case, the regulatory fisheries management context is important because it sets the parameters against which certification and quality signalling programs operate. It also affects the benefits and costs of those systems and their distribution within the supply chain, which is an area of tension within the supply chain and in some cases also on the public-private interface.

103. If a government decides to directly fund private certification of its fisheries, what are the implications and what are the challenges it might face? If it decides to set up its own label what are the likely challenges and how might they be met? Are there other ways of responding to buyers' demands for 'guarantees 'that fish and seafood products come from sustainable sources? Which strategies are the most valuable in terms of incentivising improved fisheries management and overall sustainability (rather than simply operating certification as a marketing strategy)?

104. Governments can play a role in reducing costs for fisheries willing to engage in private eco-labelling. Based on the continuum of policy options for eco-labelling in Box 6, the following paragraphs provide a brief overview of how some countries respond to the certification challenge.

105. The Dutch Ministry of Agriculture, Nature and Food Quality, believes that certification of fish and fish products can provide an important contribution to sustainable fisheries. While recognizing that certification is a market responsibility the government has decided to facilitate MSC certification of the Dutch fishing industry with EUR 1 million funding in order to further stimulate sustainable fisheries. More specifically, the government has negotiated specific conditions with MSC (e.g. with regard to the cost of the use of the label) to allow a broad participation of the Dutch fishing industry in the certification effort. The motivation behind this decision is that government regulatory measures had not achieved the required results and that private sector mechanisms may be better placed to incite better fisheries management. This is one of the most explicit examples of incentive based structures included in Box x with a government utilizing a private eco-label to pursue its public policy goals.

106. France in contrast, rather than endorsing any particular private scheme, has chosen to create its own national eco-label and related certification scheme. This decision, officialised through the law Grenelle 2, was based on a feasibility study[10] undertaken in 2008 by the responsible French authority, FranceAgriMer. As part of that process, FranceAgriMer examined existing private eco-labels, including for consistency with the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries. FranceAgriMer concluded that of the existing eco-labels, only MSC was fully compliant with those guidelines. However, it also concluded that the MSC model would not fit all fisheries. FranceAgriMer therefore decided to adopt a public framework to meet the needs of its the fishing industry as defined by the feasibility study; a scheme that was less costly than MSC, easily recognised by consumers (along the lines of the French public quality label, Label Rouge), and one that was consistent with the FAO guidelines but went beyond by including social and economic criteria. The public label will not preclude the certification of French fisheries to other private eco-labels, on the contrary certification to other labels will be encouraged. Bureau Veritas is developing the technical aspects of the scheme and a commission of interested parties is under identification to ensure stakeholder participation, confirming the co-regulation character of this approach. A Council order followed by a Ministerial decree will determine the juridical and technical conditions for the granting of the eco-label.

107. Another example for co-regulation is Iceland. The Icelandic fishing industry, with public support, has developed an Icelandic 'logo' based on Iceland's 'Statement on Responsible Fisheries in Iceland' (signed in partnership by both government and the fishing industry). While the Icelandic industry and government are convinced that its fisheries management is sound and that the Icelandic industry is engaged

[10] The results of this feasibility study are available (in French) online at: www.ofimer.fr/Pages/Ofimer/Publications.html

in responsible fishing, they realised the need for some mechanism of proof' or documentation that this was the case. The Icelandic logo will be a label of origin but with reference to sustainability. Certification will be conducted by an independent internationally recognised and accredited certification body, which will in essence involve third party certification of the government's fisheries management performance. The certification body will assess fishery conformance to a specification based on the FAO guidelines.

108. The US has adopted the information and education approach. The US National Marine Fisheries Service has developed its own information portal to address potential information asymmetry about fisheries sustainability. *FishWatch* is designed to help consumers make informed decisions about seafood purchase and consumption. It also provides information about the management and science requirements involved with building and maintaining sustainable fisheries.

109. In the state of Alaska, the Alaska Seafood Marketing Institute (ASMI) - a cooperative partnership between the Alaska seafood industry and state government to advance the mutually beneficial goal of a stable and sustainable seafood industry in Alaska – will introduce in 2011 a 'Global Trust' label based on third-party certification. The label will certify sustainable fishing and no fee for the use of the label will be charged.

110. Spain has not developed its own certification scheme but the Council of Ministers has approved a Draft Sustainable Fisheries Act. This Act is set out to ensure sustainable fisheries in line with international legislation and the FAO Code of Conduct for Responsible Fisheries. In addition to IUU-specific rules the Act also refers to European guidelines on environmental matters of the Marine Directive Framework. While not being a government initiated eco-labelling scheme, the Spanish case is an attempt to close a governance gap on sustainability and to build an overall sustainability reputation of Spanish seafood.

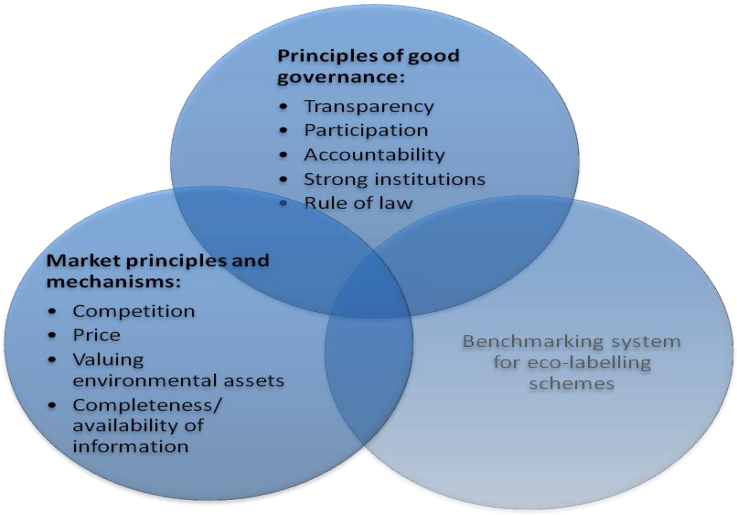
2.2.3.1 Governance and accountability in eco-labelling: private, public, both?

111. As mentioned, the key challenge for governments with regard to private eco-labelling schemes is to address the public-private interface. Shifting power to judge the appropriateness of public management schemes to the private sector may undermine the sovereignty of the public sector and generate challenging situations for the allocation of limited public resources (financial, human and political). If substantial government resources are required to support certification of already sustainably managed fisheries, transitional fisheries in need of government attention and resources may be penalized, with a resulting net loss of overall sustainability.

112. At the OECD/FAO Round Table on Eco-labelling and Certification in the Fisheries Sector these issues led to the broader consideration of the components of a global governance system for sustainable fisheries and aquaculture and who would be entitled/willing to decide on them. In this regard, what would be the role of market mechanisms in a global governance framework for sustainable fisheries? Can the FAO *Guidelines for the Eco-labelling of Fish and Fisheries Products from Marine Capture Fisheries* be strengthened for this purpose? And how can success be measured?

113. An 'ideal' governance regime for sustainable fisheries and aquaculture should combine the principles of good governance with market principles and mechanisms (Box 7). The development of such a framework is likely to be a more important task for governments and international organisations than their involvement in eco-labelling as it would establish minimum criteria for sustainable fisheries management, including market-based mechanisms like eco-labelling.

Box 7. Elements of an 'aspirational' governance regime for sustainable fisheries and aquaculture



114. Accountability can be defined as 'a system, or set of mechanisms, designed to make sure promises are kept, duties are performed, and compliance is forthcoming' (Iles, 2006). Accountability is particularly important for private eco-labelling schemes which build primarily on credence value. Market acceptance of a scheme depends crucially on its robustness, stability and legitimacy.

115. One important aspect of the public-private interface is how governments should/can ensure ongoing good governance in a private scheme. For example, can a private scheme with current acceptance in the market be hold accountable in the case of failure to achieve promised objectives (e.g. in terms of environmental/stock improvements)?

116. During the OECD/FAO Round Table on Eco-labelling and Certification the representatives of all stakeholder groups voiced their interest in a framework against which to assess the quality and credibility of the existing and emerging private fisheries certification schemes. In the absence of a reference framework the current system may have difficulties in delivering its maximum benefits. Some NGOs and associations have initiated benchmarking or review exercises for seafood eco-labels (e.g. WWF, 2008, Fish Sustainability Information Group through Parkes *et al*. 2010). However, the methodologies developed so far does not seem to be sufficiently impartial and comprehensive and can therefore not serve as a solid reference system.

117. The FAO Guidelines are often cited as a benchmarking entry point. The translation of the Guidelines into measurable indicators for a practical benchmarking system, however, is hampered by the sheer number of provisions and the lack of explicitly verifiable criteria.

118. Although benchmarking is called for it remains unclear who, how and what exactly to benchmark. In this regard, a number of questions for policy makers remain:

- Is a commonly accepted definition of 'sustainability' for fisheries and aquaculture feasible? If so, who develops it and how binding should it be?
- Who should develop a benchmarking system? Public authorities or the industry?
- Is it more efficient to have one dominating standard for sustainable seafood or should the market be left for many standards to compete?
- Who ensures compliance and how?

119. Key industry representatives[11] have presented 'wish lists' for certification scheme features. Those features includes for example that schemes should:

- build on sound international protocols for standard development;
- be continually evolving to meet new challenges,
- deal with traceability/supply chain integrity,
- seek continuous improvement through active engagement with fishers and fishery managers
- not be a barrier to trade
- carry clear and simple messages.

120. The recent review of fish sustainability information schemes conducted by Parkes *et al*. (2010) identifies a similar list of key attributes that need to be addressed by seafood certification schemes: scope, accuracy, independence, precision, transparency, standardization and cost-effectiveness.

121. Regulatory oversight can provide some quality assurance with regard to accountability and truth in labelling and advertising. Transparency of the certification assessment and review process, including public access to reports, for example is an important quality criteria. Complaints management is another one, as it allows stakeholders to actively manifest their disagreement or doubts and forces the certifier or scheme manager to provide a response.

122. Meanwhile, the private sector is aware of the importance of accountability to protect the economic value of sustainability reporting. The Global Reporting Initiative (GRI) for example is a multi-stakeholder effort which has developed a shared framework for sustainability reporting. This framework builds on globally shared concepts, consistent language and metrics and can be applied to companies of any scale and any sector. Other coalitions led by industry associations, NGOs or international organizations promote consistency in certification methodologies and convergence between standards (OECD, 2006). Prominent examples are the Global Food Safety Initiative (GFSI) that promotes convergence between standards through a benchmarking process for food safety management schemes; the Global Ecolabelling Network and the Association of Sustainable Fisheries of MSC-certified fisheries.

123. Likewise, the ISEAL Alliance is an international NGO that codifies best practice for the design and implementation of social and environmental standards systems (Box 8). So far, codes of good practice are available for standard-setting procedures, measuring impacts of standards systems and verification practices. These codes are part of the 'evolving suite of credibility tools that support the effective implementation of voluntary standards systems' (ISEAL, 2010).

11 . Findus, Iglo

Box 8. ISEAL Alliance Code of Good Practice for Setting Social and Environmental Standards

The Standard-Setting Code can serve as a minimum bar against which to measure processes to develop voluntary standards. The intention is not to promote the development of an ever increasing number of standards initiatives, but to improve consistency between standards, enhancing their effectiveness.

Standard-setting practices should be based on relevant international normative documents, where appropriate. The normative documents from which the Standard-Setting Code draws are ISE/IEC Guide 59 (Code of Good Practice for Standardization) and the WTO TBT Agreement Annex 3 (Code of Good Practice for the preparation, adoption and application of standards).

Source : extracted from ISEAL Alliance, 2010

124. Chapter 3 provides more insights on the credibility of certification schemes and the architecture and assurance mechanism of the certification industry.

2.2.4 Key points for discussion

125. Private eco-labels provide a potential nexus between marketing fish and fisheries products and fisheries management and are well established in the fisheries sustainability discussion. The stakeholder analysis reveals different incentive structures with regard to eco-labelling: public authorities potentially expect better results in terms of compliance with management measures and hence stock status, the industry aims at differentiating products and consolidating market positions through branding and NGOs aim to direct consumer demand towards sustainable consumption. Consequently, both private operators and NGOs seek to promote specific process and product attributes to distinguish themselves in the market.

126. Despite the different drivers, private eco-labelling represents a tool to align public and private incentives towards the shared goals of sustainable fisheries and aquaculture production, management and consumption. The consequences of eco-labelling on fisheries and aquaculture management, sustainability and on consumers have not been assessed empirically to an extent that allows to draw general conclusions on the success of eco-labelling in fisheries/aquaculture.

127. It is assumed that in the medium-long run the market mechanism of eco-labelling in fisheries and aquaculture can contribute to changing unsustainable behaviour in production (Haland and Esmark, 2002) and consumption. To do so, the sustainability debate needs to be aligned in terms of definitions and translated into action. High industry participation, proper design (including accessible language), credibility, affordability and acceptance are minimum requirements for the positive contribution of private eco-labelling to sustainable fisheries and aquaculture. Constant policy attention over a long time is key to support a political economy change towards sustainability.

128. Price signals are an important determinant for business behaviour. Market mechanisms needs to be shaped in a way that allows for economically efficient business decisions while catering to broader societal goals. This is captured in the OECD Green Growth Strategy which explicitly states that ‘we [the signatories from 34 countries and the EC] also work towards establishing appropriate regulations and policies to ensure clear and long-term price signals encouraging efficient environmental outcomes.’ Eco-labelling is part of a trend which may eventually result in a paradigm shift towards a sustainable societal development, including a healthy fisheries and aquaculture sector (Söderbaum, 2008).

129. The overall paradigm modification implies also institutional change. Traditional power relations shift and stakeholders engage in strategic alliances, for example NGOs and the food industry. This is a relatively new phenomenon and it is too early to predict the outcome in terms of sustainability compared to the use of traditional public management systems. In the meantime, forming alliances has the advantage of fostering dialogue and understanding of different positions among stakeholders.

130. While not providing a panacea, private eco-labelling certification and the momentum it generated for the sustainability debate has contributed to opening new dimensions for public-private forms of collaboration in support of improved fisheries management.

131. Overall, the anticipated impact of certification on key variables (e.g. price, volume, profit and cost distribution, product variability, 'sustainability') is not well documented. Price premiums predicted by economic theory seem not to materialize, or only to a small extent. Sustainability impacts remain a crucial question but little evidence has been presented so far Furthermore, causal relationships between certification and fisheries sustainability are difficult to measure and to separate from other impacts including changes in management tools and changing natural conditions. In their study of the environmental benefits resulting from certification of ten fisheries (MSC) Agnew *et al.* (2006) are unable to ascertain if certification has resulted in environmental benefits. Whether private standards, certifications and labels positively impact on fish resources ultimately depends on reliable science, objectivity, independent verification of claims and proper systems management (Ponte, 2008).

132. A focus on *certification* may be to miss the point about the impacts of *sustainability requirements more generally*. If sustainability can be demonstrated without engaging in certification, the net benefits may be greater than pursing certification.

133. If the primary intended benefit of certification is to bring about change in fishing practices (and this may be seen as the main benefit by governments, consumers and NGOs, *i.e*. those outside the value-chain) using a market-based mechanism, then it becomes important to consider the extent to which different schemes can bring about change in fishing practices, as opposed to just certifying fisheries that may already comply with scheme standards.

134. The extent to which this may or may not be the case is likely to be revealed in the coming years, now that much of the 'low hanging fruit' (in terms of well-managed fisheries complying with certification standards) has already been assessed and certified, leaving more problematic fisheries to engage with certification in which more significant management changes might be required.

135. It therefore bears consideration from a political economy perspective, whether public investments in eco-labelling as a means of improving ecological outcomes is efficient when compared to directly targeting fisheries management problems with conservation policy, sound scientific advice and fishers' incomes (Anders and Caswell, 2009).

136. A more important call for governments to consider remains the need to develop an 'aspirational' global governance regime for sustainable fisheries and aquaculture in terms of principles, terminology and measureable indicators. This would help close the gap of the current lack of a mechanism whereby states can analyse their own progress in fisheries management. It would also support efforts to prove responsible fisheries management to international partners, including for trade and marketing purposes. The recent call by governments to pursue a green growth strategy may help advance this debate further.

2.3 Government initiated certification schemes

137. In addition to sustainability related certification schemes, there are two other important product/process dimensions generating seafood certification:

(i) food quality (in the sense of food safety and hygiene properties of a food product) and

(ii) legality.

138. These two dimensions fall traditionally under public responsibility and governments have taken the initial lead in developing technical regulations that may be used for certification. The private sector - in particular again the seafood processing, distribution and retail industry - has picked up on some food quality and legality aspects by developing private certification schemes. Such private schemes are "over and above" government minimum criteria. The reasons for the private sector to do so are to improve individual market positions, to lift the reputation of the sector as such and to defer perceived risks (for example, food contaminations are expensive to deal with both in terms of product recall and in terms of reputation).

139. Food quality and legality certification poses fewer questions for the role of governments than private eco-labelling. The main features of these schemes are summarized to complement the previous discussion of privately initiated certification schemes and underscore some fundamental differences as well as similarities. The following will first look at food quality certification and then on legality related certification in fisheries and aquaculture.

2.3.1 Food quality related certification schemes

2.3.1.1 What it is about

140. Food quality encompasses a large range of notions: food hygienic/safety quality, nutritional quality, organoleptic quality, technological quality, convenience quality. Within this paper, the notion of food quality is however limited to food safety and hygiene aspects, which refer to chronic and acute hazards that make food harmful for human consumption.

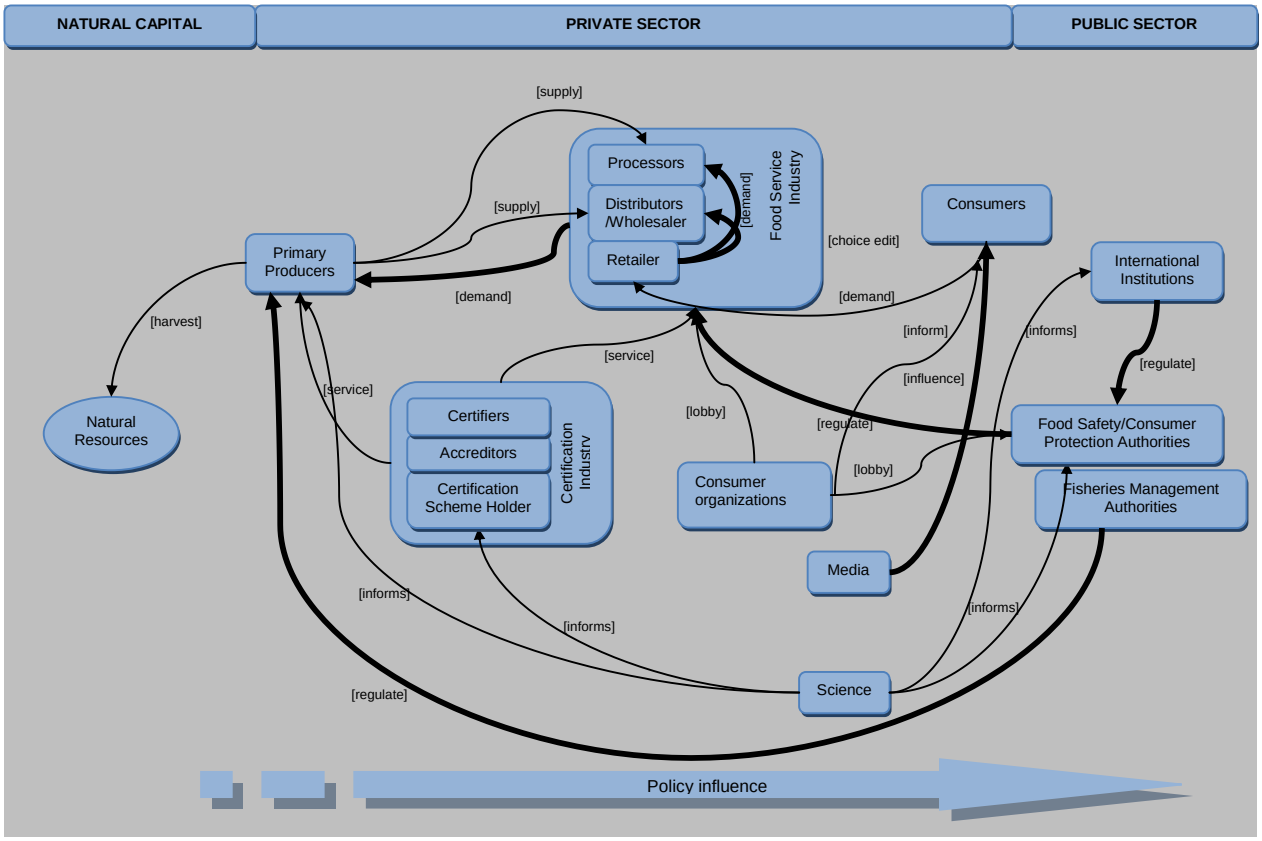
141. The development of food quality systems is occurring in the context of a broader shift in regulatory approaches to assuring food quality, particularly food safety (Henson, 2008; Garcia *et al*., 2007). The shift is a response to larger food trade volumes and the globalization of supply chains. And seafood is one of the most traded food commodities.

142. The subject of a food quality regulation can be a single attribute or a multitude of attributes of either the product (expected product characteristic) or the production process (partly or entirely). Food quality regulations are primarily single-attribute product standards (e.g. maximum histamine levels in fish products). They are often compiled in one comprehensive public technical regulation (*e.g.* as national food standards). The compliance with technical food quality regulations is usually not visible to the consumer and not necessarily subject to certification in strict sense but can require documentation with implications for the various players along the seafood value chain.

2.3.1.2 Economics of government initiated certification scheme: food quality

143. Figure 7 provides a snapshot of the main features of the food quality market in fisheries and aquaculture.

Figure 7. Actor-linkage map: food quality



144. Fisheries products are usually covered by food quality certification schemes and a well developed body on the economics of food quality and food safety exists. An OECD Working Paper on the interaction of public and private standards in the food chain provides key findings that also apply to the fishery sector (Smith, 2009). The following will therefore only provide a brief overview of the argument.

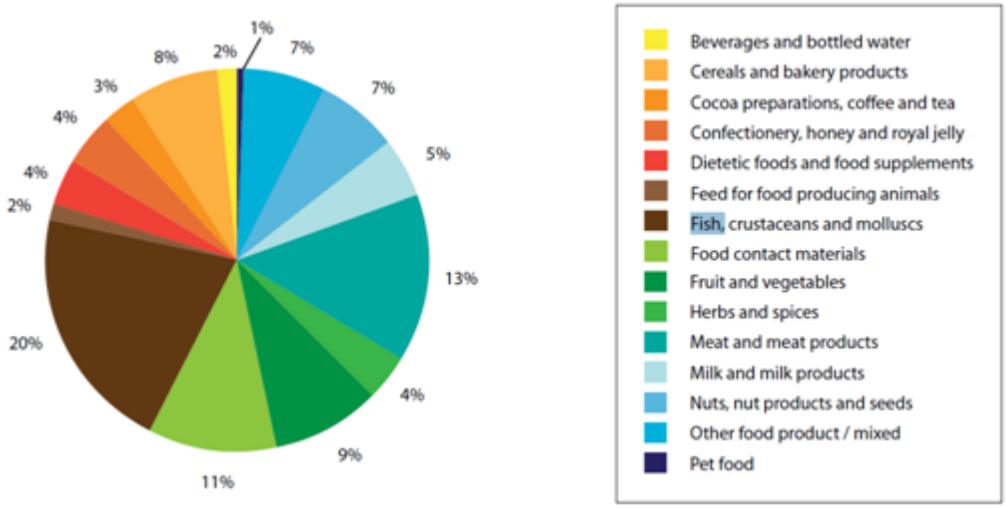
145. The economic literature identifies various imperfections in the market for food safety, (i) asymmetry in the knowledge of risk (causing divergence between perceived and real risk), (ii) (global) public good character of food safety and (iii) social costs and benefits (Ritson and Mai, 1998).

146. Imperfect information often occurs in a situation where the demand for that information is societal rather than commercial. For instance, epidemiological information may link food borne illness to a particular type of fishery products. Consumers may not make this connection because it is difficult to link particular incidents of food borne illness to specific foods. The market may fail to provide incentives to companies to disclose that type of information if liability systems don't identify and punish companies that sell unsafe products.

147. So what are the drivers behind governments' interest in food quality regulation and certification? Among the functions of the state is to address market failures and to provide 'public' goods and services (Josling *et al*., 2004). By ensuring food safety through regulation the state reacts to the societal demand for safety and corrects the market failure. By setting minimum standards for food quality the state ensures consumer protection and hence limits the societal costs of food borne diseases. According to a recent study, the annual costs of acute food borne illnesses in the US alone is estimated at USD152 billion including healthcare, workplace and other economic losses (Scharff, 2010). In the EU, in 2008 the product

category 'fish' accounted for 20% of the alert notifications (Figure 8). In the same year, fishery products accounted for 11% of the total of food products rejected at the border (EC, 2009).

Figure 8. Food safety: alert notifications by product category, 2008



Source: The Rapid Alert System for Food and Feed (RASFF), Annual Report 2008 (EC, 2009)

148. A succession of food scares from BSE and bird flu to the recent swine flu has repositioned food safety high on international agenda. Highly traded seafood carries the risk of mercury contamination, shellfish poisoning, etc. Given the fast spread of many food borne diseases at a global scale, intergovernmental organizations have over time developed widely accepted standard and regulations for food safety and hygiene. The most important institutions and arrangements in this context are the so-called 'three sisters':

- FAO/WTO Codex Alimentarius Commission (1962),
- World Organization for Animal Health (OIE) and
- International Plant Protection Convention (IPPC).

149. These three have the main responsibility - for international standards for food safety, animal health and plant protection respectively - under the Sanitary and Phyto-Sanitary (SPS, 1995) agreement. The WTO/FAO Codex Committee on Fish and Fishery Products (CCFFP) is the sector–specific international reference body for food safety regulation.

150. The international framework for food safety consists of the WTO SPS/Technical Barriers to Trade (TBT, 1995) agreements and the Codex Alimentarius which has a Committee on Fish and Fisheries Products. This international framework aims to support trade liberalization; to protect human, animal and plant health and to minimize technical obstacles to trade. There is hence an inherent conflict risk that protective measures turn into protectionism. Ongoing trade tariff reductions put in fact a lot of pressure on non-tariff measures to shield domestic markets from international competition.

151. The international framework is integrated by other voluntary references like ISO, the FAO Code of Conduct for Responsible Fisheries and Good Manufacturing Practices. ISO standards (*e.g.* ISO 9000:2000 – Quality management; 22000:2005 – Food safety management system) and include a certification element. The ISO 22000:2005 standard requires a food safety management system to have

four key elements: interactive communication, system management, prerequisite programs and HACCP principles.

152. Box 9 illustrates some examples of food safety regulation in OECD countries.

Box 9. Food safety regulation for fishery products in selected OECD countries

EU

In 2004 the EU introduced the 'Hygiene Package' to make food quality regulation more transparent and accessible. Fishery product imports to the EU are subject to official certification based on recognition of the Competent Authority (CA) of the non-EU country by the European Commission. Public authorities with the necessary legal powers and resources must ensure credible inspection and control throughout the production chain, which covers all relevant aspects of hygiene, public health and, in the case of aquaculture products, also animal health. For all fishery products, countries of origin must be on a published list of eligible countries for the relevant product.

USA

The US Food and Drug Administration (FDA) operates a mandatory safety program for seafood products. FDA publishes a *Fish and Fisheries Products Hazards and Controls Guidance* to support compliance with the program.

153. Domestic and international food quality (safety and hygiene) regulations now widely adopt the Hazard Analysis and Critical Control Points (HACCP) method. HACCP is a systematic preventive approach to food safety and pharmaceutical safety that addresses physical, chemical and biological hazards in production processes as a means of prevention rather than finished product inspection. It consists of the following main components:

- hazard analysis to identify potential food safety risks (hazards)
- the identification of critical control points to prevent such hazards;
- the establishment of critical limits;
- monitoring of the critical control points;
- corrective actions if something goes wrong;
- verification to assess whether monitoring occurs correctly, corrective actions are taken in time and effectively, etc.
- documentation

154. The costs of food quality certification are carried primarily by the industry while the benefits in terms of reduced food hazard risk are reaped mainly by the individual consumer and by society through reduced costs on welfare. The incentive to implement voluntarily costly food quality assurance schemes for the private industry is hence limited as they are not able to fully capture the returns.

155. Mandatory public domestic and international technical requirements for food safety set minimum standards and provide an incentive for the private sector to develop appropriate production processes (Holleran *et al*., 1999) to reduce compliance costs. However, the private sector also has self-interest in up-scaling mandatory food quality standards as it comes to realize that hazards can be very damaging and costly for a company or even an entire sector. Buyers along the value chain therefore often require proof of

the ability to identify and control food quality risks. This is where private food quality certification comes into play.

156. Private food quality requirements and certification schemes developed by industry associations are an expression of self-imposed regulation of the sector. The development of these private schemes is explained by a consolidation and vertical integration processes in the food sector, the emergence of 'food coalitions', and the increasing market power of supermarkets. High transaction costs caused by uncertainty about quality are an important incentive for private companies to adopt private food quality systems.

157. These schemes are often operated at a B2B-level, but they have marketing potential if information about product quality is communicated to final consumers. As in the case of eco-labelling, the driver is market differentiation, buyer acquisition, risk reduction and/or relationship consolidation.

158. There is a trend away from product sample testing to continuous monitoring and quality assurance processes. Vertical supply chain alliances as opposed to traditional open-market transaction facilitate the implementation of food quality assurance systems along the value chain and potentially improve risk management (Gray and Boehlje, 2005). In fact, while eco-labelling in fisheries and aquaculture focuses on the initial stage of the value chain - the production stage - food quality certification requires a shared responsibility throughout the entire value chain up to the point of consumption. Along the value chain there is an understanding that food quality – in the sense of food safety – should not be a competitive issue within the food industry.

159. Food quality certification schemes hence operate as 'tools of chain coordination, as meta-management systems to implement process standards' (Reardon and Farina, 2002) to increase supply chain efficiency and to enhance brand recognition, safeguarding and reputation'. Mislabelling is one threat to those latter ones. Species substitution cases of Pangasius sold as sole or flounder in the US and as cod in the UK are two examples of recently detected scams. Short-weighting is another common mislabelling problem in the industry.

160. The adoption of common quality assurance systems is therefore in the interest of all players, with retailers, distributors and processors driving the process and imposing it as a business condition on primary producers.

161. ISO 22000 for food safety management systems is an important mechanism as it provides a reference for the entire value chain and a framework for third party certification (Seagrave, 2007). While ISO addresses both the public and the private sphere, intra-industry certification initiatives are specific tools to pursue common objectives, like the overall quality reputation of products, to the benefit of the industry as a whole.

162. Although not a standard setting or certification organization, the Global Food Safety Initiative (GFSI) is an example of a strictly private initiative to promote a trustworthy, cost-efficient and harmonized food safety standard landscape. A crucial tool to achieve this is the publication of a *Guidance Document* with key requirements against which food safety management standards are benchmarked. GFSI was set up by retailers with support from the independent global food business network CIES in 2000. According to its website, GFSI's mission is the continuous improvement in food safety management systems to ensure confidence in the delivery of safe food to consumers. The GFSI objectives are to:

- Foster convergence between food safety standards through maintaining a benchmarking process for food safety management schemes;

- Improve cost efficiency throughout the food supply chain through the common acceptance of GFSI recognised standards by retailers around the world; and

- Provide a unique international stakeholder platform for networking, knowledge exchange and sharing of best food safety practices and information.

163. The Global Aquaculture Alliance (GAA) and the Aquaculture Certification Council (ACC) have recently submitted a Best Aquaculture Practices (BAP) standard for seafood processing plants to the Global Food Safety Initiative (GFSI) in order to benchmark it to GFSI food safety guidelines, which are increasingly required by industry buyers.

164. Other examples of private food quality schemes are the British Retail Consortium (BRC), a union of British supermarket chains, which requires documented approval to ensure food quality and safety, the International Food Standard (IFS) established by German supermarket chains and the Safety Quality Food (SQF) program endorsed by the US Food Marketing Institute (FMI). BRC, IFS and SQF are primarily B2B-schemes and benchmarked against the GFSI guidelines. The FMI has developed a specific sustainable seafood policy in 2009.

165. GLOBALGAP is another B2B-standard setting organization which has developed modules for aquaculture. It is a pre-farm-gate standard (certificate covers the process of the certified product from farm inputs like feed or seedlings and all the farming activities until the product leaves the farm). Its integrated farm assurance standard includes specific requirements for salmonids, shrimp, pangasius, tilapia and others.

166. As in the case of private eco-labels, increasing acceptance and use of private food quality certification schemes transform them from voluntary into *de facto* requirements for market participants. Non-compliance with these schemes automatically reduces business opportunities in highly concentrated oligopolistic food markets. There is thus a considerable impact of these schemes on the distribution of power among participants in international trade in fish and fishery products.

167. In terms of equity, an OECD study concluded that ”health and safety standards [for shrimp] imposed by importing countries lead to improvements of production methods in the exporting countries that increase foreign producers’ welfare. In particular, if OECD countries were to ban shrimp imports for health reasons, substantial profit incentives exist in exporting countries to adopt improved production methods in order to regain access to OECD countries’ markets” (OECD, 2009b). It could be questioned, however, if the benefit of international harmonization of private food quality standards that reduces overall costs of control and increases consumer welfare justifies potential market access issues caused for exporting countries and small-scale producers by this form of non-tariff measures.

2.3.2.2 Key points for discussion

168. The existence of an international reference framework supports the harmonization of national food standards. The SPS and TBT agreements specifically encourage the harmonization of food standards. In addition, despite its government-to-government nature, the transparency of the standard development process in Codex allows the private sector to provide input. Some countries have in fact established ‘Codex Contact Points’ where the private sector can review and comment proposals. ISO on the other hand is a dialogue platform for national standards institutes with private *and* public members.

169. The international governance framework and the existing public, private and hybrid institutions in the food quality landscape have contributed to achieving a certain level of harmonization which is expected to develop further. Private food quality certification can also contribute to raising the mandatory

bar if appropriate. However, harmonization of private (and public) certification schemes should be further pursued to reduce compliance/transaction costs and market access barriers. This is particularly important for individual buyer specifications for food quality aspects of fishery products.

170. Main critical issues for governments with regard to private food quality certification schemes remain twofold: avoiding potential market access restrictions due to the non-tariff barrier nature and ensuring truth in marketing. Both issues will be dealt with in the next chapter.

2.3.2 Legality related certification schemes

2.3.2.1 What it is about

171. Compared to the complex issue of sustainability addressed by eco-labels, legality is a narrower concept. It refers to the compliance of fishing activities with national and international laws and regulations on:

- access to fishing areas in terms of space and time,
- target species,
- fishing methods;
- agreed quotas and
- reporting rules.

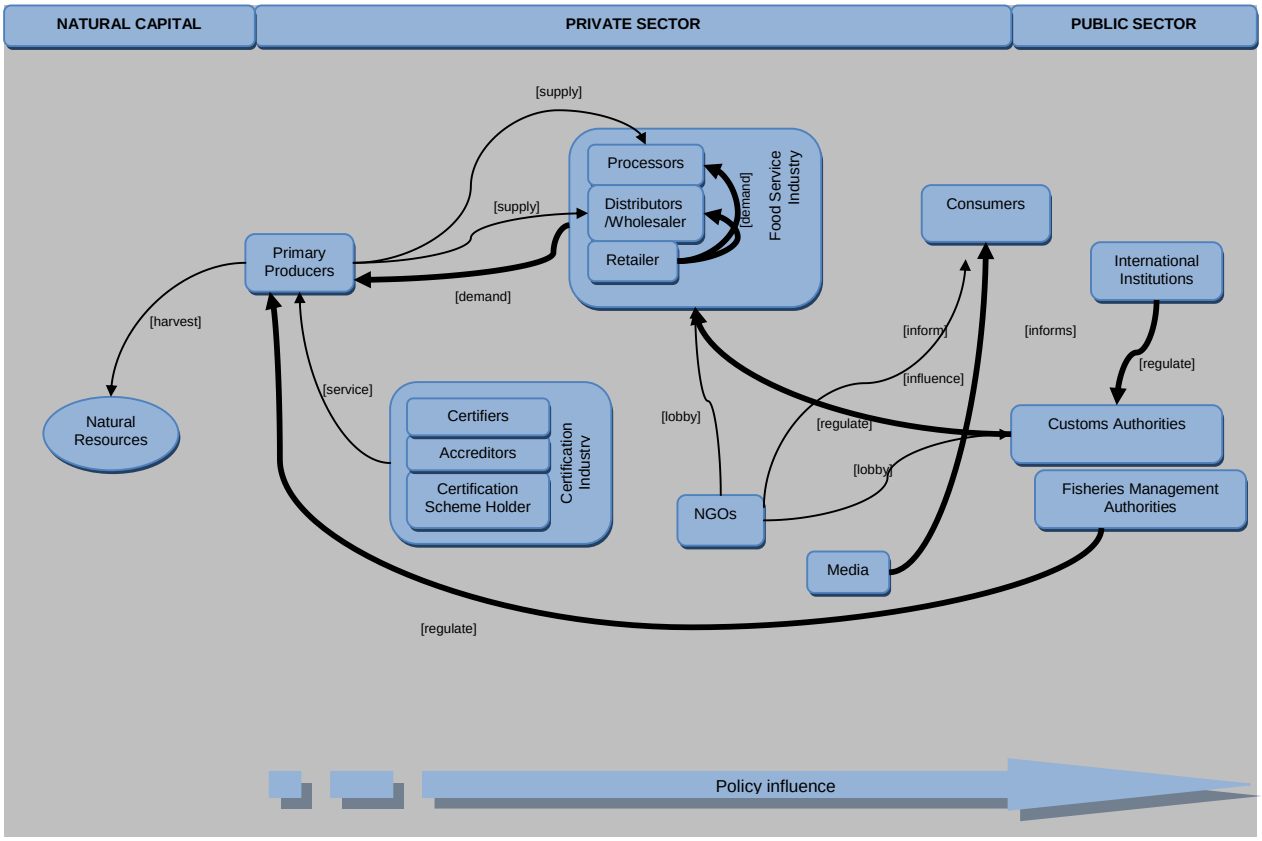
172. The non-compliance with the above mentioned criteria results in illegal, unreported and unregulated (IUU) fishing. With the globalization of fish trade, legality certification has developed in response to illegal, unreported and unregulated (IUU) fishing which poses a major threat to the global sustainability of fisheries, in terms of stocks and in terms of wider environmental, economic and social implications. By definition, legality certification is developed by national or international public institutions as it deals with sovereignty issues.

173. Estimates of an annual produced value of EUR 10 billion make IUU fishing the second largest global ‘producer’ of fishery products (EC, 2009).

2.3.2.2 Economics of government initiated certification schemes: legality

174. Figure 9 and the following paragraphs provide a snapshot of the main features of the market for legality certification in fisheries.

Figure 9. Actor-linkage map: legality



175. In its analysis of the economics of IUU fishing activities the OECD provides a model for the incentive for IUU fishing based on the economics of crime and punishment (OECD, 2005). The economic driver behind IUU fishing is that the expected benefit exceeds the expected punishment.

176. The reasoning behind legality certification is less linked to traditional punishment, e.g. in the form of monetary sanctions, but builds on the assumption that it reduces the incentive for IUU fishing by reducing market access opportunities. Legality certification can be seen as an extension of or a complement to national and international monitoring, surveillance and enforcement measures embedded in fisheries management systems. Legality certification is somewhat complementary to sustainability certification which implicitly requires the absence of IUU fishing.

177. The global governance framework for fisheries has the following key components:

- United Nations Convention on the Law of the Sea (UNCLOS, 1982);
- FAO International Plan of Action to Prevent, Deter and Eliminate IUU Fishing (2001);
- United Nations Fish Stocks Agreement (UNFSA, 1995) and
- Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2009).

178. The Agreement on Port State Measures is the first ever global agreement focusing specifically on the problem of IUU fishing. The objective of the agreement is to help block IUU-caught fish from entering international markets, thereby removing an important incentive for some fishers to engage in illicit fishing.

Under the Agreement, countries agree to take a number of steps against IUU fishers. Foreign fishing vessels wishing to dock will be required to request permission from specially designated ports ahead of time, transmitting information on their activities and the fish they have on board to give authorities an opportunity to spot irregularities in advance.

179. Furthermore, the agreement commits countries to regular inspections and outlines a set of standards that will be used during those inspections. Signatories must ensure that ports and inspectors are adequately equipped and trained. When a vessel is denied access, port states must communicate that information publicly and national authorities from the country whose flag the vessel is flying must take follow-up action.

180. The agreement calls for the creation of information-sharing networks to let countries share details on IUU-associated vessels, and also contains provisions intended to assist resource-strapped developing countries meet their treaty obligations. These measures apply to foreign fishing vessels not flying the flag of port states; however countries can apply them to their own fishing fleets as well.

181. Given the EU's importance as an importer of fish and fish products, a new EU regulation that entered into force on 1 January 2010 can be included in the framework on legality in fisheries. The *EC Regulation 1005/2008 to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing* has two main objectives:

- To make EU markets inaccessible for IUU products and
- To eliminate the involvement of EU nationals and vessels in any IUU fishing activity.

182. The main tool to implement the regulation is a catch certification scheme that traces the product along the entire value chain, from its origin to the consumer.

183. In the US, another major import market, the NOAA has published proposed rules that would establish procedures and criteria for the identification and certification of countries whose fishing vessels are engaged in IUU fishing or bycatch of protected living marine resources.

184. The global governance framework is complemented by Regional Fisheries Management Organizations (RFMOs). By regulating fishing in the High Seas they play a role in setting legality requirements: the reduction of IUU fishing and the implementation of sustainable fisheries through coordinated conservation and management efforts are the main purpose of RFMOs. According to the UN Fish Stocks Agreement, '*in fulfilling their obligations to cooperate through subregional or regional fisheries management organizations or arrangements, States shall …agree on standards for collection, reporting, verification and exchange of data on fisheries for the stock*.'(UN, 1995). Some of these organizations have developed specific traceability regulations, like for instance the Southern Bluefin Tuna Statistical Document Program of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) which requires imports into any member country to be accompanied by specific statistical documents (Schmidt, 2000).

185. Given the close link to sustainability, private operators are realizing the marketing potential of legality certification. Improvements in information technology and integration in transportation systems open up new opportunities to comply with this type of documentation requirements.

186. Box 10 provides a short overview of country of origin labelling which can be considered to be related to legality certification.

Box 10. Country of origin labelling

The European regulations in this area focus on Protected Designations of Origin (PDO) and Protected Geographical Indications (PGI), while the North American counterpart of certified geographical origins is part of the trademark protection system. Common to the three systems is an assumed positive consumer willingness to pay for a proven and trustable link between geographical origin and the inherent quality characteristics of a particular food product

Source : Loureiro and Umberger, 2005

2.3.2.2 Points for discussion

187. Legality certification is a stepping stone towards sustainability certification. However, legality verification remains primarily a public responsibility and should be protected from commercial interests.

188. The fact that several countries are running different systems means that harmonization among countries, through international rules, equivalent definitions and mutual recognitions, could pave the way towards one global system to reduce IUU fishing. International organizations could play a role in this.

189. The use of modern information technology to trace origin is already in place in many countries and will play a major role in future legality certification. In the UK, trial runs with tagged sea bass and lobster have already been conducted.

PART 3 – UNIFYING ISSUES

3.1 The credibility of certification schemes

190. In addition to the target's group awareness and understanding of a certification scheme, the certifications scheme's effectiveness depends crucially on its level of credibility. Credibility and trust are a direct function of the reputation of the scheme developer/owner, the robustness of the requirements and the level of independence and transparency in the compliance verification process.

191. The ability to convey trust is thus a precondition for acceptance which is closely linked to the existence of a well functioning accountability framework. This chapter concentrates on private certification schemes as it is assumed that credibility is an intrinsic characteristic of government certification schemes.

3.1.1 Certification scheme development and administration

192. To be credible, certification schemes need to be science-based. In addition, it has to have a transparent governance structure. Accountability is in fact considered an important driver for change and lack of accountability can induce a 'race to the bottom' (Worldwatch Institute, 2008). Private certification schemes are potentially only accountable to the final consumer. This situation has been identified as a perceived democratic deficit (Vorely *et al.*, 2002).

193. However, private certification scheme development in fisheries and aquaculture is widely characterized by a multi-stakeholder consultation process to achieve credibility.

194. Certification credibility can be enhanced through *ex-post* legal liability regulation which punishes misleading claims (OECD, 2007). Organizations like ISO, WTO and the International Code Council (ICC) have developed guidelines for the preparation of standards to enhance confidence and impede unsubstantial or inappropriate product and process claims. Under the WTO TBT agreement, member countries are required to ensure that non-governmental bodies accept and comply with the *Code of Good Practice for the Preparation, Adoption and Application of Standards*. It is still unclear to which extent the Code applies to private certification schemes. It is also an indicator for the blurring distribution of responsibilities with respect to certification.

195. More specifically related to fisheries and aquaculture, ISO has a Technical Committee on fisheries and aquaculture (ISO/TC 234) which is currently developing a number of standards (see Table 3).

Table 3. International reference framework for fisheries and aquaculture certification scheme development

Organization	Reference	Main subject
International Standards Organisation (ISO)	ISO 14040 (2006)	Environmental management – Life cycle assessment – principles and framework
ISO/TC 234	ISO/DIS 12875	Traceability of finfish products -- Specification on the information to be recorded in captured finfish distribution chains
ISO/TC 234	ISO/DIS 12877	Traceability of finfish products -- Specification on the information to be recorded in farmed finfish distribution chains
ISO/TC 234	ISO/CD 12878	Environmental monitoring of the seabed impacts from marine finfish farms
Codex Alimentarius Commission (CAC)	CAC/GL-1-1979 (revised 1991, amended 2009)	General Guidelines on Claims
Codex Alimentarius Commission (CAC)		Principles for Food Import and Export Inspection and Certification
Codex Alimentarius Commission (CAC)		Guidelines For The Design, Operation, Assessment and Accreditation of Food Import and Export Inspection and Certification Systems
Codex Alimentarius Commission (CAC)		Guidelines For The Development of Equivalence Agreements Regarding Food Import and Export Inspection and Certification Systems
Codex Alimentarius Commission (CAC)		Guidelines for the Judgment of Equivalence of Sanitary Measures Associated with Food Inspection and Certifications Systems
Codex Alimentarius Commission (CAC)		Principles for Electronic Certification as an Appendix to the Codex *Guidelines for Generic Official Certificate Formats and the Production and Issuance of Certificates* (CAC/GL 38-2001)
Codex Alimentarius Commission (CAC)		Principles for Traceability/Product Tracing as a Tool within a Food Inspection and Certification System.

Source: Codex Alimentarius Commission

196. The business model of certification scheme owners contributes to credibility. Dependency on donations and public funding may raise the issue of vested interests. The MSC for example is run as registered charity. However, the use of the MSC label is administered by MSCI, a separate trading company of which the MSC owns all shares. The association Naturland in Germany is based on a similar model, with a commercial company administering the logo use.

197. In more general terms, there is a need to define performance measurements, demand performance data reports, evaluate certification practices and measure compliance with stated principles and goals. However, to do so it needs first to be clarified who is accountable to whom, for what and over what time frame. In this regard the specific business model and funding mechanisms adopted by certification schemes need to be clarified to exclude conflicts of interest and ensure independence.

3.1.2 Certification processes

198. There are different types of compliance *verification*:

- *First party certification:* self-declaration of conformity with self-set requirements by the entity making the claim;
- *Second party certification:* verification through an affiliated body, e.g. an industry/trade/consumer association or a hired consultant, usually against requirements established by these bodies or by peers;

- *Third party certification:* conformity assessment and audit by an independent inspection body/individual, preferably an accredited auditing body, but potentially also by other external entities against the requirements of a certification scheme.

199. First and second party certification is relatively vulnerable in terms of conveying credibility. Second party certification is not regulated and hence its conclusions difficult to evaluate for a buyer/consumer. A Supplier's Declaration of Conformity (SDoC) is one form of first party certification. The ISO-standard for SDoC (ISO 17050 – Conformity Assessment – Supplier's declaration of conformity) aims to harmonize SDoC and to increase their credibility. SDoC as cost-efficient and non-discriminatory conformity assessment tools could become increasingly recognized if ex-post regulation rather than more expensive pre-market measure guarantee their reliability (OECD, 2008).

200. The value of third party certification for the food industry is summarized in Tanner (p. 1, 2000):

- Reduced risk and liability;
- Strengthened due diligence defence;
- Greater confidence in regulatory compliance;
- Competitive advantage;
- Improved access to markets;
- National/international acceptance (WTO);
- Reduced costs and improved profitability;
- Reduction in insurance costs;
- More effective management.

201. Often, certification is carried out by individual evaluators. However, some major players (e.g. the Aquaculture Certification Council) are moving to a more systematic use of ISO-certified inspectorates in engaging evaluators.

202. A number of companies (e.g. Bureau Veritas) provide conformity assessment and certification services (inspection, analysis, audit, certification) and has a dedicated service for responsible fishing.

203. During the OECD/FAO *Round Table on Certification and Eco-labelling in the Fisheries Sector* the quality, consistency and capacity of certifiers was brought up and it was asked "who certifies the certifiers?" If private certification involves the assessment of a state's fisheries management an important question is what recourse there is to challenge those judgements. What levers do governments have to ensure good governance in private certification schemes?

204. Producers complain that the different certification schemes in fisheries and aquaculture vary in their degree of robustness and rigor. As more and more industry players commit to sustainable sourcing, eco-label managers may feel pressured to increase the supply of certified fisheries. The pressure from the demand side and the already existing shortage of human capacity for seafood certification could have impacts on the robustness of audit processes.

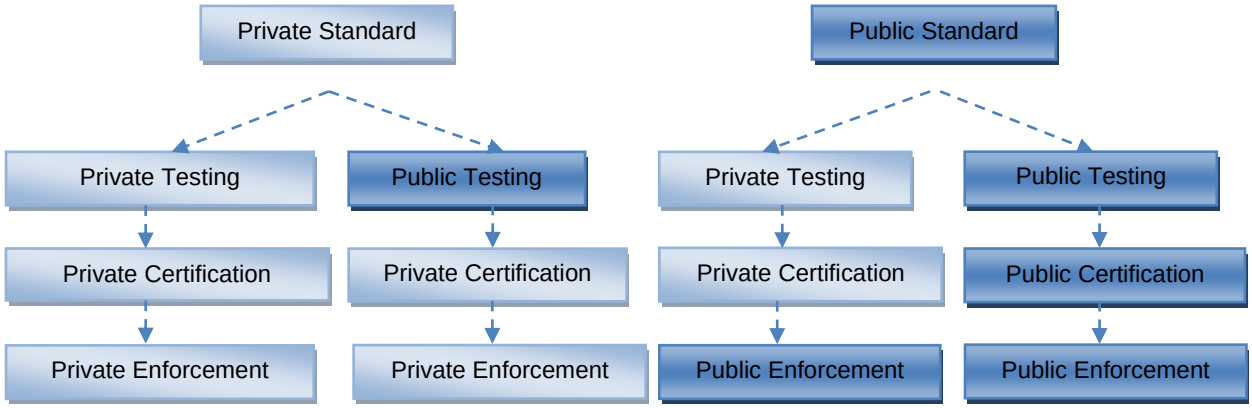
205. Pauly et al. (2010) state that 'the certification system creates a potential financial conflict of interest, because certifiers that leniently interpret existing criteria might expect to receive more work and profit from ongoing annual audits.'

206. Accreditors play a role in assuring the credibility of the certification system. Accreditation bodies verify that certifiers are competent to carry out certification processes, usually in line with relevant ISO standards (e.g. ISO 9000). Accreditation bodies can be commercial or non-profit private entities (e.g. the International Accreditation Service – IAS, Accreditation Services International - ASI) or public bodies (e.g. Irish National Accreditation Board (INAB)).

207. The International Social and Environmental Accreditation and Labelling Alliance (ISEAL Alliance) is one example of an international player that contributes to the self-regulation of the environmental and social standard sector through the development of codes of conducts.

208. Figure 10 from Golan *et al*. (2000) illustrates the possible interplay of private and public institutions along the certification implementation chain. It shows that the different stages can be carried out by both types of institutions or by combinations of them (for example, a private histamine standard being tested in a public laboratory), thus stressing the need to better understand their respective roles and responsibilities at each working level.

Figure 10. Private and public roles in certification implementation



Source: Golan *et al.* (2000)

209. A step towards disentangling the complexity of current private seafood certification processes would be harmonization. Convergence, equivalence agreements and mutual recognition between standards facilitate the comparability of audit outcomes, reduce costs, facilitate trade and contribute to buyer/consumer confidence by simplifying messages (WTO, 2008). The Global Partnership for Good Agriculture Practices (GlobalGAP) is an attempt towards this for agriculture products. Whether similar attempts will be undertaken to harmonize across the different certification schemes in fisheries and aquaculture remains to be seen.

3.1.3 Communication

210. There are many different channels to communicate certification to different target audience: product labels, information campaigns, the internet, etc.

211. National advertising authorities watch over the proper use of claims and advertising tools to avoid unsubstantiated, misleading or irrelevant claims and unfair commercial practices. Advertising codes typically include clauses on substantiation, evidence and the scope of environmental claims.

212. For the fish processing, distribution and retail industry, Corporate Social Responsibility (CSR) has been incorporated in many companies' business models as a form of voluntary self-regulation beyond mandatory rules that caters to increased public awareness of environmental and social issues. CSR can consist in the reduction and monitoring of potentially negative environmental and social impacts of an activity and/or in the involvement in socially/environmentally public interest activities. CSR reporting can contribute to deliver the green agenda to a broad audience. However, given its voluntary nature, CSR reporting is often accused as a 'green-washing' attempt to improve a company's reputation and ultimately its market position and investment attractiveness. The lack of a consistent and comparable metric for sustainability measurements reduces the information value of these performance reports. There is an overall agreement on 'what' is measured – but not necessarily about the 'how'.

213. An OECD study on CSR and trade (Fliess *et al.*, 2007) concludes that '*labelling is the most widely employed CSR information scheme in fisheries*' and that '*compared to labelling, reporting has yet to take root in this market*.' The study further reveals that *'as far as corporate advertising and marketing is concerned, many fish harvesting and processing companies, including SMEs, as well as seafood retailers provide information and communicate with consumers and other stakeholders via their homepages on the Internet. On their websites, many fisheries companies state their commitments to sustainable fishing and provide related information, e.g. about adherence to ISO 14001 or SA8000, observance of a quality standard, sourcing policies and production practices*.'

214. Box 11 gives an example of international regulation of advertising.

Box 11. The International Chamber of Commerce and its International Code of Environmental Advertising

The International Chamber of Commerce was founded in 1919 with an overriding aim that remains unchanged: to serve world business by promoting trade and investment, open markets for goods and services, and the free flow of capital.

A year after the creation of the United Nations in San Francisco in 1945, ICC was granted the highest level consultative status with the UN and its specialized agencies. Ever since, it has ensured that the international business view receives due weight within the UN system and before intergovernmental bodies and meetings such as the G8 where decisions affecting the conduct of business are made

The International Chamber of Commerce (ICC) has direct access to national governments all over the world through its national committees. The organization's Paris-based international secretariat feeds business views into intergovernmental organizations on issues that directly affect business operations. ICC codes on advertising and marketing are frequently reflected in national legislation and the codes of professional associations.

The ICC Working Group on Sustainability was established in 2007. The group's work resulted in the launch of the ICC *Framework for Responsible Environmental Marketing Communications* in January 2010.

The framework is a companion to the Consolidated ICC *Code of Advertising and Marketing Communications*, which sets forth general principles governing all marketing communications. The framework offers more detailed interpretation of the environmental claims chapter of the general code. As many of the national and regional codes are built on ICC's Codes, this interpretation can also be applied to national and regional marketing codes used by self-regulatory organizations to set best practices for business.

ICC has been a major rule-setter for international advertising since the 1930s, when the first ICC code on advertising practice was issued. Since then, it has extended the ICC self-regulatory framework on many occasions to assist companies in marketing their products responsibly.

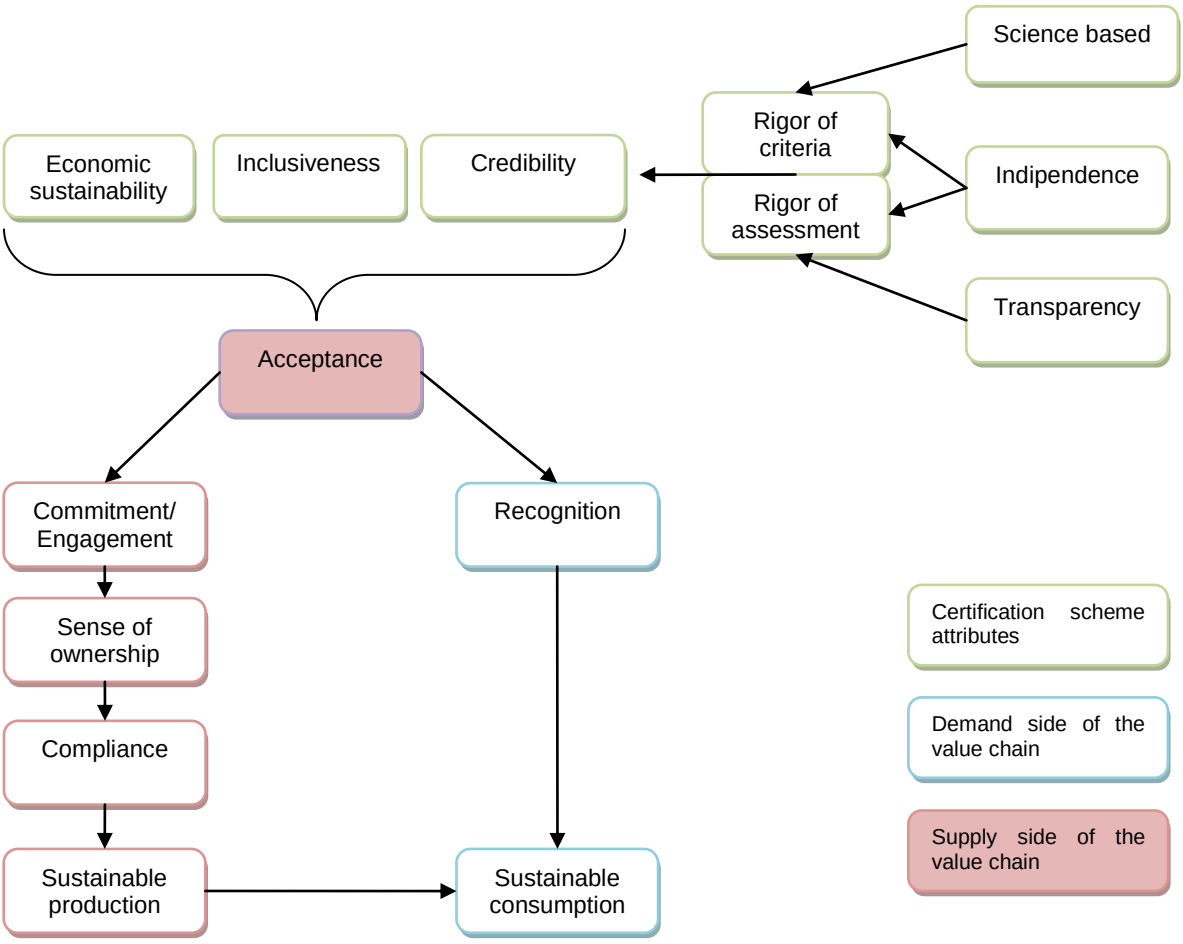
Source :extracted from the ICC homepage - http://www.iccinternationalchamberofcommerce.com/id93/index.html

215. Through opinion pieces, documentaries and other communication tools the media also play a role in informing and influencing the public opinion on fisheries and aquaculture related issues.

216. In conclusion, with regard to the credibility of voluntary certification schemes the role of the public sector is to ensure the truth of the claims.

217. Figure 11 is an attempt to summaries key features of an ideal model of private certification schemes.

Figure 11. 'Ideal' model of private certification schemes



3.2 Integrated traceability systems – solution to or outcome of certification scheme proliferation?

218. The previous sections have highlighted that public regulation and increasingly private certification schemes require extensive data trails to ensure fisheries and aquaculture product sustainability, quality and legality. Compliance with these requirements adds monitoring and control costs to each step in the value chain.

219. Traceability systems provide the ability to trace and identify a specific product at any stage of the production chain. Traceability systems track quantitative details like catch location and time, product temperature monitoring, processing details and transportation logistics. This greatly facilitates the recall of products in case of food safety hazards, can limit the market access for IUU products and provides information about product origin and production method. A closely related concept is that of chain of custody which combines traceability with the assurance of product integrity throughout the value chain.

220. Traceability can strengthen or restore consumer confidence in seafood.

221. Some countries require mandatory traceability for seafood, including the EU and the US which represent the two biggest seafood import market. The question arises if traceability systems can be up-scaled to turn from 'passive' mechanisms into active, fully integrated supply chain management tools which provide economic, environmental and social benefits to both the private and the public sector. An integrated system may reduce compliance cost and allow for multi-attribute certification (*e.g.* in terms of product and process food safety, sustainability and legality). Traceability can also be considered an asset that serves multiple purposes: regulatory verification needs of the public sector and logistic efficiency and marketing opportunities for the private sector. Some insurance underwriters have even started to offer 'discounts' on product recall insurance premiums if companies adopt traceability systems.

222. It is however to be expected that economies of scale of larger producers with vertically integrated chains would be more likely to be able to establish and successfully operate such integration than small scale independent producers, in particular in developing countries.

223. An international framework for traceability exists: the Codex Committee on Food Import and Export Certification and Inspection Systems has developed Principles for the Application of Traceability/Product Tracing in the Context of Food Import and Export Inspections and Certification Systems. ISO has developed the ISO/DIS 12875 *Traceability of finfish products — Specification on the information to be recorded in captured finfish distribution chains*.

224. The market for certification has also adapted to traceability needs and provides in particular western markets with seafood sector-specific traceability software (*e.g.* Astra System, Wisefish, Trace 2000).

3.3 Policy coherence for development

225. Fish and fish products are the most traded food commodity (FAO, 2009a) with close to 40% of the global production entering trade. A large amount of the world fish supply originates in developing countries. The different certification categories discussed earlier have potential trade implications which need to be carefully assessed. The question is if efficiency gains in terms of information availability through certification outweigh equity losses in terms of potential market access difficulties.

226. Criticism of labelling schemes, in particular privately initiated ones, refers often to their potentially trade-distorting effects, in particular for (small-scale) producers from developing countries. In that perspective, standards are perceived as a technical barrier to trade. Opponents of this view consider

standards as catalysts for trade: *i.e.* investments in production system upgrading in developing countries to meet standards would improve their standing in international markets in the medium-long run (OECD, 2007).

227. It appears that the trend to reduce tariffs is compensated by an increasing number of private certification schemes that may have the potential to act as *de facto* non-tariff measures. As already mentioned in the section on eco-labelling, the WTO has started looking into the implications of private certification since 2005. This is an indicator of the growing importance of private certification, given that the WTO is a platform for governments. In the specific case of fisheries, the increasing power of voluntary private standards in international trade relations is illustrated by the 'Dolphin safe' label for tuna. This voluntary labelling scheme has caused a dispute between Mexico and the USA at the WTO – the first time ever that a non-mandatory label (administered by a government) was examined in that arena.

228. The recent OECD Declaration on Green Growth underlines the special need to co-ordinate international development activities in order to help developing countries promote green growth. This includes also the need to ensure that trade and environmental policies are compatible and that internationally agreed trade rules like transparency and non-discrimination are respected.

229. FAO has conducted studies on the impact of certification on capacity building to comply with certification requirements. An important conclusion is that well-tailored certification requirements that respect different framework conditions are one possible step towards policy coherence.

PART 4 – MESSAGES TO POLICY MAKERS

230. The previous chapters validate findings from previous OECD studies: *fuzzy boundaries between private and public institution's roles in the standard landscape, in particular in OECD countries, raise global governance issues as these standards also affect production systems in other countries* (OECD 2004).

231. Bunte (2009) identifies three key mechanisms to address policy issues: negative and positive incentives (*e.g.* taxes, subsidies, prices); private responsibility (supported by information, moral persuasion) and hierarchical instruments (*e.g.* regulation, bureaucracy).

232. Hierarchical instruments remain the key tool for food quality and legality certification where roles and responsibilities between the private and the public sector seem to be well defined. The national and international regulatory framework sets minimum conditions which are complemented by voluntary schemes that go beyond them. In addition to setting the minimum regulation, it is the role of the public sector to ensure truth in labelling and advertising.

233. With respect to private eco-labelling and sustainability certification on the other hand it appears that without an international coordinated framework private certification scheme's accountability remains questionable. A balanced use of the three mechanisms against the background of an international framework for eco-labelling seems to be the necessary approach to deal with the moving target of 'sustainability'. An agreed and efficient sustainability reference framework could provide the necessary incentive structure for private certification schemes to better contribute to national and international policy objectives with respect to fisheries and aquaculture (environmental) sustainability.

234. This international framework would need to include agreed definitions, minimum requirements and a benchmarking mechanism. The FAO Guidelines for Fish and Fishery Products from Marine Capture Fisheries as well as the respective guidelines for inland fisheries and for aquaculture currently under development represent a potential point of departure for such an international framework on certification in fisheries. As mentioned earlier on, governments should however go beyond the issue of certification and aim for a broader 'aspirational' governance framework for sustainable fisheries to close the gap in the international fisheries governance framework and to be able to assess and measure progress.

ANNEX I: KEY DEFINITIONS[12]

Accreditation system

System that has its own rules of procedure and management for carrying out accreditation. Note: accreditation of certification bodies is normally awarded following successful assessment and is followed by appropriate surveillance. (FAO Glossary[13] - based on ISO Guide 2, paragraph 17.1)

Audit

A systematic and functionally independent examination to determine whether activities and related results comply with planned objectives (Codex Alimentarius 1995).

Authority

A body that has legal powers and rights (ISO/IEC 2004).

Body responsible for standards and regulations

A legal or administrative entity that has specific tasks and composition. Examples of bodies are organizations, authorities, companies and foundations (ISO/IEC 2004).

Certification

Procedure by which official certification bodies, or officially recognized certification bodies, provide written or equivalent assurance that foods or food control systems conform to requirements. Certification of food may be, as appropriate, based on a range of inspection activities which may include continuous on-line inspection, auditing of quality assurance systems and examination of finished products (Codex Alimentarius 1995).

The procedure can be carried out as first, second or third party certification. There is no official definition of the different types of certification, but commonly the following distinction applies:

- *First party certification:* self-declaration of conformity with self-set standards by the company making the claim;

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13. www.fao.org/fi/glossary/

- *Second party certification:* verification through an affiliated body, e.g. an industry/trade/consumer association, usually against standards established by these bodies or by peers;

- *Third party certification:* conformity assessment and audit by an independent inspection body/individual, preferably an accredited auditing body, but potentially also by other external entities against a standard. (Dankers 2003).

Claim

Any representation which states, suggests or implies that a food has particular qualities relating to its origin, nutritional properties, nature, processing, composition or any other quality (Codex Alimentarius 2007).

Ecolabelling scheme

In fisheries, ecolabelling schemes entitle a fishery product to bear a distinctive logo or statement which certifies that the fish has been harvested in compliance with conservation and sustainability standards. The logo or statement is intended to make provision for informed decisions of purchasers whose choice can be relied upon to promote and stimulate the sustainable use of fishery resources (FAO Glossary[13])

Fitness for purpose

The ability of a product, process or service to serve a defined purpose under specific conditions (ISO/IES 2004).

Inspection

Examination of food or systems for control of food, raw materials, processing, and distribution including in-process and finished product testing, in order to verify that they conform to requirements (Codex Alimentarius 1995).

Code of practice

A document that recommends practices or procedures for the design, manufacture, installation, maintenance or utilization of equipment, structures or products. A code of practice may be a standard, a part of a standard or independent of a standard (ISO/IEC 2004).

Food hygiene

Conditions and measures necessary for the production, processing, storage and distribution of food designed to ensure a safe, sound wholesome product fit for human consumption (Codex Alimentarius 2001)

Food safety

Assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use (Codex Alimentarius 2003).

Implementation of normative documents

A normative document can be said to be "implemented" in two different ways. It may be applied in production, trade, etc., and it may be taken over, wholly or in part, in another normative document. Through the medium of this second document, it may then be applied, or it may again be taken over in yet another normative document (ISO/IEC 2004).

Label

Any tag, brand, mark, pictorial or other descriptive matter, written,printed, stencilled, marked, embossed or impressed on, or attached to, a container of food (Codex Alimentarius 2007).

Mandatory

Required or commanded by authority; obligatory, compulsory.

Organization

A body that is based on the membership of other bodies or individuals and has an established constitution and its own administration (ISO/IEC 2004).

Quality

The degree to which a set of inherent characteristics fulfil requirements (ISO 2005).

Recommendation

A provision that conveys advice or guidance (ISO/IEC 2004).

Reference to standards (in regulations)

Reference to one or more standards in place of detailed provisions within a regulation (ISO/IEC 2004).

Regulation

A document providing binding legislative rules, that is adopted by an authority (ISO/ICE 2004).

Requirement

A provision that conveys criteria to be fulfilled (ISO/IEC 2004).

Regulatory authority

An authority that is responsible for preparing or adopting regulations (ISO/IEC 2004).

Sanitary or phytosanitary measure

Any measure applied:

(a) to protect animal or plant life or health within the territory of the Member from risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms;

(b) to protect human or animal life or health within the territory of the Member from risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs;

(c) to protect human life or health within the territory of the Member from risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests; or

(d) to prevent or limit other damage within the territory of the Member from the entry, establishment or spread of pests.

Sanitary or phytosanitary measures include all relevant laws, decrees, regulations, requirements and procedures including, *inter alia*, end product criteria; processes and production methods; testing, inspection, certification and approval procedures; quarantine treatments including relevant requirements associated with the transport of animals or plants, or with the materials necessary for their survival during transport; provisions on relevant statistical methods, sampling procedures and methods of risk assessment; and packaging and labelling requirements directly related to food safety (WTO 1995).

Standard

A criterion (or indicator, or reference point) which has been formally established and is enforced by an authority and on the basis of which constraining action can be taken (FAO Glossary – see note 13).

A standard the application of which is made compulsory by virtue of a general law or exclusive reference in a regulation is a mandatory standard (ISO/ICE 2004). When a standard is declared mandatory it becomes a technical regulation (UNCTAD/WTO 2002).

Standard for certification Document approved by a recognized organization or arrangement, that provides, for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods, with which compliance is not mandatory under international trade rules. It may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method (FAO Glossary[13]). *Product standard*

A standard that specifies requirements to be fulfilled by a product or a group of products, to establish its fitness for purpose (ISO/ICE 2004).

Process standard

A standard that specifies requirements to be fulfilled by a process, to establish its fitness for purpose (ISO/ICE 2004).

Equivalent standards

Standards on the same subject approved by different standardizing bodies, that establish interchangeability of products, processes and services, or mutual understanding of test results or information provided according to these standards (ISO/ICE 2004).

Unified standards

Harmonized standards that are identical in substance but not in presentation (ISO/ICE 2004).

Unilaterally aligned standard

A standard that is aligned with another standard so that products, processes, services, tests and information provided according to the former standard meet the requirements of the latter standard but not vice versa. A unilaterally aligned standard is not harmonized (or equivalent) with the standard with which it is aligned (ISO/ICE 2004).

Comparable standards

Standards on the same products, processes or services, approved by different standardizing bodies, in which different requirements are based on the same characteristics and assessed by the same methods, thus permitting unambiguous comparison of differences in the requirements. Comparable standards are not harmonized (or equivalent) standards. (ISO/ICE 2004).

Standardization

The activity of establishing, with regard to actual or potential problems, provisions for common and repeated use, aimed at the achievement of the optimum degree of order in a given context. The general aims of standardization follow from the definition of standard. Standardization may have one or more specific aims, to make a product, process or service fit for its purpose. Such aims can be, but are not restricted to, variety control, usability, compatibility, interchangeability, health, safety, protection of the environment, product protection, mutual understanding, economic performance, trade. They can be overlapping. (ISO/IEC 2004)

Standard-setting organisation or arrangement

Organization or arrangement that has recognized activities in standard setting (FAO Glossary[13]).

Sustainability

In its original sense, sustainability refers to development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundlandt, 1987). Applied to fisheries and aquaculture, the focus is on protecting the resource itself (fish stocks) and avoiding negative impacts on the surrounding eco-system.

Technical regulation

Document which lays down product characteristics or their related processes and production methods, including the applicable administrative provisions, with which compliance is mandatory. It may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method (WTO 1979)

Technical specification

A document that prescribes technical requirements to be fulfilled by a product, process or service. A technical specification should indicate, whenever appropriate, the procedure(s) by means of which it may be determined whether the requirements given are fulfilled. A technical specification may be a standard, a part of a standard or independent of a standard (ISO/IEC 2004).

Traceability

Ability to follow the movement of a food through specified stage(s) of production, processing and distribution (Codex Alimentarius 2001).

Unit of certification

The "unit of certification" is the fishery for which eco-labelling certification is called for. The certification could encompass: the whole fishery, where a fishery refers to the activity of one particular gear-type or method leading to the harvest of one or more species; a sub-component of a fishery, for example a national fleet fishing a shared stock; or several fisheries operating on the same resources. The certification applies only to products derived from the "stock under consideration" In assessing compliance with certification standards, the impacts on the "stock under consideration" of all the fisheries utilizing that stock or stocks over their entire area of distribution are to be considered (FAO Glossary – see note 13).

Voluntary

Without any legal obligation

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TRADE AND AGRICULTURE DIRECTORATE
FISHERIES COMMITTEE

TAD/FI/RD(2010)9
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WORKSHOP ON THE ECONOMICS OF ADAPTING FISHERIES TO CLIMATE CHANGE

CHAIR'S SUMMARY

This Chair's report summarising the key messages of the OECD Workshop on the Economics of Adapting Fisheries to Climate Change has been prepared by John C. Davis, Institute for Coastal and Oceans Research, University of Victoria, and Vice-President, Canadian Operations, iDUS Controls Limited, Nanaimo, British Columbia, Canada. It will be included in the Workshop proceedings, which are currently in the publication process. Delegates may also refer to the presentations given at the Workshop, which are currently available on the website (www.oecd.org/fisheries).

It is presented to Delegates for INFORMATION regarding agenda item 6) Climate Change and Fisheries as well as with respect to agenda item 12) Programme of Work 2011-2012.

For further information, please contact:
Carl-Christian SCHMIDT at carl-christian.SCHMIDT@oecd.org

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Foreword

Scientific findings indicate that aquatic climate change impacts are becoming more apparent and will continue to have a profound effect on the productivity of fisheries and the distribution of fish stocks around the world. However, there is a great deal of uncertainty associated with climate change in a fisheries context, particularly with respect to when it will occur, what kind of changes will take place and the extent of the impact it will have on aquatic ecosystems and fisheries. While global models exist and provide some indication of the magnitude of impacts, much work needs to be done at the local level in terms of understanding how fish stocks will react to changes in their environment, as well as how ecosystems will change. From a social and economic point of view, it is clear that the effects of climate change will result in the redistribution of costs and benefits for the fisheries sector and for coastal communities, but how much, when and to whom these benefits and costs will flow are less clear. In this regard, there is a need for fisheries policy makers to develop strategies and decision-making models to adapt to climate change under uncertainty, while also taking into account social and economic consequences.

As a complementary exercise to the various other international events on climate change that generally have had a scientific focus, the OECD Committee for Fisheries held a Workshop on the Economics of Adapting Fisheries to Climate Change on 10-11 June 2010 in Busan, Korea, as part of its Programme of Work for 2009-2010. The main objective of the Workshop was to provide a forum for policy makers, economists, biologists, international organisations, the private sector and non-governmental organisations to examine the economic issues, policy challenges and institutional frameworks and responses to adapting to climate change. This publication, the outcome of the Workshop, highlights actions that are needed to respond to climate change: strengthening the global fisheries governance system, a broader use of rights-based management systems, ecosystem protection, industry transformation, ending perverse subsidies and a focus on demand for sustainable seafood. Policy makers will also need to consider how to ensure sustainable aquaculture production as part of adaptation strategies, and how to develop adaptable and flexible fisheries and aquaculture policies within a broader oceans management framework.

The Workshop brought together over 100 participants, ranging from policy makers, fisheries managers, economists and biologists. The two-day Workshop consisted of six sessions which included expert presentations and plenary discussions and focussed on identifying the key economic issues, challenges and possible impacts in relation to climate change and the fisheries; explored adaptation policy measures and options; selected case studies on national adaptation strategies in the fisheries sector; policy issues regarding trans-boundary and high seas stocks as well as climate change adaptation challenges facing developing countries. The Workshop concluded with a panel session on the political economy aspects of developing and implementing climate change adaptation strategies for fisheries, especially with regard to managing expectations and working collaboratively with stakeholders.

CHAIR'S REPORT[1]: OECD WORKSHOP ON THE ECONOMICS OF ADAPTING FISHERIES TO CLIMATE CHANGE

BUSAN, KOREA, 10-11 JUNE 2010

Introduction

1. Recent scientific findings, including the 2007 Intergovernmental Panel on Climate Change report (IPCC, 2007) indicate that the global effects of climate change are becoming more evident. Climate change is likely to influence fisheries and aquaculture production in various ways. For capture fisheries, climate change affects fish productivity and distribution through changes in recruitment, growth rates and mortality rates, as well as in the migratory patterns of some stocks. From an economic point of view, these changes will result in losers and winners, between regions or countries as well as within national jurisdictions. With respect to aquaculture production, climate change may necessitate changes in the species composition farmed in some areas depending on tolerability of the species to temperature and other changes. Other possible impacts of climate change on aquaculture include changes in feed composition and supply as well as changes in the type, scope and extent disease outbreaks in fish farms. For both sectors, relocation of aquaculture production sites, wild harvest landing sites (*e.g.* ports), and fish processing facilities may be required due to extreme weather events, changing stock distribution and location relative to markets.

2. The expected changes in the fisheries and aquaculture sectors caused by climate change will require enhanced adaptability and flexibility in fisheries and aquaculture policies in order to be able to quickly and effectively respond as circumstances evolve. While there will continue to be a great deal of uncertainty associated with the interactions between climate change and fisheries and aquaculture over the next several years, fisheries policy makers should now turn their attention to the development and implementation of climate change adaptation strategies. These strategies must also expressly consider social and economic consequences and the distribution of impact across time and between stakeholders. More specifically, fisheries policy makers will need to consider the following fundamental questions when developing climate adaptation strategies: What policy options are available? How should decisions be made? When should actions be taken? How do we build support for the changes required?

3. Against this backdrop, the OECD Committee for Fisheries (COFI) hosted an international workshop entitled "The Economics of Adapting Fisheries to Climate Change" on 10-11 June, 2010 in Busan, Korea to address these challenges and provide insights to policy makers. Adaptation to climate change was the primary focus of this Workshop in order to allow for a fulsome discussion on this topic. COFI nevertheless recognises the importance of mitigation strategies as part of a comprehensive response to climate change, and further work in this area is warranted.

4. The Workshop was designed to provide guidance to fisheries policy makers in terms of when to implement policy changes or develop new policies or approaches to adapt to climate change impacts. Furthermore, it was conceived to allow for an examination of the "tools" in the fisheries manager's "toolbox" in terms of their suitability in the face of climate change, as well as to develop an understanding of the economic, social and environmental information that can underpin decisions on climate change adaptation. The Workshop findings included in the Chair's summary are intended to inform governance considerations that are important to national and international efforts to manage and conserve aquatic resources while adapting to the effects of climate change, as well as other pressures that influence fisheries resources, whether they be natural or man-made. Specifically, the objectives of the Workshop were to:

1. John C. Davis, Chair of the Workshop. Institute for Coastal and Oceans Research, University of Victoria, and Vice-President, Canadian Operations, iDUS Controls Limited, Nanaimo, British Columbia, Canada.

- Improve the understanding of the interaction between climate change and fisheries and aquaculture from economic, social and institutional perspectives, in light of risk and uncertainty;

- Identify key policy issues that should be taken into consideration when developing fisheries and aquaculture strategies to adapt to climate change;

- Explore the fisheries policy tools that will increase flexibility in adapting to climate change;

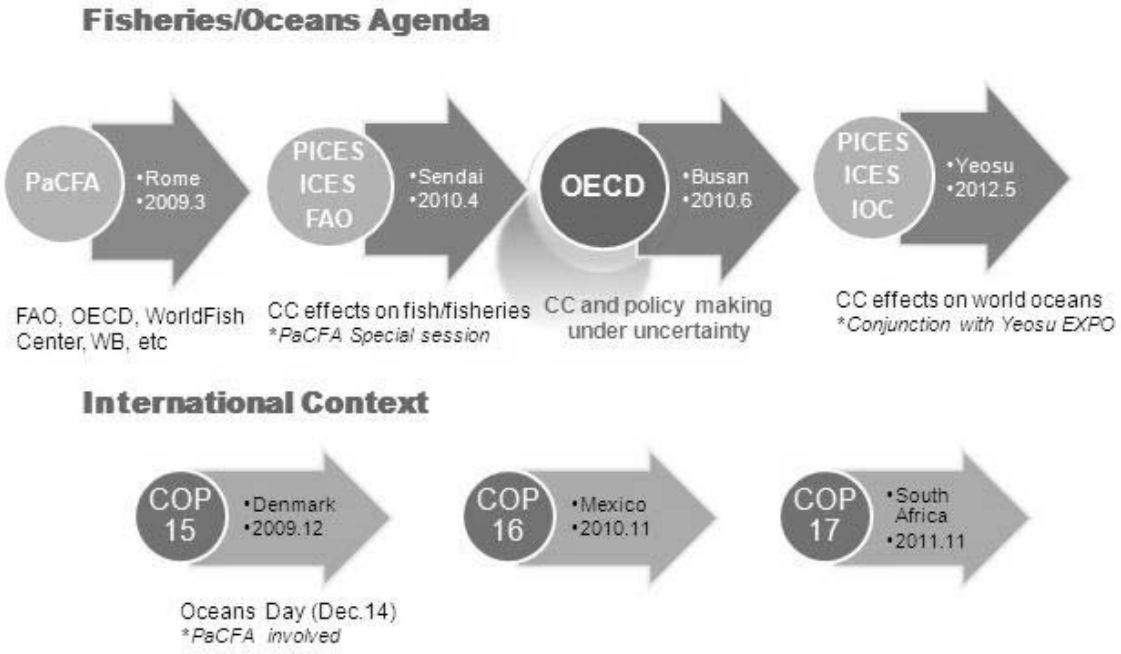
- Analyse the possible social and economic consequences of the management strategies to help fisheries decision-making; and,

- Provide fisheries policy makers with insights on developing climate change adaptation strategies and when to make decisions under uncertainty.

Context

5. As an organisation mandated to provide a setting where governments compare policy experiences, seek answers to common problems, identify good practice and coordinate domestic and international policies, the OECD has a particular role to play in the global discussions on climate change and fisheries. Specifically, the OECD's role and expertise regarding economic and policy analysis, coupled with the COFI's analytical work regarding to fisheries economics, management, policy development and governance will assist in shedding light on the economic and institutional aspects of climate change. While the science around climate change is relatively advanced in a number of areas, there are significant gaps in knowledge and particularly a need for informed policy-making, strengthened governance structures, and international cooperation based on sound economic analysis. The OECD Worksop was designed to fill that gap. Figure 1 illustrates the how this Workshop complements and contributes to other international fisheries and climate change conferences.

Figure 1. Role of the OECD COFI in the global discussions on climate change and the fisheries sector



6. The Workshop agenda was structured to build towards a comprehensive consideration of the subject of fisheries adaptation to climate change, reviewing the status of scientific knowledge, uncertainty, and fisheries management and governance challenges in order to adapt to climate change. The fisheries management toolbox was also examined, from the perspective of whether or not existing tools are available to develop effective climate change adaptation strategies for the fisheries and aquaculture sectors. In addition, a number of presentations addressed the ecosystem approach, economic implications, and the strategies being employed by various nations to adapt fisheries and aquaculture to the impacts of climate change. There was also an emphasis on adaptation strategies in both developed and developing nations, including an assessment of their respective vulnerability to adapting to climate change impacts. A follow-up session dealt with the political economy of adapting fisheries to climate change with views from the large-scale fishing industry, NGO's and policy makers. Finally, a Panel Session with active involvement of the Workshop participants brought together key findings and insights, with a view to developing key considerations for policy makers.

7. The growing awareness of the importance of these issues, the shift towards embracing the "Green Growth" paradigm, and the urgency of these matters, offers considerable impetus to move forward, particularly if market forces are harnessed to ensure appropriate reduction in greenhouse gas emissions and more generally in support of green growth and sustainable management practices for aquatic resources. In this context it is important to ensure that the right incentive structures are built.

8. This Chair's Summary is intended to summarize key insights and major findings of the Workshop and not to repeat all the rich content of the papers presented by speakers. Readers are encouraged to refer to the complete volume of the Workshop Proceedings for further information.

Climate Change and Fisheries Adaptation Issues and Strategies: Current State of Play

9. The opening presentations examined science, uncertainty, and fisheries management and governance challenges in the context of climate change in order to set the scene for the workshop. Key findings of a recent large-scale ICES, PICES and FAO symposium on the subject held in Sendai, Japan in April 2010 were outlined by a representative of ICES. The Sendai Conference illustrated that while there is a considerable body of science, this information tends to be patchy, with a bias towards developed countries. It also demonstrated that the Ecosystem Approach to Fisheries (EAF), which incorporates multiple and interactive factors, offers the best potential for understanding and responding to climate change impacts on fisheries.

10. Several participants raised the comparative carbon-related costs of fishing relative to those of other food-related activities such as raising cattle. It was pointed out that many fisheries and aquaculture activities do not contribute significantly to greenhouse gas emissions and that a good case in this regard can be made for such activities compared with more traditional and environmentally costly forms of food production. Panellists concluded that this perspective does not appear to be widely known and may be an important marketing, certification and policy-related point for consideration. Accordingly, there may be benefits in developing and promulgating comparative data of this type for policy-makers.

11. Workshop participants agreed that clearly, it is very important that fisheries managers and policy makers find effective ways of managing uncertainty and incorporating it in management practices and governance arrangements. In managing both fisheries and those individuals and organisations that conduct fishing, we are dealing with coupled marine socio-ecological systems. One cannot separate the natural science from the social science aspects; in that regard, our systems and processes must take both into account in order to develop effective management and governance structures to deal with the adaptation of fisheries to climate change impacts. During the workshop, it emerged that uncertainty can be grouped into four categories:

- Observational uncertainty, where the current state of system is not known;
- Model uncertainty, in that models are not perfect;
- Process uncertainty, where there is a lack of understanding of the system; and,
- Policy uncertainty, where scientific and economic information and advice are inadequately applied.

12. Workshop participants argued that the ocean has always been variable and that stock collapses are most likely a combination of environmental effects and overexploitation. Climate change is superimposed upon natural variability, with resultant fluctuations in stocks (which may be major or minor in nature) and possible irreversible changes.

13. A session at the workshop was devoted to the political and economic aspects of developing and implementing fisheries adaptation strategies to climate change, especially regarding stakeholder involvement and expectations. Linked to this is the question of governance and how policy-makers and managers deal with competing interest groups and effect policy change in the face of varying positions. At issue are questions of local, regional, national and international governance, established interests of large and small-scale fishing operations, national and individual self-interest, the effectiveness of governance systems and processes, and how to build consensus to make needed changes for sustainable use of fisheries resources and adapting fisheries to the impacts of climate change. While it was recognised that many fisheries management tools that incorporate uncertainty exists, they may not be effectively applied due to implementation challenges associated with political, social, economic and financial factors.

14. From a commercial fishing sector perspective, it emerged that changes in fish stock location and abundance presents major challenges, as do the costs of fossil fuels and refrigerants and impacts of incentives to discourage the use of those products. For example, there have been major changes in composition of the New Zealand charter fleet in recent times and major decreases in mid-water landings of a number of species. As fish stocks move and distribution and abundance change, there will be significant issues with respect to access and allocation between affected States and their commercial stakeholders, possibly resulting in situations where national and local community interests may clash.

15. From a fisheries policy maker's perspective, the need for strengthening already existing good fishery governance practices, including implementing an ecosystem approach to fisheries management, rebuilding fish stocks and applying a participatory approach, was stressed. Lessons can be learned from applying traditional knowledge, involving fishers and building on practices supported by those individuals. While not extensively discussed, the need for adequate fisheries data in light of climate change may be an important consideration given that many fisheries management practices are based on historical, single species data sets. If the ocean changes beyond our historic scientific experience, managers and scientists may have a weakened foundation for making predictions and assessing which management actions to take, and also in terms of developing ecosystem strategies.

16. The experiences of OECD countries as well as non-member economies in identifying climate change impacts on fisheries, developing adaptation strategies and addressing social and economic issues were presented. A number of developed nations are actively anticipating, designing and implementing actions to deal with expected climate change impacts on fisheries. In contrast, developing countries are affected by their limited capacity despite the overall importance of the fisheries as a source of food protein. Fisheries on the high seas and those for straddling stocks face unique challenges, as fish move across national boundaries. The following paragraphs identify the state of play at the national and international

level, and in some cases illustrate how nations are seeking ways in which to deal with the four types of uncertainty identified earlier.

17. The EU is currently instituting measures that seek to address both process and policy uncertainty in particular. This is being undertaken through the appointment of a European Commissioner for Climate Action, the establishment of a Commissioner's Group on Climate Change, and an Inter-service Group on Adaptation to Change to explore integration of adaptation policy into policy development. A comprehensive EU climate change adaptation strategy is under development and is intended to harmonize EU fisheries management policies and procedures.

18. In the United Kingdom, the government is developing an approach for climate change adaptation which considers the impact of increased ocean temperature, sea level rise, ocean acidification and changes in storm intensity and ocean circulation with resultant impacts on fish species distribution and abundance. Adaptation approaches are being designed with the goal of securing sustainable and stable fish biomass, alongside a viable and economically healthy fishery. The core elements of the strategy include building trust between fishers, scientists and government, while also ensuring resilience in marine ecosystems. The incorporation of an ecosystem- based approach to marine management is crucial in this regard. The UK also places a strong focus on reducing reliance on government transfers to the sector and instead focussing on market incentives. To this end, the UK government is examining approaches that would allow fishing enterprises greater flexibility and incentives to self-adjust as required, without significant government intervention. Further details on the UK's fisheries climate change adaptation strategy are provided in a separate chapter in this volume.

19. In Korea, indications of changing ocean conditions have included the appearance of sub-tropical species and toxic jellyfish, and there have been significant changes in the distribution and abundance of major fish species. In response, Korea has instituted the comprehensive Marine and Fisheries Policy in 2007 and the National Action Plan for Climate Change in 2009. These two policies incorporate climate change initiatives, including strengthening resource management for emerging warm water species while taking advantage of new harvest opportunities, developing farming technologies for new species (*e.g.* tuna), and creating marine parks to protect fish habitat and spawning grounds.

20. Similarly, Chinese Taipei has experienced significant changes in distribution and abundance of fish stocks in recent years. There have been declines in key fisheries linked to climate change effects, with the resultant impacts on fishers and the fishing industry. Typhoon-induced floods have had major impacts on the aquaculture industry through facilities damage and escapes of cultured fish. Major reductions in fisheries catches are projected to occur. Adaptation strategies are under development in Chinese Taipei that are intended to include specific adaptation measures to supplement current management practices.

21. The workshop also identified the divergence in approaches and highlighted the varying levels of capacity between developing and developed countries in adapting to climate change. In many developing countries, marine and freshwater fisheries are an important source of protein and national food security, as well as crucial to the livelihoods of parts of the population. Some are land-locked countries with a dependence on freshwater fisheries and aquaculture. Accordingly, as global climate change impacts intensify and affect freshwater availability and food security issues, impacts on fisheries and aquaculture may be severe.

22. It emerged that developing nations appear to be the most vulnerable to the effects of climate change on fisheries, and many lack the capacity to adapt and cope with these impacts. In this vein, a global study on the effects of climate change conducted by the UK QUEST project that explored the vulnerability of countries was presented. This study used an indicator-based approach based on exposure, sensitivity and adaptive capacity of the societies and noted that vulnerabilities were especially high in developing

countries. African countries, former Soviet countries and landlocked countries were identified as most vulnerable.

23. As a way forward in the Pacific, a number of adaptation strategies to restore and sustain the food production potential of the coastal fisheries of Pacific Island nations were proposed: applying an EAF, increasing access to tuna for subsistence fishers with low-cost, inshore Aggregating Fish Devices, storing and distributing tuna and by-catch from industrial fleets to urban areas; and developing pond aquaculture. The debate about sharing experiences and building capacity among nations was illustrated by the example of "The Blue Economy Initiative" of the Korea 2012 Yeosu EXPO. This program is intended to institute a capacity-building program where resources will be devoted to developing countries in order to deal with problems in the field of marine and fishery affairs, including climate change impacts.

24. The Workshop also addressed management of fisheries and aquaculture in the ocean area beyond national jurisdictions in a world where climate is changing. Participants generally agreed that major steps have been made in addressing international agreements and regulatory arrangements for high seas fisheries through initiatives such as the UN Fish Stocks Agreement, FAO Compliance Agreement, and the FAO International Plan of Action. However, given the size of the ocean and limited enforcement capacity, it was concluded that illegal activities are largely state failures that result from either a lack of capacity or lack of will. While the international legal framework to effectively manage fish stocks and adapt to climate change exists, further work on implementation (*e.g.* enforcement) is required.

25. Changes in fish distribution resulting from variations in ocean conditions will likely affect fish stock sharing arrangements between countries regarding straddling or migratory stocks, creating a need to develop incentives for those countries that may receive smaller shares as a way to ensure conservation. However, one provocative comment raised during the discussions was that future changes in fish abundance on account of climate change may not be as dramatic as what was seen in the 70s and 80s as a result of overexploitation. As such, we may be able to draw on past fisheries management measures that were effective in rebuilding or managing depleted stocks.

Key Messages for Fisheries Policy Makers

26. Climate change will impact fish species in uncertain ways relative to their current range of distribution or historical patterns, and some species within an ecosystem may shift in one direction (*e.g.* north), while others move in the opposite direction *(e.g.* south). This may result in changes in ecosystem structures themselves, as species that have traditionally cohabited within certain geographical ranges may move apart, altering predator/prey interactions for example. Resilient fisheries management regimes are required in order to provide a buffer against this uncertainty.

27. At issue is the effectiveness of fisheries organisations and existing governance structures and their ability to ensure conservation and sustainability while being adequately flexible so as to deal with change. It is clear, that climate change impacts, in association with natural variation and the various factors that affect fish stocks and the ecosystems they inhabit, will add uncertainty to fisheries management and pose a challenge to our efforts to conduct sustainable fisheries, feed a growing global population, and put in place effective international fisheries organisations and arrangements. Fostering initiatives to address key gaps in natural and social scientific knowledge associated with fisheries adaptation to climate change including specific impacts on major target species, shifts in ecosystem dynamics related to climate change, public awareness and decision-making and incentives to policy change and good fisheries management governance arrangements and practices will be essential. Based on the discussions and findings of the workshop, the following section outlines the main messages to be considered by fisheries policy makers in adapting to climate change challenges in the fisheries and aquaculture sector.

i) The fisheries toolbox to adapt to climate change already exists, but stronger and more flexible governance frameworks are needed.

28. The consensus of the Workshop is that an effective array of management tools exist to allow us to adapt to the impacts of climate change on fisheries, although governance itself appears to be the weak link. It was highlighted that evolving, responsible, and resilient fisheries management approaches require a contextual and participatory governance framework characterized by flexible and adaptive operational and strategic fisheries decision making. Often, emphasis is placed on examining the causes of stock collapses, but rarely do we look at and capitalize on the lessons learned from stock recovery. However, it was agreed that it is possible to strengthen fisheries management systems to be more adaptive to climate change through a flexible management framework that explicitly considers uncertainty.

29. In this regard, there is a need to avoid "institutional mal-adaptation" which refers to a governance structure that assumes the ecosystem is static, rather than a structure that recognises that for example, fish distribution will evolve over time. For instance, in cases where species managed under a quota system move between pre-determined zones and the fishers cannot "follow the fish" to an area where they do not hold quota is evidently problematic. Designing an enabling framework and developing markets for trading domestic and international quotas were raised as options in this regard. Another case in point refers to marine protected areas; such geographically based tools require some inherently flexibility so as not to be rendered redundant as species migrate to more suitable climates. Participants emphasized that an important role for governments include identifying and removing institutional barriers, periodically reviewing protection measures to see if they are still applicable and ensuring that they do not dilute incentives for fishers to adapt to climate change, as well as addressing ongoing concerns such as discards, while also building trust between fishers, scientists and governments.

30. Furthermore, "coping strategies" will need to be developed as aquatic conditions change and the ecosystem responds. In the short term, this may include tuning fishing intensity, gears, times, areas, target species, etc. and using the appropriate methods in the fisheries management toolbox. In the longer term, adapting to climate uncertainty will require political reform leading to effective governance arrangements, and the will and capacity to enforce the required management actions. In this regard, marine spatial planning (or aquatic spatial planning) and integrated ocean management is an important element in developing strategies to respond and adapt to fisheries climate change.

ii) The economic effects of climate change will depend on specific conditions of a fishery or coastal community and need to be taken into account in developing adaptation strategies.

31. Economic effects are influenced by a number of factors, including value of catch (*e.g.* productivity, size, species distribution, markets, etc), costs of production (*e.g.* new investment and energy consumption), employment, community economies (reach of the market for seafood and their flexibility in responding to changes in supply and prices), redistribution of benefits and costs among stakeholders, and long-term profitability and ability to account for a range of possibilities. Economic effects depend on the context of a situation and may be positive or negative. Economic vulnerability of a business or an individual is related to the level of exposure to change, response capability, and level of dependence on the fish species or group of species in question.

32. In addition, there is an inherent contradiction between stability and flexibility and that managing portfolios of fisheries (*e.g.* multi species approach) may promote more resilience for fisheries and fishing enterprises than managing single stock managing individual fishery units.

iii) Involving stakeholders and communicating with them in designing and implementing climate change adaptation strategies is essential.

33. The need to consider the human dimension of fisheries management and the need for stakeholder engagement, including literacy and capacity, was also emphasized. In particular, the need to engage the public (the fisheries resource users) as well as the broader set of stakeholders in order to anticipate social and economic impacts, explore options, make the necessary choices and implement effective policies was highlighted. Inclusion of local and traditional knowledge is an important element of this approach. Effective engagement will facilitate the necessary social, economic and political policy changes required to adapt. Failure to do this may cause the often competitive and sometimes antagonistic relationships between competing interests to persist and frustrate effective change and governance. Accordingly, there is a need to better communicate with a broader set of stakeholders and the public with respect to fisheries, global food and water security issues, and the impact of climate change in order to facilitate awareness, establish priorities and develop the needed political and societal support for adaptation.

34. There is a need to think about how to communicate and implement overarching good governance principles of fisheries management and incorporate climate change impacts while doing that. In this way, the focus would be less on climate change per se, but would be considered as part of the complexity and uncertainty to be addressed as part of fisheries management. An important part of building understandings and effecting policy change is the need to inform people about anticipated impacts so that choices can be made. This will require more engagement of economists and social scientists to assist the public in gaining understanding and in facilitating change based on human behavioural patterns. Understanding the natural science and the biology and oceanographic implications will not be sufficient to achieve the necessary changes. The social-ecological relationships will need to be addressed as well.

iv) New arrangements for international fisheries management to deal with stock migration and conserve the stocks are required.

35. A continued focus on efforts and initiatives to elucidate, foster and develop adaptive, flexible international arrangements, agreements, organisations, and cooperation to address the fisheries climate change adaptation challenge and to promote effective stewardship, conservation and good governance of aquatic resources is essential. The changing distribution of fish stocks and altered abundance in the face of climate change will require a renewed focus on developing and/or adapting international fisheries agreements that address fish stock migration between EEZs, and treaties governing the distribution of shared stocks amongst countries. Strengthening regional fisheries management organisations will also be key to managing fish stocks as they migrate on the high seas, with the added urgency posed by stress on the stocks due to exploitation as well as climate change impacts.

36. Some changes in species abundance, distribution or ecosystem composition may be irreversible; these shifts will put international arrangements and treaties under stress. As a result, innovative incentive structures and adaptation strategies will need to be considered, including side payments to countries that would offset reductions in their fish catches; greater flexibility regarding fishing in adjacent zones and in foreign EEZs; the advent of new technology; creating and accessing new markets or introducing new products; and, increased flexibility to deal with supply changes in relation to market demand.

v) Sustainable aquaculture production, the Ecosystem Approach to Fisheries management and strong science are core elements of a fisheries adaptation strategy.

37. Sustainable aquaculture production may be one solution to supplement stagnating/declining capture fisheries or those affected by climate change. Sustainable aquaculture has the potential to help address global food security challenges and may be particularly important for developing countries where

fish forms a very important component of the diet. Aquaculture may offer flexibility in dealing with challenges associated with climate change such as water scarcity, storms, temperature, choice of adaptive species, etc. Technological developments to increase the ability to adapt fish cages and installations to prevent storm damage, techniques for dealing with temperature stress, breeding technology innovations, genetic engineering, improved food sourcing away from reliance on fish meal, and reduced antibiotic use would be key elements of ensuring sustainable aquaculture production. A simpler governance model compared to wild fisheries, in which property rights for aquaculture sites and stocks are clearly assigned, was also considered a benefit.

38. There was strong consensus that adoption and implementation of the ecosystem approach is a very important strategy as it is only this approach which can incorporate all elements which are necessary to deal with the complexities of natural systems and the impact of climate change. This however, is a major task and often ecosystems are not well understood and our ability to manage fisheries stocks on a multi-species basis is not well developed.

39. While there is considerable scientific work being done, the global view on climate change impacts on fisheries is patchy and not fully understood. There is a need for more comprehensive science, particularly with respect to fisheries of developing countries, and a focus on key stocks and areas of concern which will vary geographically in sensitivity to climate change. Aligning global estimates of climate change to the local scale and accordingly downscaling predictions to the local level remains a challenge and must be addressed as is assigning a priority to further elucidating the biological, social and economic impacts of climate change on fisheries and aquaculture.

vi) Developing countries are especially vulnerable to climate change, calling for knowledge transfers and capacity building.

40. For developing countries, there is an urgent need for anticipating and understanding the expected impacts, developing adaptive capacity, particularly for knowledge transfer, capacity building, and effective technology transfer from developed countries. Furthermore, small developing countries with coastal or artisanal fisheries may be significantly impacted by distant water fishing nation activities which may change with climate change influences. Considerable research and development efforts are needed in this area to ensure that other human activities and uses (*e.g.* urbanization, population growth, and agriculture) are not negatively effecting water quality, fisheries productivity or aquaculture potential. In short, a focus on the specific problems of developing nations and their lack of capacity to deal with fisheries climate change adaptation and need for assistance from developed countries is required.

Future research and considerations

41. This Workshop covered a vast and complex topic of global proportions with strong implications for the fisheries and the aquaculture sector, and with major elements of an economic and social nature. Global water security issues and their impact on fisheries and aquaculture, including in the freshwater environment, are major challenges. Effective water use and water conservation initiatives, anticipating and coping with storms, floods, drought, snow-pack depletion, coastal sea level changes, and impacts on freshwater ecosystem integrity are topics for important research and policy development. These issues have both a natural science and a social science dimension in terms of choices that must be made with respect to global water security issues, including those related to the fisheries sector. In this regard, future work on climate change and the fisheries should also consider the following aspects:

- Mitigation Strategies: There is a major difference in the costs and benefits of adaptation and mitigation activities respectively. The costs and benefits of adaptation are more likely to be local in nature, and can thus strain countries with limited capacity and resources to implement

adaptation measures. In contrast, the costs of mitigation are more likely to be local, while the benefits are often diffuse and experienced on a global scale. Research to assess the various approaches and strategies regarding mitigation of the effects of climate change (*e.g.* carbon sequestration in the oceans; increasing fuel efficiency for fishing vessels) for fisheries and aquaculture is required. In addition, the scale and scope of socio-economic sensitivities of fisheries to climate change, including the associated fishing communities, may be assessed in terms of their resilience to respond to the effects of climate change. Such work would help identify if the fishery can adjust autonomously or whether targeted transitional policies (*e.g.* additional capacity building or economic development) are needed.

- Integrated marine management: There is a call for a comprehensive approach to examining the cumulative impacts of the various human activities in the ocean is required. This may include shipping, oil exploration, fishing, tourism etc. Holistic management plans may be based on an assessment of the impacts on the marine environment of human activities and the interactions between them. Elaboration of the necessary elements of a governance structure that adopts such an integrated approach would enable strong institutional frameworks within which to deal with climate change.

- Freshwater fisheries management: There is a need for more emphasis on climate change impacts on freshwater fisheries which will affect many of the most vulnerable countries with a strong dependence of fisheries for food security. The ocean has always been a highly variable ecosystem and variation in abundance and distribution of fish stocks has always challenged fisheries managers, with considerable uncertainty present which must be accounted for. In many locations around the world, changes in fisheries related to phenomena in the ocean are being observed, particularly changes in fish distribution and abundance. Changes are also happening in freshwater water bodies, and these must equally be considered in the development of climate change mitigation and adaptation strategies.

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KEY MESSAGES FROM THE WORKSHOP

Recently the OECD in-house policy on policy briefs has changed. Responsibility lies now directly with the Secretariat/the Directorate and it is no longer referred to as 'policy brief'. The present document is proposed as a 'backgrounder' and builds on the OECD Workshop on Advancing the Aquaculture Agenda. Policies to ensure a sustainable aquaculture sector.

This paper is distributed for DISCUSSION and INFORMATION at the 106th Session of the Committee for Fisheries 25-27 October 2010, under item 7. ii).

For further information, please contact:
Nicole FRANZ (Email: nicole.franz@oecd.org)

JT03288246

English - Or. English

SUSTAINABLE AQUACULTURE DEVELOPMENT: POLICY CHALLENGES

Context

1. Increasing world population, changing consumption patterns and a growing middle class with more disposable income sustain a global increase in the demand for seafood. To meet this growing demand, the aquaculture sector – *i.e*. the farming of aquatic organisms – is well placed to complement aquatic protein supply from stagnating capture fisheries, both marine and freshwater. While most of the production takes place in developing countries, OECD economies are the main importers of fish products, including aquaculture products.

2. The aquaculture sector has certain advantages over capture fisheries: it is easier to produce fish in controlled 'farming' conditions than through an unpredictable hunter-gathering activity – which is the case for wild capture fisheries.

3. Aquaculture is remarkably diverse, with a wide range of species, environments (marine, coastal, inland and land- based), and production systems. However, less than a dozen species account for most of the production – fish (e.g. tilapia, catfish, carps, trout, salmon) grown in ponds or cages, shrimp or prawn in ponds, molluscs (mainly mussels and oysters) and seaweed/algae in beds or on suspended lines. In terms of volume, freshwater species like carp and catfish are by far the most important. While the bulk of wild captured species are carnivores, the lion's share of farmed fish production focuses on omnivorous and herbivorous fish species. Yet, OECD and other more advanced economies favour high value carnivorous fish species (*e.g*. salmon, sea bass and bream) and certain molluscs such as oysters and mussels, both in production and consumption.

4. Commercial aquaculture production at the current scale of intensity is a relatively new sector. It poses economic, environmental and social challenges, which may be poorly addressed within existing policy frameworks. The sustainability of operations may therefore be compromised and the sector's development and performance constrained. In the longer term this could have implications for aquaculture's contribution to global food security; the setting up of aquaculture development policies and regulatory frameworks that can contribute to furthering sustainable aquaculture production is therefore an important endeavour for policy makers.

5. Governments have a long-term interest in healthy marine and freshwater ecosystems, which provide inputs for current and future aquaculture production. Policies and regulatory frameworks can encourage sustainable aquaculture production methods (*e.g*. regulations in terms of water effluent quality) which also can contribute to the OECD Green Growth Agenda. But to achieve Green Growth - understood as *environmentally sustainable economic growth* – political will needs to be harnessed. While the understanding of the risks and potential solutions for furthering aquaculture has advanced considerably over recent years, practical implementation of that knowledge to develop aquaculture has been insufficient, in particular among OECD economies. And at the same time, in many countries, a plethora of regulatory agencies are involved making it difficult for fish farmers to get started in the first place.

6. This brief first addresses *why aquaculture is important* then discusses *key aquaculture challenges* and concludes with a *policy message for sustainable aquaculture*. These observations may be of use to

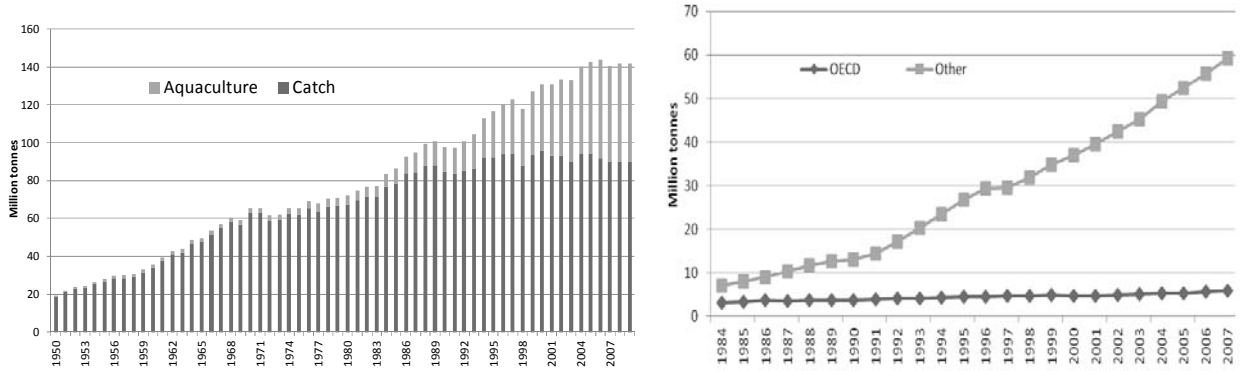
policy makers in the design and implementation of comprehensive aquaculture strategies with a view to ensure stable and sustainable aquatic food production.

Aquaculture on the rise

7. For the first time, in 2007, aquaculture overtook capture fisheries in supplying more than half of aquatic products consumed worldwide. Assuming that capture fisheries production for human consumption remains constant (approx. 58 million tonnes/year), by 2030 aquaculture need to produce 80.5 million tonnes to maintain current per capita consumption of aquatic protein for an estimated population of 8 billion. With an average annual production increase of 8.7% since 1970, aquaculture continues to grow more rapidly than any other animal food production sector. And seen from a technical and economic point of view the future for increased aquaculture production looks very bright.

8. But aquaculture growth is not distributed evenly across continents. Developing countries, in particular in Asia, provide most of the production with China alone accounting for close to 70% of the entire global production. OECD economies, which accounted for 9% of global production in 2007, had an average annual growth rate of only 1.7% between 1996 and 2006 (Figure 1). Advantageous natural conditions, availability of and access to space, and favourable regulatory frameworks are key reasons for the large differences across countries in production.

Figure 1. Global fisheries and aquaculture production and Aquaculture production in OECD and non-OECD countries



Source: FAO

9. Close to 40% of the world production of fish and fishery products is traded, with the US, Japan and Europe accounting for more than 70% of the total import value. Although aquaculture products are not traceable in international trade statistics, where they are lumped together with capture fisheries products, considerable amounts of shrimps, salmon, sea bass and bream, tilapia and catfish from aquaculture production find their way into international markets.

10. Nowadays, many high value species like shrimp, salmon, sea bass/sea bream originate primarily from aquaculture production. For some species, the annual volumes produced through aquaculture by far outstrip the highest volumes ever produced through capture fisheries (*e.g.* shrimp, Atlantic salmon). Control over the production cycle stabilizes product availability, quality and price and hence caters to the needs of the increasingly globalized food value chain, and in particular to the retailers and food service outlets.

11. Massive improvements in rearing technology, feed formulation, bioengineering and disease management as well as the successful marketing of new species (*e.g.* Vietnamese *pangasius*) are key drivers behind the sectors' growth. And off-shore farming, domestication of new species, integrated multi-trophic aquaculture production systems are only a few examples of innovative solutions that will sustain the future directions of aquaculture development.

Key aquaculture challenges

12. ***Natural and environmental risks*** in aquaculture consist of harmful natural conditions that the sector is exposed to and of man-made externalities. Examples of natural and environmental risks are pollution (*e.g.* through drugs, feed residues, inorganic waste); diseases; escapes (*e.g.* genetic and disease interactions with wild populations, loss of biodiversity); predations; overall environmental degradation (*e.g.* mangrove deforestation, wild shrimp seed collection) and ecosystem instability (*e.g.* climate change impacts, natural disasters). The so-called "fishmeal trap", *i.e.* the use of wild captured fish to feed farmed fish (Box 1), also belongs to this risk category.

Box 1. The fishmeal trap

Fed aquaculture of carnivorous species depends on fishmeal and fish oil from capture fisheries. Declining stocks of species used for reduction to fish meal and oil represent therefore a potential constraint to aquaculture expansion. However, improvements in feed formulation and ongoing research about substitutes has widely contributed to address this challenge. Fish oil currently remains a more critical ingredient for fish feeds as it is more difficult to identify suitable alternatives.

13. At the same time, the sector has to deal with externalities generated by other human activities, in particular effluents from agriculture and urban encroachment and other activities in the coastal zone that have a direct impact on aquaculture activities.

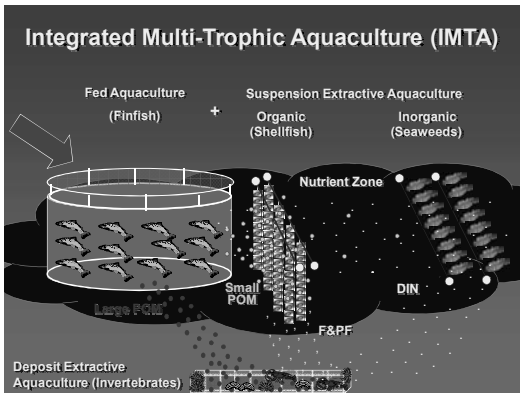
14. A major challenge for policy makers is to encourage risk reduction to facilitate long-term investment in sustainable aquaculture. Natural and environmental risk reduction measures can include the promotion of better/best practices to optimize the management of escapes, disease and pollution and the support of adaptive innovation (*e.g*. improved water use and feed formulation). But central to achieving this is a stable and predictable aquaculture governance framework.

15. There are certain ***systemic risks*** associated with aquaculture production. These risks refer for example to technical aspects like holding unit or other component failures (*e.g*. pump brake down, rope abrasion) or appropriate water supply (in terms of quantity and quality). While they may be the subject of insurance they can nevertheless be costly for fish farmers and also give rise to externalities (*e.g.* escapees).

16. Investment in targeted research and development - particularly if it supports the development of green technology, better production materials and process design and water efficiency improvements - can serve both public and private interests to overcome systemic risks. In addition, alternative production systems may provide ways forward for minimizing the risks associated with production processes (see *e.g.* Box 2).

Box 2. Integrated Multi-Trophic Aquaculture (IMTA)

IMTA is one way for moving towards environmental sustainable and economically efficient aquaculture production. This practice combines the cultivation of fed aquaculture species (*e.g.* finfish) with inorganic extractive aquaculture species *(e.g.* seaweeds) and organic extractive aquaculture species (*e.g.* suspension- and deposit-feeding invertebrates) for an ecosystem management approach that takes into consideration site specificity, operational limits, and food safety guidelines and regulations.



The aim is to increase long-term sustainability and profitability per farm unit (not per species in isolation as is done in monoculture), as the wastes of one crop (fed animals) are converted into fertilizer, food and energy for the other crops (extractive plants and animals), which can, in turn, be marketed.

Feed is one of the core operational costs of finfish aquaculture operations, but with IMTA this cost is reduced because some of the food, nutrients and energy considered lost in finfish monoculture are recaptured and converted into crops of commercial value, while biomitigation takes place.

Source: Chopin *et al*. (2010) Integrated Multi-Trophic Aquaculture, in *Advancing the Aquaculture Agenda. Workshop proceedings,* OECD, forthcoming

17. On the demand side, aquaculture is subject to ***market and economic risks*** affecting costs and returns, and business viability potential (*e.g.* competition). Food safety concerns (*e.g.* contamination of farmed products with heavy metals, pollutants, chemicals, drugs and pathogens) as well as animal welfare aspects are increasingly important challenges in terms of consumer perceptions and the overall image of the industry.

18. To reduce economic and market risks the fish farming sector has to be accurately portrayed. This implies proper communication about sustainable aquaculture to the industry and consumers to make sure that sustainable products and production methods are valued by the market. An important aspect here is that the farmer knows what the fish have been eating and the environment in which they were raised. This is not the case with wild caught fish. Yet few consumers think about such aspects and often do not take informed purchasing decisions.

19. In addition, permit and licensing regulations influence the commitment of farm operators to long-term investments. The sector's long-term profitability, its capacity to attract investment and to access credit depends on a rage of things, but most importantly, includes the rights allocation system (in terms of strength of property rights, timeliness, complexity, duration and renewal) and the operational (*e.g.* environmental) requirements, their stability and predictability.

20. Finally, the aquaculture industry also faces ***political and institutional risks*** which are closely related to the overall policy environment and the legal and regulatory context within which the sector operates (Table 1). In this regard, a major challenge is access to land and water. Socio-economic concerns, including with respect to user conflicts with tourism, fishing, agriculture and other users come into play here.

Table 1: Institutional and policy factors in aquaculture development

Intitutional/ policy factor	Effects	Notes and issues
Overall framework	Legislative structure, definition, certainty, basis for contracts, leases, property rights, protections, obligations; infrastructures	Provides the basic context in which aquaculture can operate; legislative factors commonly need to be developed; rights often difficult to establish
Economic policy	National economic strength, income distribution, market conditions, investment opportunity and structures, trading conditions	Aquaculture sector usually the recipient of policy, as relatively small scale; may affect international competitive environment
Fiscal structures	Business entities, investment opportunity and structures; development and re-investment, internationalisation	Positive and negative aspects for aquaculture; financing delayed-payoff projects mat require special instruments; small-scale credit may be a constraint
Social policy	Development targets, objectives; poverty focus, investment priorities, availability of support structures/ development services	Aquaculture commonly seen as a possible socially effective activity, but targeting may be difficult because of need for resources, security
Environmental policy	Environmental objectives, resource assessments, protection and conservation, development constraint, resource pricing, rehabilitation	Increasing impact on aquaculture, possible over-reaction; aquaculture can contribute to environmental gain - needs good management
Other	Consumer protection, public health, resource development and management, employment regulation, liability, personal property, wealth	Various issues affect aquaculture development, cost of production, security, market issues, etc.

Source: Muir, J. (2010) Growing the wealth of aquaculture, in *Advancing the Aquaculture Agenda. Workshop proceedings,* OECD, forthcoming

21. In some instances, aquaculture production rights and operational regulations overlap with regulations for spatial planning, water quality, animal welfare, pharmaceutical use and food safety. In turn, this explains the fragmentation of responsibility among different national or regional authorities which is often cited as a problem for aquaculture development, *i.e.* only few countries have a "one stop shop" dealing with aquaculture.

22. Formalised dialogue among the sector's operators, public administration, policy makers and other stakeholders (including relevant inter-sectoral players) can contribute to understanding the respective needs and to develop efficient, policy coherent solutions (Box 3). Most importantly though adaptive regulatory frameworks for aquaculture can facilitate the early recognition and incorporation of emerging issues.

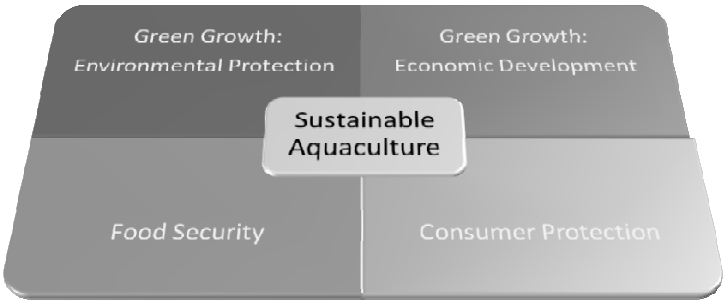
Box 3. The FAO Code of Conduct for Responsible Fisheries (CCRF) - Article 9 Aquaculture Development and the FAO Technical Guidelines for Responsible Fisheries No. 5 – Aquaculture Development

'Government authorities will increasingly have a key role to play in enhancing effective collaboration with and among many players, in order to promote sustainable development of aquaculture. Responsibilities for sustainable aquaculture development will need to be shared among government authorities, aquafarmers, manufacturers and suppliers of aquaculture inputs, processors and traders of aquaculture products, financing institutions, researchers, special interest groups, professional associations, nongovernmental organizations, and others.'

Policy messages

23. The aquaculture sector has several policy dimensions. In the first place, potential environmental externalities generated by aquaculture production require measures to ensure environmental protection. Secondly, aquaculture can contribute to food security. Thirdly, as an economic activity, aquaculture provides income and employment, in particular in rural and coastal areas. Finally, aquaculture product safety and hygiene ensures consumer protection (*e.g.* threat of farmed shrimp import bans from Bangladesh to the EU due to the presence of harmful substances). The concept of sustainability contributes to aligning the different policy objectives associated with these four dimensions.

Policy dimensions of aquaculture



Source: OECD

24. The economic motivation behind government intervention in the aquaculture sector stems mainly from two types of externalities: negative environmental impacts of aquaculture production and competition for access to scarce land and water (marine and inland) resources. An important public sector role is the mitigation of market failures by providing stable structures that minimize uncertainty and therefore reduce the cost of conducting business and within which long-term stability and predictability of offered to potential investors.

25. Hence there is a need for regulation to ensure aquaculture sustainability and policy coherence. However, this needs to be balanced against the fact that in a globalised world, complex access and production regulation for aquaculture restricts development potential and may divert investment capital to alternative uses.

26. A holistic policy approach, in which economic profitability, environmental risk and social acceptability are defined and addressed, is needed. In this regard, aquaculture is part of a wider policy incorporating not only food supply, but also broader ecosystem and economic services. Addressed in an appropriate way, aquaculture development has a bright future and can contribute significantly to global food security and green growth.

Further reading

OECD Advancing the Aquaculture Agenda. Workshop Proceedings *(forthcoming)*
OECD Review of Fisheries in OECD Countries 2009. Policies and Summary Statistics (2010)
OECD Globalisation in Fisheries and Aquaculture. Opportunities and Challenges (2010)

More information

For more information on this subject, contact:

Nicole Franz at Nicole.franz@oecd.org

Further details of OECD work on fisheries and aquaculture can be found on our website:

www.oecd.org/fisheries

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REVISION

This revised document is submitted for DISCUSSION and APPROVAL to the 106th Session of the Committee for Fisheries 25-27 October 2010, under agenda item 9.

For further information, please contact:
Carl-Christian SCHMIDT (Email: carl-christian.schmidt@oecd.org)

JT03289560

English - Or. English

NOTE BY THE SECRETARIAT

This paper on fossil fuel consumption, fuel subsidies and tax concessions has been revised following discussions and feedback received on the initial draft of the paper presented at the 105th Session of the COFI, and in light of the additional information and data received during the inter-sessional period. The results of this analysis have been included in the OECD response to the G-20 request for an analysis of the " … scope of energy subsidies …" as well as the Committee's Governmental Financial Transfers (GFT) database.

This document has benefitted from the voluntary submissions and responses of most countries surveyed. In order to develop a credible estimate of the total value of fuel subsidies and tax concessions for OECD fishing vessels, it is critical that all countries are transparent in providing a comprehensive submission of their respective fossil-fuel subsidies and tax concessions as part of this voluntary exercise.

This present paper is presented to Delegates at the 106th Session for DISCUSSION and APPROVAL. Delegates are requested to:

- Verify the accuracy of the data presented here, and ensure that their national submissions are appropriately captured.
- It is envisaged that this paper would be included in the OECD Food, Fisheries and Agriculture Working paper series following confirmation at the 106th Session of COFI.
- Agree to submit information on fuel-tax exemptions to the Secretariat on a regular basis as part of the Review of Fisheries (Government Financial Transfers –GFT - section). This current assessment of fuel-tax exemptions is also a useful starting point for a possible future review of the Committee's GFT framework.

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FOSSIL FUEL IN THE FISHERIES: TAX CONCESSIONS AND CONSUMPTION

Context

1. In September 2009, Leaders from the Group of Twenty (G-20) nations gathered in Pittsburgh for a Summit. Among other things, they agreed to "phase out and rationalize over the medium term inefficient fossil fuel subsidies while providing targeted support for the poorest". In their joint communiqué, they "request relevant institutions, such as the IEA, OPEC, OECD, and World Bank, provide an analysis of the scope of energy subsidies and suggestions for the implementation of this initiative and report back at the next summit".

2. In October 2009, at its 104th session, the Committee for Fisheries identified an interest in assessing the long-term impacts to fishing fleets of phasing out fuel subsidies. In this regard, the Committee agreed to an immediate effort that would both contribute to this interest while also providing timely input to the G-20 process. This analysis responds to that request. It endeavors to:

- provide an approximation of the value of fuel subsidies for fishing fleets in OECD Member countries, as well as non-member economies where data was made available.
- provide an initial assessment of the impacts of fuel subsidies and the implications of phasing out fuel subsidies to the fishing industry; and,

3. At the 2009 Pittsburgh Summit, G-20 Leaders recognized that "inefficient fossil fuel subsidies encourage wasteful consumption, reduce our energy security, impede investment in clean energy sources and undermine efforts to deal with the threat of climate change". The presence of pre-existing policies whose side effects encourage carbon emissions (e.g. fossil fuel subsidies, tax exemptions) can undermine the effectiveness of climate policy instruments. This document should also provide a starting point in determining the extent of fuel subsidies and fuel consumption in the fisheries sector (primarily in OECD member countries), as well as provide an indication of the potential contribution to reducing greenhouse-gas emissions and other impacts that phasing out inefficient fuel subsidies would entail.

SECTION 1: METHODS AND ANALYSIS

Methods

4. Subsidies for fossil fuels are prevalent in most of the world, although the type of support varies. The scope and definition of the term 'subsidies' have been the subject of intense international debate over the last several years.

5. The data reported as part of this exercise indicates that most respondents primarily rely on indirect mechanisms, such as various forms of tax relief or concessions on fossil fuels (primarily diesel) used by fishing vessels.[1] In this regard, this exercise does not attempt to make any interpretations of the WTO definition of a subsidy. The Norwegian submission to this exercise specifically notes that "… in the context of subsidies within the framework of the WTO, tax relief systems may or may not be considered as subsidies. The purpose of such systems is primarily to regulate or 'improve' the conditions of competition between different national sectors and the WTO does not take as a premise that possible countervailing measures will even out different conditions of competition between like sectors in different countries. To the contrary, the situation where a country taking countervailing measures subsidizes its own sector (for the 'like product') is not addressed by the WTO Agreement."

6. For this reason, and given that it is not the purpose of this exercise to define what constitutes a subsidy, this paper will henceforth refer to such transfers as fuel-tax concessions or fuel-tax exemptions. Such fuel-tax concessions are often made available to other primary production sectors of the economy as well, such as agriculture and forestry, though this varies by country.

7. While the rate of the fuel-tax expenditure per litre varies across countries, in the majority of instances, a full tax exemption is applied. In some countries, fuel-tax concessions vary depending on the level of government. For example in Canada and the United States, fuel taxes, and therefore the value of concessions from these taxes, vary at the sub-national (provincial or state) level, as well as from those at the federal level.

8. The international debate over financial support to the fisheries sector has resulted in a variety of definitions and classification frameworks. This has the potential for creating various interpretations about the effects of various types of support as well as policy implications. Against this backdrop, the OECD's Committee for Fisheries developed an analytical framework to define and catalogue all government financial transfers (GFT) to the fishing industry, specifically the monetary value of government interventions associated with fisheries policies (Box 1.1). The GFT framework does not attempt to define which transfers may or may not constitute a subsidy, but is rather intended to lead to a complete dataset of public funding directed to the fishing sector and an understanding of the effects of such transfers on the fisheries.

9. As part of the detailed GFT classification system, fuel-tax exemptions fall into one of the seven categories - the category entitled "Other cost-reducing transfers and direct payments". This category refers to all monetary transfers that are intended to reduce the costs of fishers that are not elsewhere captured in

1 . These are classified as *tax expenditures* by the OECD, which is defined as "a transfer of public resources that is achieved by reducing tax obligations with respect to a benchmark tax, rather than by a direct expenditure" (Kraan, 2004) – extracted from "Tax Concessions in OECD Countries" (OECD, 2010).

the classification system. A 2006 OECD study notes that "these transfers will have the effect of increasing incomes or reducing variable costs, and will more directly affect the competitive position of fishers in international trade and maintain their profits in the short term, with the long-term effects dependent on the management regime in place" (OECD, 2006).

Box 1.1. OECD's GFT Analytical Framework

The OECD's Committee for Fisheries has undertaken a systematic effort to define and measure GFTs to the fisheries sector in Member countries. The development of a GFT classification system and the collection of detailed information on GFTs in OECD Member countries were undertaken as part of the OECD's project on the *Transition to Responsible Fisheries*. As a result, country-level data have been collected by the OECD on an annual basis, and results included in its regular statistical publications, *The Review of Fisheries in OECD Countries: Country Statistics*. GFTs are defined as "the monetary value of government interventions associated with fisheries policies" and covers transfers from central, regional and local governments.

The analytical framework used to develop the GFT framework is based on the sustainable development concept. Government implementation of a transfer policy will impact firstly on the economic dimension as it is an economic policy instrument designed to change the prices faced by agents in the sector, or to change the relative wealth of participants. The effects on the economic dimension will then flow through to the environmental and social dimensions, which will in turn generate dynamic feedback effects amongst the three dimensions. The main advantage of taking a sustainable development approach is that it allows the full range of short-term and long-term effects of transfer policies to be addressed, potentially identifying and avoiding unintended or unforeseen consequences.

Sources : OECD (2000, 2006)

10. For the purposes of data collection, a questionnaire was developed and circulated to Committee for Fisheries (COFI) in December 2009, which includes OECD member countries as well as some non member economies (Annex 1). This questionnaire defined the term "fuel subsidy" (to fishers) as any government intervention relating to fossil fuels that reduces the cost and/or increases revenues of commercial fishers, regardless of whether or not they involve direct financial transfers. This would include a rebate, refund, expenditure or reduction (to fishers) from Value Added Taxes (VAT) and other such direct fuel taxes that are normally levied by the government on fuel users in the economy; price controls that suppress fuel prices below normal market prices; and, programmes that provide direct transfers or payments.

11. Data on fisheries fossil fuel consumption, subsidies and tax concessions were provided through the voluntary responses of OECD Member economies, accession countries and observers. The most recent data were requested, with a focus on 2007 and 2008 (as feasible) and for both the national and sub-national level. Information was also requested on any specific fuel subsidy or tax relief programs implemented as a result of the sharp increase in fuel prices in 2008. Existing data captured as part of the annual statistical collection on GFTs was also examined.

12. This information was supplemented by the data collected on fuel-taxes which is compiled in a database on instruments used for environmental policy and natural resources management by the OECD and the European Environment Agency[2], as well as the desktop literature. The market price paid for fuel by fishers was calculated using data from the International Energy Agency (OECD/IEA 2009).

13. The methodology used by countries for calculating the total value of fuel-tax concessions depends on how the tax concessions are applied in each case; this may be through a tax refund where an individual pays the fuel tax and the government refunds part or all of it. In such cases, the amount of the refund the government makes (e.g. forgone revenue) is the value of the tax concession. Alternatively, there

2 . The database is located at http://www2.oecd.org/ecoinst/queries/index.htm

may be a tax reduction or an immediate exemption; this refers to instances where an individual pays less or no tax at the time fuel is purchased.

Analysis: Summary of Data Submissions

14. In order to develop a credible estimate of the total value of fuel-tax concessions in the fisheries for the OECD as a whole, it has been critical that all countries are transparent in providing a comprehensive submission of their respective fossil-fuel subsidies and tax concessions as part of this voluntary exercise. Twenty-seven responses were submitted, while three OECD member countries were not responsive in the timeframe of the development of this report. Of these countries, the questionnaire was not applicable to seven OECD economies as no system for fuel-tax exemptions were in place during the years assessed. Table 1.1 summarizes the responses received. Detailed country data are provided in Table 1.2, with methodological comments and ancillary information presented in Section 2.

Table 1.1. Summary of Country Submissions (as of August 2010)

Submissions Received	Fuel-tax Concession	Australia, Belgium, Canada, Denmark, Estonia, Finland, France, Greece, Italy, Japan, Latvia, New Zealand, Norway, Slovenia, Spain, Sweden, Turkey, United Kingdom, United States
	Subsidy	Russian Federation[3],
	No Fuel-tax concession or subsidy	Chile, Germany, Iceland, Netherlands, Poland, Portugal, Thailand
	Not applicable	Austria, Czech Republic, Hungary , Luxembourg, Slovak Republic, Switzerland, Israel
Submissions not yet received		Ireland, Korea, Mexico

15. Specifically, Table 1.2 provides a summary of the responses received, including rate of the fuel-tax and the total value of the tax concession in U.S. dollars (USD), as well as the total volume of fuel consumed by national fleets. Based on the data submitted, the total value of fuel-tax concessions for OECD countries was USD 1.45 billion in 2008, with a total amount of fuel consumed of 6.84 billion litres; this latter figure also includes fuel consumed by fishing vessels that was not eligible for a tax concession or subsidy. Chile, Germany, Iceland, Netherlands, Poland, Portugal, and Thailand indicated that they have not provided fuel subsidies or tax concessions to their fishing vessels in recent years, while Ireland, Korea and Mexico have not provided a submission within the timeframe for this report.

16. The EU also provides other payments which may be linked to fuel use, but are not captured here. Specifically, the "*de minimis*" regulation for fisheries, EC Reg. 875/2007, allows a maximum support of EUR 30 000 per firm for each three-year period during 2007-2013 for which the Commission does not require notification; these funds may be used to finance variable costs of fishing vessels, including fuel. A recent study indicates that EUR 1.3 billion was spent on fuel in 2006 (based on 53 700 vessels); this amount has been estimated to have increased to EUR 1.7 to 1.8 billion under the average fuel price of 2008 (Box 2.1 provides additional details). As a result, *de minimis* resources represented approximately 13% of the 2008 fuel costs of the EU fleet (Framian BV in co-operation with Symbeyond Research Group, 2009).

[3] The Russian Federation submission and subsequent clarification indicates that there was a one-time subsidy of RUB 817m (USD 32m) instituted in 2009 as a response to rising fuel costs. This subsidy was not in place in 2008 nor was it carried over to 2010.

17. These estimates of fuel-tax concessions should be treated with caution and not compared across countries, given the variations in the methods of estimation used and the purpose of the tax concession. It should also be noted that USD 1.45 billion is an under-estimate of the total value of fuel-tax concessions in OECD countries, because:

- some countries have yet to respond;
- there are possibly sub-national tax concessions that have not been reported; and,
- in some cases, a reasonable estimate of the total value of fuel-tax concessions could not be estimated because fuel-consumption data were not available, though the tax and exemption rates were known.[4]

18. The *relative* level of the fuel-tax concession is a factor limiting the meaningfulness of international comparisons to be drawn from the data presented. Specifically, a reference point or benchmark tax system that could be used to establish the nature and extent of any concession cannot be easily determined. It is not the purpose of this exercise to harmonise international tax levels. The only relevant benchmarks in this study are fuel-tax concessions accorded to a sector within a particular national economy. As such, drawing international comparisons of fuel-tax concessions based on the data provided in Table 1.2 is a challenge and cannot be undertaken with the information presented here. This is because there are different benchmarks (e.g. level and extent of fuel-tax) across countries which result in significant differences in terms of the value of the fuel-tax concession (Box 1.2).

Box 1.2. International comparability

Tax expenditure accounting was never designed with international comparability in mind. The main challenge in any analysis of tax expenditures is to identify the reference point or benchmark tax system to be used in order to establish the nature and extent of any concession. Even where countries have adopted broadly the same methodological approach, the way in which they have implemented it in response to practical issues such as how far a relief should be regarded as a structural part of the tax regime may well differ (e.g. depreciation allowances used in calculating taxable profits). Moreover, differences in reporting in nominal versus present values can bias comparability. Without definitive answers to many of the issues outlined above, countries have either taken different approaches in measuring their tax expenditures or have simply not measured them at all. Ensuring relative consistent approaches across countries in this regard is a first step.

Even once such conceptual difficulties have been overcome, a simple cross-country comparison of tax expenditures can provide a highly distorted picture of countries' "green" credentials. Tax expenditures are dependent on two important factors: (i) the level of the standard or "optimal" tax rate and (ii) the existence of taxes on fossil fuels. As an example of the first issue, if two countries each applied a reduced rate of VAT of 10% to domestic consumption of fuel and power, but the standard VAT rate in one was 20% and in the other it was 25%, the latter would show a higher tax expenditure (in relation to GDP). In the case of the second issue where there are few taxes on fossil fuels, a country that applies a carbon tax with some tax breaks would have more tax expenditures than another country with no carbon tax in an analysis where the baseline was a standard tax and not an "optimal" tax. Clearly, any final statistic must be taken in the context of other statistics.

Source : Extracted from OECD (2010b)

19. Several countries (Canada, Denmark, Japan, New Zealand, Norway, and the United States) specified that they do not consider fuel-tax exemptions reported here as subsidies, but nevertheless provided data, in keeping with the G-20 Leaders request.

4 . An example is that of Canada, where a there is a rebate of the federal excise tax of 4 cents per litre of diesel, available to many sectors of the economy, including fishing vessels that fish 12 nautical miles offshore. However, access to data on how many vessels proceed beyond 12 nautical miles from shore is not available, and there is therefore no way of knowing how many claim this federal rebate or the total amount of rebates claimed.

Table 1.2. Value of fuel-tax concessions (FTC) and Volume of Fuel consumed, 2008

Country	Fuel Tax rate ($USD/ litre)	FTC as % of national market price	Total Value of all FTCs (in USD)	Total volume of fuel consumed (litres)	Type of fuel	Type of tax
Australia	0.32	23.9%	62 642 008	196 664 668		Tax
Belgium	0.03	1.8%	1 231 609	45 570 578	Gasoline	Excise duty
Canada (Federal)	0.04	-	NA	NA	Diesel	Excise Tax
Newfoundland & Labrador	0.15	-	1 225 725	7 930 505	Diesel	Excise Tax
Maritimes	0.12	-	2 847 615	23 294 ,977	Diesel	Excise Tax
Gulf	0.14	-	1 632 427	11 409 287	Diesel	Excise Tax
Quebec	0.15	-	1 107 870	7 300 713	Diesel	Excise Tax
Pacific	0.12	-	3 831 557	32 723 269	Diesel	Excise Tax
Canada (total)	0.13	11.1%	10 645 195	82 658 751		
Chile	0.00	0.0%	0	167 284 589		Not applicable
Denmark	0.54	36%	85 722 295	92 805 000	Diesel	Direct tax, CO2 tax, VAT
Finland	0.37	24.6%	457 180	1 226 700	Petrol, diesel, domestic fuel	Excise tax
France	0.63	0.0%	328 959 392	520 000 000		
Greece	0.43	28.9%	42 980 496	100 333 056	Diesel, unleaded	Special Consumption Tax
Iceland	0.00	0.0%	0	163 955 000	Marine diesel, heavy fuel oil	Not applicable
Italy	0.95	58.1%	398 151 593	421 968 384	Diesel	VAT; other direct fuel taxes
Japan	0.08	7.1%	165 190 031	2 021 000 000	Heavy fuel oil, light oil	
Netherlands	0.00	0.0%	0	238 000 000	Gas oil, fuel oil	
New Zealand	0.00	0.2%	306 337	216,000,000	Petrol, LPG, CNG	
Norway	0.25	14.3%	58 810 096	404 000 000	Mineral oil	Base tax on mineral oil; carbon dioxide
Poland	0.43	30.3%	6 944 338	15 969 936	Diesel	Excise Tax
Slovenia	0.44	32.3%	77 847	175 392		Excise duty
Spain	0.14	9.8%	46 457 838	334 484 211		
Sweden	0.59	36.5%	28 132 128	47 544 688		Carbon dioxin and energy tax
Turkey	0.73	32.8%	67 033 739	93 604 000	TBC	Private Consumption Tax
United Kingdom	0.17	9.3%	57 794 143	338 606 007	Diesel	Fuel duty, VAT
United States	0.06	6.4%	85 599 627	1 337 494 165		Highway Trust Fund
TOTAL OECD			**1 447 135 891**	**6 839 345 125**		
Estonia (A)	0.09	6.5%	365 470	4 071 400		To be confirmed
Russian Federation (A)	0.00		0	1 590 000 000	Diesel	
Latvia (other)	0.40	29.4%	7 107 216	17 859 000	Diesel	Excise tax
GRAND TOTAL			**1 454 608 578**	**8 451 275 525**		

Notes:
1: Most recent data available used; 2007 for Australia and Japan; 2009 data for Estonia and Russian Federation.
2: New Zealand fuel consumption estimate is from 2005; averages used for Sweden and Estonia as a range of values supplied. French fuel tax-exemption and fuel consumption data from 2005.

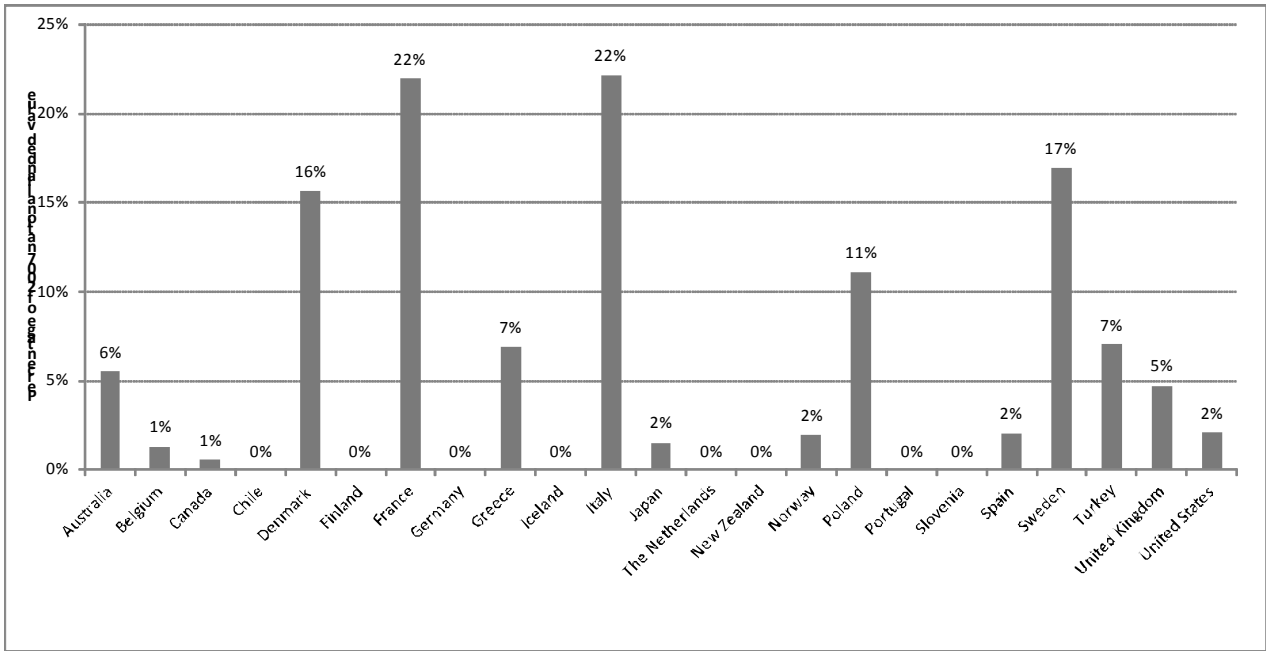
3: The national fuel market price was not available in all submissions. As such, data provided here derives from the International Energy Agency`s 2009 report - Automotive Diesel Oil Prices for Commercial Use in US Dollars/litre section (OECD/IEA 2009). *For Iceland, no IEA data available - used GTZ data instead for 2008 (http://www.gtz.de/de/dokumente/gtz2009-en-ifp-full-version.pdf)
4: OECD calculated total volume of fuel consumed for Spain and total value for Japan based on the respective country submission.
Sources: Country Submissions to the OECD; USD exchange rate extracted on 20 Jan 2010 from OECD.Stat.; Latvian exchange rate from www.oanda.com

Preliminary Analysis

20. The relative importance of fuel-tax concessions compared with the primary output generated by the fishing industry varies considerably across countries (Figure 1.1). The twenty-three countries which provided data for this exercise and for which current landed value data are available, can be divided into three broad categories: those for which fuel-tax concessions account for less than 3% of the total landed value, those for which concessions account for between 3% and 10% of the total landed value, and finally, those for which concessions exceed of 11% of the total landed value. The majority of countries (fourteen) fell into the first category, with fuel-tax concessions accounting for less than 3% of the total landed value. Four countries were in the second category (3% to 10%), while five countries out of the fifteen were in the last category (more than 15%).

21. These varying proportions show that the relative importance of fuel-tax concessions to fishers differs significantly across countries. Where the tax concessions represent a higher proportion of landed value, we can expect that phasing them out may have more consequences for the fishing industry then where they are lower. Considering transition mechanisms such as the gradual phasing out of fuel-tax concessions may be particularly relevant for countries where their relative importance is the highest.

Figure 1.1. Fuel tax concessions (2008) as a percentage of total landed value by country (2007)



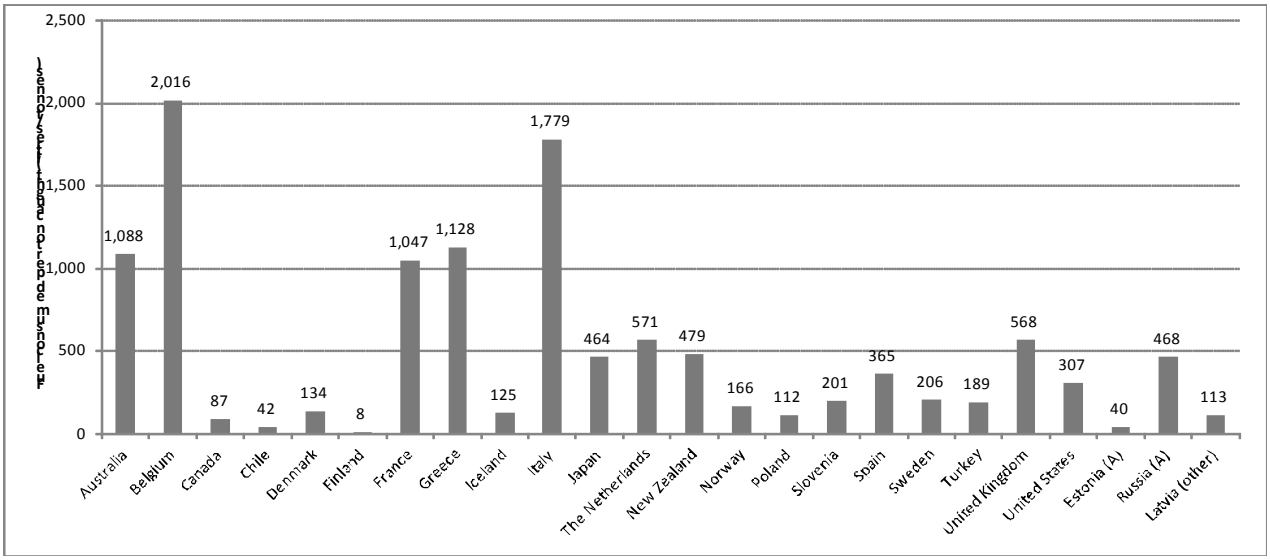
1. For a variety of reasons mentioned throughout this paper, international comparisons cannot be drawn.
2. For Japan, the landed value for 2006 was used as data were not available for 2007.
Source: 2007 landed value data from OECD.stat and country submissions to the OECD

22. Figure 1.2 provides an indication of the ratio of fuel consumed by fleets to land fish in OECD countries to give an indication of the fishing fuel intensity. Volumes of fuel consumed (in litres) per metric

tonne of fish caught are obtained by dividing the total landed volume by the total amount of fuel consumed in each country in 2007.

23. Uncertainty in estimates can affect the results depicted in Table 1.2 regarding the amount of fuel consumed per tonne of fish caught. Several factors explain the variability of fuel consumed per tonne caught such as the distance to fishing grounds, vessel size, the type of gear used (e.g. trawling uses more fuel), engine and gear efficiency, type and characteristics of the stock fished. There is also uncertainty related to estimating fuel consumption in the fishing fleet as it is difficult to distinguish the sales between the petroleum industry, shipping, fisheries and distributors. These factors likely play a greater role in explaining the differences than the amount of fuel-tax concessions, although this relationship has not been explored empirically in this exercise. Given a more complete dataset, this line of research could be further pursued.

Figure 1.2: Fuel consumed per tonne of fish caught in 2008 (litres/tonnes)



1. Fuel consumption data is indicative only, as some countries only reported consumption of marine diesel and not heavy oil, or vice versa, as well as for the uncertainties identified in this paper. Given this, international comparisons cannot be drawn.
2. Data not available for the following OECD member countries: Ireland, Korea, Mexico.
3. (A) refers to OECD accession countries.

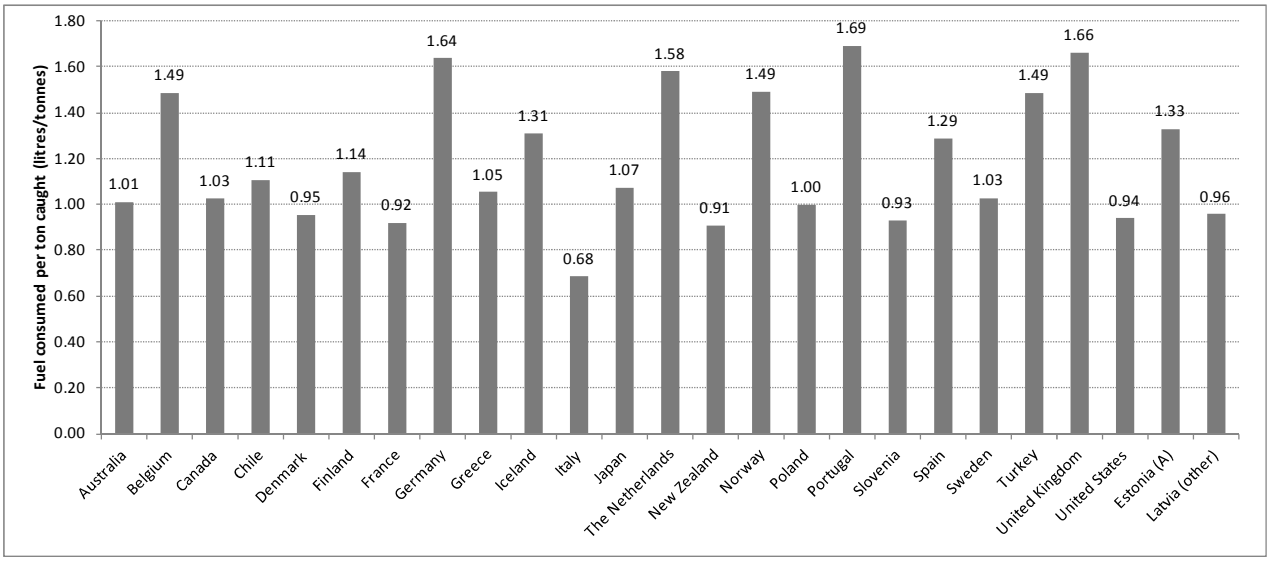
Source : OECD.stat, FAO (for volume caught) and Country submissions to the OECD

24. Previous to this specific information request, only a handful of countries had reported the value of fuel-tax concessions (exemptions and rebates for fossil fuels) as part of the information collected for the fisheries Government Financial Transfer analysis. Nevertheless, it has been widely known that most OECD countries provide such fuel-tax concessions to their maritime industries or for navigation, in one form or another. Examining GFT data would provide an indication of the relative importance of fuel subsidies and tax concessions compared with other forms of financial transfers to the fisheries sector. The relative importance varies: in some countries, fuel-tax concessions account for the major part of all GFTs, while fuel subsidies and/or tax concessions form only a small part of all GFTs to the fisheries sector in other countries.

25. Table 1.3 is a comparison of the estimated cost of fuel to fishers across OECD countries. This was estimated by using the average annual International Energy Association commercial diesel price, minus the fuel-tax exemptions that fishers receive in each country (OECD/IEA 2009). From this graph we can observe that the effect of the fuel-tax exemptions is to smooth the cross-country differences in cost of

fuel per litre. In the countries where fuel prices are higher due to higher country-wide taxes or fees, the impact of fuel-tax exemptions is to bring down the cost of fuel for fishers to the cross-country average. In countries where there are no fuel-tax exemptions or very low fuel-tax exemptions, the costs of fuel to fishers are higher if country-wide fuel tax rates are high (e.g. Germany, Belgium, The Netherlands, Portugal) or close to the cross-country average if country-wide tax rates are low (e.g. US, New Zealand). Note that differences in fuel prices are also explained by country-specific variables such as supply and demand balance, degree of competition, relative transportation costs, etc. Further analysis to develop more precise values of the price of fuel paid by fishers is required.

Figure 1.3: USD Estimated price paid by fishers (market price minus FTC) in 2008



Note: This is an approximated cost of fuel for fishers, based on the average country IEA price for commercial diesel, minus reported fuel-tax exemptions (USD).

Source: OECD/IEA 2009

Possible impacts of removing fuel subsidies and tax concessions

26. In theory, reducing fuel subsidies can be an attractive policy option because in contrast with other alternatives, it can generate both environmental and economic benefits (OECD, 2005). This of course depends on the original policy goals and an understanding of the actual effects of the subsidy or tax concession. The following sections summarize these potential impacts in a general sense.

Environmental impacts

Carbon emissions

27. Subsidies distort price and resource allocation decisions and may also affect the amount of goods and services produced and consumed in an economy. Given this, subsidies may have a detrimental impact on the environment that are either unanticipated or otherwise not captured in the policy process. Specifically, the OECD study on *Environmentally Harmful Subsidies: Challenges for Reform* (2005) noted that "… fuel-tax rebates and artificially low energy prices stimulate the use of fossil fuels and greenhouse-gas emissions."

28. Under any fisheries management regime, reducing the cost of fuel will encourage fishers to use more of this input relative to other inputs, and use fuel-intensive fishing techniques, including larger and

longer boats and heavier capital equipment (in theory, these activities could be managed by other means in such a way as to negate these potential effects). This shift in the pattern of input usage has implications for marine pollution and carbon-dioxide emissions. For example, the OECD and the International Energy Agency estimate that eliminating fossil fuel subsidies by 2020 would reduce global greenhouse gas emissions in 2050 by ten percent. Removing environmentally harmful fossil-fuel subsidies would also lower the cost of achieving a given mitigation target through other measures such as carbon taxes and as such could be considered an important first step in any strategy to tackle climate change. More detailed consideration of the environmental impacts of these transfers is required, including within the fishing sector.

29. The FAO (2006) calculated that the 14 million tonnes of fuel used by the global fishing industry accounted for less than 0.5% of global oil consumption in 2006. Tyedmers *et al.* (2005) estimate that fisheries account for about 1.2% of global oil consumption and directly emit more than 130 million tonnes of CO_2 into the atmosphere (Box 1.3). However, estimating the impact of removing fuel tax exemptions in terms of global emissions reductions would be a difficult task. For example, the 10% reduction in greenhouse gases by 2050 through the removal of fuel subsidies referenced above includes a wide range of fuel sources, from natural gas, to oil and coal; fishing vessels primarily use diesel.

Box 1.3. Fuel consumption in the fisheries

Tyedmers et al. (2005) estimate that fisheries account for about 1.2% of global oil consumption and directly emit more than 130 million tonnes of CO_2 into the atmosphere. This study calculates that the energy content of the fuel burned by global fisheries is 12.5 times greater than the edible protein energy content of the resulting catch. However, the paper notes that "while the fishing sector consumes a substantial amount of fuel, its use of energy is far more efficient than many other contemporary food production systems, a finding that flies in the face of some widely held perceptions of capture fisheries in general. This seeming incongruity between perception and reality may, in part, result from the relatively high proportion of total energy inputs, and resulting energy-related costs that accrue at the level of the fishing enterprise itself. In contrast, in the case of many other animal protein production systems, the majority of energy inputs tend to occur farther back in the production chain".

Source : Tyedmers *et al*. (2005)

Stocks and habitat

30. Fuel subsidies and tax concessions that make fuel less costly relative to other inputs can lead to an increase in the use of fuel-intensive fishing techniques such as dredging, beam trawling and bottom trawling. Under certain conditions (e.g. a hard ocean floor) such fishing techniques may be more damaging to the marine environment, especially benthic species and habitat, than other, less fuel-intensive fishing techniques (e.g. longlines).

Impacts on the fishing industry

31. The impact of fuel subsidies on the fishing industry is largely dependent on the type of fisheries management regime in place, and in turn, the impacts of removing fuel subsidies will also depend on the management system (Table 1.3). In open-access fisheries, fuel subsidies will lead to the expansion of effort by individual vessels, increasing both fuel usage and pressure on the resource. Under rights-based regimes (such as ITQs), subsidies would generally not have any effect on the volume caught, but could distort the choice of production inputs compared with a cost-minimizing choice at market prices. The degree to which this effect will produce new outcomes will depend on the extent to which production inputs, or factors of production, are substitutable. While fishers will not have an incentive to fish more under fixed individual

quotas[5], they may elect for example to fish for longer periods of time and with less gear or manpower, effectively substituting fuel for manpower (to a certain extent). If this substitution is not possible, then the impact of subsidies will be to raise the market price of quotas (OECD, 2006).

Table 1.3. Effects of subsiding variable and capital costs

Management Regime or Status of the Fish Stocks	Property Rights		No Property rights		No Property rights, no controls
	Catch Controls	Effort controls	Catch Controls	Effort controls	
Overfished	No effect on the catch or stock. No effect on effort. Highervalue of fish quotas.	Higher market value of effort rights. Total effort may expand, with effects as with effort control.	No effect on catch or stock. Greater effort and more boats. Same revenue or lower. Higher costs and lower industry profits. Negative resource rent.	Effort expansion likely, which would reduce stocks and catches and vessel profit except perhaps for new and refitted vessels. Lower resource rent and possibly negative.	Greater effort and more boats. Smaller fish stocks. Lower fish catch\Lower revenue. Higher costs. Negative resource rent.
Underfished	Same as for overfished stocks.	Higher market value of effort rights. Total effort may expand, with effects as with effort control.	Same as for overfished stocks.	Same as for overfished stocks, except that catches would increase.	Greater effort and more boats. Smaller fish stocks. Greater fish catch. Higher revenue. Higher costs. Higher intra marginal rents. Negative resource rent.

Note: It is assumed that the management regulations that are in place are fully and effectively enforced. The impacts on key variables are the expected effects in the face of perfect enforcement of existing regulations.

Source : OECD, 2006.

32. Removing fuel subsidies will have the opposite effect in open-access fisheries: effort will decrease, leading to less pressure on the resource. The magnitude of the impact depends on the efficiency of the fleet initially. In the case of inefficient fleets with low profitability, the removal of fuel subsidies could drive the less efficient firms out of the fishery, further reducing pressures on the resource and increasing the profitability of the remaining firms. Under a rights-based regime with catch controls, removing fuel subsidies should result in only input substitution: fishers will adjust their input mix to lower the proportion of the now more costly fuel input.

33. Under a fishery managed through effort controls, the impact of subsidies will be similar to that which occurs under a rights-based regime, and will depend on how effort is controlled. If the number of days at sea is limited, for example, with subsidized fuel, fishers may switch to more powerful engines or bigger boats, which may lead to raising the total real effort of the fleet despite the controls.

[5] Unless the quotas correspond to a level of effort that, in the absence of subsidies, would be acceptable.

34. Fuel-tax concessions, a form of cost-reducing transfer, are widespread among OECD countries as the present survey shows. They can distort patterns of fuel use and fishing similarly to other types of more direct subsidies (such as direct budgeted fuel subsidies). However, such distortions are likely greater for true fuel subsidies (*e.g.*, those that reduce the price below the international price) than those that, through tax-concessions, bring most fishing fleets' prices down to the international level. Even when all industrial and commercial vessels in a country benefit from a fuel-tax concession or rebate, there will still be a distortion in fuel usage patterns, likely leading to higher usage of fuel than otherwise would take place, especially when compared with other sectors of the economy and other countries (particularly those that do not exempt fuel-tax or provide rebates).

35. Fuel-tax concessions lower the variable costs of fishing. Fuel costs generally account for an important percentage of total variable costs of fishing, but their importance varies significantly depending on parameters such as the type of fishing and gear, vessel, distance to fishing grounds, and time spent fishing. Fuel costs are generally higher for mobile-gear fleets than for fixed-gear fleets that fish close to the coast (Table 1.4). For example, UK North Sea beam trawlers have fuel costs that can reach as much as 78% of all operating costs, while in some fixed-gear coastal fisheries fuel costs can reach a percentage as low as 3% to 5% of operating costs.

36. Given these examples, it would appear that, generally speaking, the impact of reducing or eliminating fuel subsidies or tax concessions should be greater on the mobile-gear fleets. However, the effectiveness of the different fishing gear and types of fishing may distort this picture when looking at the fuel consumed per tonne of fish caught, as discussed by Tyedmers et al. (Box 1.3).

37. There are very few empirical studies of the effects of varying fuel-tax concessions on fishing operations. One such study was undertaken of the Senegalese fishery (UNEP, 2002). Based on the operating accounts of small-scale fishing units, a reduction in the fuel subsidy by one-half was estimated to result in a substantial reduction in the operating profits of boats, and possibly leading to losses. That notwithstanding, the elimination of these subsidies would not necessarily put an end to small-scale fishing, but it would certainly cause some boats to leave the fishery and so reduce fishing effort. The lower effort would, however, most likely result in a higher catch per unit of effort as fish stocks increase. The study shows that, over time, the catch per unit of effort has declined drastically for most Senegalese stocks, which most likely is due to the increase in effort and the resulting depletion of fish stocks over the same period.

Table 1.4: Fuel costs as a proportion of operating costs in selected OECD fisheries

Country and fishery	Fuel costs as percentage of operating costs
Australia	
Torres Strait prawn	39
Commonwealth trawl sector	23
Eastern tuna and billfish	17
Gillnet, hook and trap sector	10
France	
Chalutiers de fond exclusifs (12-16m)	22
Chalutiers drageurs (12-16m)	16
Arts dormants (12-16m)	7
Iceland	
Pelagic trawlers / purse seiners	15
Trawlers	13
Freezer trawlers	15
Coastal vessels (<10m)	3
Norway	
Trawlers	19
Purse seiners (blue whiting)	15
Purse seiners (other)	12
Pelagic trawlers (herring, blue whiting)	20
Trawlers (cod)	20
Coastal vessels (<13m, cod)	5
Spain	
Atlantic longliners	20
300 fleet (trawl)	17
Galician purse seiners	9
Ùnited Kingdom	
North Sea beam trawl (over 300 kW)	78
Area VIIA nephrops twin-rig trawl	38
Irish Sea demersal trawl	36
UK pelagic (over 40m)	25
UK pelagic (10-40m)	16
Potters and creelers (over 12m)	12

Sources: Vieira and Hohen (2007), Vieira *et al.* (2007), Seafish Industry Authority (UK). Planchot and Daures (2008), STECF (2006).

Concluding Comments

38. In order to understand the effects of fuel subsidies and fuel-tax concession (and impacts from phasing them out) there are data, methodological and definitional issues that merit additional reflection and consideration, not only in a fisheries context, but also broadly.

39. Reducing fuel subsidies can be an attractive policy option; in contrast with other alternatives, it can generate both environmental and economic benefits, but this depends on original policy goals and an understanding of the actual effects of the subsidy.

40. The implications of phasing out subsidies is determined largely on the initial level of the subsidies, the extent to which they are phased out globally, the profitability of the subsidized fisheries and the type of fleet affected. Country-based initiatives to reduce subsidies could place national fisheries at a disadvantage compared with others that continue to provide subsidies. However, New Zealand's strong

performance and competitiveness in the fisheries sector following the phasing out of all subsidies has shown that this is not necessarily the case.

41. A 2009 OECD report addresses the consequences for the Norwegian fishing fleet should the country's current system of refunding the CO_2 tax and the base tax on mineral oil be terminated. This report has revealed some interesting conclusions that are of relevance to this paper and possible future work on the issue.

- The report demonstrated that the fishing fleet has limited possibilities for fuel substitution. The vessels would be able to adjust their operations (*e.g.* reduce the time of travel between fishing areas, more seasonal fisheries, higher capacity for storing fish on each tour) but these modifications would be of minor significance. However, the varying possibilities of substitution between different vessel groups could be explored further, and it could also be seen in relation to Table 1.4 presenting fuels costs as a proportion of operating costs in selected vessel groups.

- In the Norwegian case, it appears that the larger vessels (i.e. the ocean going fleet) will not necessarily adjust or change their input mix to lower the proportion of more costly fuel input if the refunds are terminated but go abroad to fuel at lower and some sort of tax exempt price. At the present time, some larger vessels already fuel abroad, and there are reasons to believe that this practice could increase if the refunds are terminated. The vessels that have least flexibility for adaptation, and limited possibilities for fuel consumption reduction or fuelling abroad, are the smaller vessels (coastal fleet). In most cases the coastal vessels have the most favourable operation pattern with least fuel consumption per kg harvested.

42. Given this analysis, an unintended consequence of eliminating fuel-tax exemptions could at worst lead to an increase of emissions due to longer distances travelled for fuelling. As such, the importance of a multilateral approach to reducing or phasing out fossil fuel subsidies and tax exemptions is of utmost importance to mitigate the possibility of such undesired consequences.

43. The underlying purpose of a fuel-tax varies and there may be some areas for which fisheries are reasonably exempted from such taxes. The purpose of a fuel-tax can vary according to different economic or policy goals, ranging from raising revenue for various state expenses (e.g. to fund specific initiatives), or it could be a means of correcting externalities from the production or consumption of the goods or service upon which the tax is levied. For example, a few countries indicated in their response to this survey that since the taxes levied on fuels are earmarked for a specific purpose (e.g. a road repair and maintenance fund), a rebate or credit is applied for those that use diesel or other fuels for non-highway uses (such as fishers)[6]. Taxes may also be applied to fuel to capture externalities, such as the effect of greenhouse-gases.

- Taxes to raise revenue for specific purposes: In some countries (e.g. New Zealand, Japan and the United States), the fuel-tax is levied as a highway user tax such that those that use diesel or other fuels for non-highway uses, such as fishing vessels, can receive an income-tax credit. In certain countries, fuel-tax concessions are also available to numerous other sectors of the economy, such as agriculture and forestry. The consideration of these circumstances is necessary in the categorisation of the value and impact of such transfers. Identifying whether a fuel-tax concession is an indirect transfer of income to a given sector would be a valuable input to the task of comparing different taxation systems and categorising subsidies and tax concessions.

6. One specific example includes the United States, where the tax revenues are applied to the Highway Trust Fund. Section 2 provides information on this and other such cases (Japan and New Zealand).

- Taxes to address externalities (e.g. pricing externalities such as CO_2 emissions): Work in this area will be important for estimating the costs and benefits of removing fuel subsidies and tax concessions. While the costs are generally known or relatively straightforward to calculate, quantifying and monetizing the benefits of phasing out *inefficient* fossil fuel subsidies, especially in the interest of reducing greenhouse gas emissions, is more challenging. This benefit-valuation exercise could take advantage of the ongoing work on the social cost of carbon, if the reduction in greenhouse gases from phasing out subsidies in the fisheries sector could be reliably estimated. The G20 Leaders statement also hinges on the phrase "inefficient fuel subsidies", which would thus benefit from discussion on what types of transfers should be considered in this context.

Next Steps and Action Required

44. Preliminary analysis based on country submissions was included as part of the Organisational response to the G-20 Leader's request for information and analysis on fuel subsidies as follows:

- There was a report for G-20 Finance Ministers (April 2010) and a final version of the report presented to G-20 Leaders (June 2010) which included a line on the fisheries as follows: "A preliminary and incomplete analysis of tax concessions relating to rebates, reductions and exemptions on excise taxes normally charged on fuels used by OECD fishing vessels suggests these could be on the order of USD 1.4 billion a year".

- The OECD is developing an inventory of fossil-fuel subsidies (including tax exemptions) to the extent possible as the basis for future work. Given the recent efforts by COFI Delegates to provide such information, it is well placed to contribute to this larger inventory.

SECTION 2: COUNTRY REVIEWS[7] [8]

45. This section provides an overview of the methods used to calculate or estimate the total value of fuel-tax concessions for fishing vessels. For most countries, this information is drawn largely from country submissions to the OECD, based on the questionnaire circulated in December 2009 ([TAD/FI(2009)22 and summarized in Annex 1). Possible fuel-tax concessions applicable to fishing vessels were also extracted from the OECD and the European Environment Agency database on instruments used for environmental policy and natural resources management. Finally, reference is made as to whether an OECD member country has supplied this information for previous years as part the annual submission on GFTs.

European Union OECD Member Countries

46. The Council of the European Union issued a directive in 2003 (Directive 2003/96/EC) which restructured the Community framework for the taxation of energy products and electricity and established minimum tax rates and tax exemptions. Article 14 (1) (b) of this Directive states that fishing activities can be exempted from fuel taxes in Community waters as follows:

> *In addition to the general provisions set out in Directive 92/12/EEC on exempt uses of taxable products, and without prejudice to other Community provisions, Member States shall exempt the following from taxation under conditions which they shall lay down for the purpose of ensuring the correct and straightforward application of such exemptions and of preventing any evasion, avoidance or abuse:*
>
> *(c) Energy products supplied for use as fuel for the purposes of navigation within Community waters (including fishing), other than private pleasure craft, and electricity produced on board a craft.*

47. Data on fuel consumption in the marine fishing fleet is gathered according to the data collection framework, Council regulation (EC) No 199/2008of 25 February 2008 concerning the establishment of a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy, Commission regulation (EC) No 665/2008 of 14 July 2008 laying down detailed rules for the application of Council Regulation (EC) No 199/2008 and the Commission decision of 6 November 2008 adopting a multiannual Community programme pursuant to Council Regulation (EC) No 199/2008.

48. The EU also provides other payments which may be linked to fuel use. Specifically, the "*de minimis"* regulation for fisheries, EC Reg. 875/2007, allows a maximum support of € 30,000 per firm for each three-year period during 2007-2013 for which the Commission does not require notification; these funds may be used to finance variable costs of fishing vessels, including fuel.

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7 . As currently defined, this questionnaire is not applicable to Austria, Czech Republic, Hungary, Israel, Luxembourg, Slovak Republic or Switzerland as they do not have commercial fishing fleets, and are such, not included here.

8 . Data included in the submissions are not repeated here, but are included as part of Table 1.2

49. This aid can be made available to fishing enterprises as well as to fish processing, trade and aquaculture companies. Eligibility rules are determined and set by the individual EU Member States. Box 2 provides a summary of a recent assessment of the "de minimis" aid and the link to fuel for fishing vessels.

Box 2.1. EU *de minimis* aid and fuel costs

In July 2008, the European Commission agreed to a package of measures to promote the restructuring of fishing fleets most affected by the fuel-price increases, allowing short-term support to fishers who undertake restructuring (European Commission 2008b, 2008c). As part of this effort, a study was commissioned to examine the effects of amending the regulation to allow for € 30,000 *de minimis* aid per vessel instead of per firm, with a limit of € 100,000 per enterprise. Below is an extract from the Commission funded study assessing *de minimis* aid and fuel costs:

"The maximum amount per firm allowed under the present regime leads to highly different impacts on fishing firm firms, depending on the size of the vessels they operate. On one hand, for small vessels below 12m, €30,000 would often represent a very significant contribution to their annual production value and income. On the other hand, for vessels over 24m, and even more strongly for those over 40m, the maximum *de minimis* represents less than 10% of their gross value added over the total period of three years. Consequently, the present regime over-compensates the higher fuel costs, for the purpose of which it was set up, for small vessels, which are not very energy dependent. At the same time, the contribution to the alleviation of high fuel costs for the larger vessels remains uncertain because of the constrained ceilings.

The total fuel costs of the European fishing fleets have been estimated at about €1.8 billion, at average 2008 price level. The fuel price increased between 2006 and 2008 by 29%. This implies that in 2008 fuel costs were about €400 million higher than two years earlier. The *de minimis* budget could on average compensate 60% of this increase over the three year period for which it is set. However, it must be stressed that 58% of the total fuel costs are incurred by 6% of the fleet (in terms of numbers), being vessels over 24m. This illustrates to which extent the increase of fuel costs of small vessels is over-compensated and of the larger vessels under-compensated, unless additional eligibility criteria in this respect would be introduced."

Source: Adapted from *Framian BV in co-operation with Symbeyond Research Group*. (2009) Economic Analysis of Raising De Minimis aid for Fisheries (MARE/2008/12).

Belgium

50. Belgium reports that its fuel subsidy consists of an excise-duty exemption, granted at the national level, for gasoline - light fuel oil [HS code 2710 1945]. This type of fuel is differentiated in the tax codes according to its final use. The level of excise duty for the fuel used by the Belgian fleet is €18,4854 euro per 1000 litres (instead of €21/1000 litres). Fishers are exempted from this excise tax on the basis of "Energy products supplied for use as motor fuel or heating fuel for the purposes of navigation within Community waters (including fishing) and electricity produced on board a craft" (OECD and the European Environment Agency database on instruments used for environmental policy and natural resources management). Data provided by companies that supply the Belgian fishing fleet with fuel indicate that fishers use gasoline of 0.1% sulphur content (with 0.86 density); this is also known as marine gas oil.

Denmark

51. No direct fuel subsidies are paid to fisheries. The calculated fuel subsidy provided to the OECD Secretariat represents tax-exemptions (e.g. taxes that *would* have to be paid *if* fisheries were subject to the same tax regime as road transport). Processing of fish etc. is not included. The taxes consist of a direct tax on fuel, a CO_2 tax on fuel and 25% VAT. These fuel-taxes are not paid by fishing vessels. The VAT is calculated as 25% of the value of the fuel including other taxes. In its submission, Denmark specifies that

"In general it should be noted that this type of calculation tends to overstate the value of the subsidy because it does not take into consideration the substitution which would take place at higher prices. Moreover VAT, if it was imposed, would be a tax on the added value not a fuel tax".

52. The volume of fuel consumed is calculated from the "Account Statistics for Fishery 2008". The statistics cover 97% of the fishing fleet measured in landings and revenue. Some fuel is bought abroad and foreign fishing vessels buy fuel in Danish ports. These quantities are not known. The fuel market price is based on information from SHELL DANMARK on diesel fuel for transport.

Finland

53. Article 9 of the Law of the Liquid Fuel Excise (no 1472/1994) notes that fuel used by commercial vessels (including fishing vessels to the extent they are used in commercial fisheries) are exempt from the fuel-excise taxes. This tax-exemption represents the full value of the excise tax.

54. Finland distinguishes three types of fuel (petrol, diesel and domestic fuel oil) consumed by fishing fleets along with the respective fuel-tax concession rates (see below).

Table 2.1. Fuel Types Used in Finland

Fuel Type	Tax rate (2008)	Tax Concession Value (€) (2008)	Fuel Consumed (2008)
Petrol	0.63	234,600	374,400
Diesel Oil	0.36	5,700	15,800
Domestic Fuel Oil	0.09	72,400	836,500

France

55. In December 2005, the Ministry of Food, Agriculture and Fisheries estimated the annual fuel consumption of the French fishing fleet (based on figures supplied by distributors) to have amounted to 520 000 tonnes, while the DGDDI (Directorate-General of Customs and Indirect Rights in the Ministry of Finance) estimated that the cost of granting exemption from the TIPP (domestic duty on petroleum products) that year had amounted to EUR 225 million. The cost of exemption from VAT was considered to be negligible due to the tax deductions for which enterprises would have been eligible

Germany

56. Through a separate exercise, Germany reported a fuel-tax concession for the OECD and European Environment Agency *database on instruments used for environmental policy and natural resources management - a*n Exemption for Navigation specified as "Use as fuel for the purpose of navigation, except private pleasure craft".

57. The Germany Delegation has clarified that this tax concession does not apply to its fishing fleet, and as such, Germany does not provide any fuel subsidies or tax concessions to its fishing vessels.

Greece

58. Professional fisheries are exempted from the *Special Consumption Tax* on fuel under Law 2960/2001 (article 78, paragraph 1b) "National Customs Code" (O.G.J. 265 A'), Law 3366/2005 (O.G.J. 96 A') and according to the provisions of Decision T1940/41/14.4.2003 of the Ministry of Economy and Finance. Greece also routinely reports the value of its fuel-tax exemption as part of its notification to the OECD on its Government Financial Transfers.

Italy

59. In Italy, a fuel subsidy for fishing vessels consists of an exemption from Value Added Taxes (VAT) and other direct fuel taxes, in accordance with the Council Directive 2003/96/EC of 27 October 2003. Italy has one fuel-tax rate for all fleets, but provided a breakdown of fuel consumption (and total value of the fuel-tax concession) by fleet; the total values are reported in Table 1.2.

60. Between 2007 and 2008 the cost of a litre of diesel fuel for fishing boats rose from €0.55 to €0.70. Italian authorities have not undertaken any special measures to mitigate the consequences of the fuel-price rises.

Netherlands

61. Through a separate exercise, Germany reported a fuel-tax concession for the OECD and European Environment Agency *database on instruments used for environmental policy and natural resources management* - Exemptions for Navigation: Petrol used for the propelling of ships (other than pleasure crafts) and Exemptions for Navigation: Mineral oils used for the propelling of ships (other than pleasure craft).

62. The Dutch Delegation has clarified that these fuel-tax concessions do not apply to its fishing fleet, and as such, the Netherlands reports no subsidies or tax concessions for fuel used by fishing vessels. In 2008, 66% of the fuel oil for Dutch fishing vessels was purchased outside the country.

Poland

63. Fuel used for commercial navigation purposes (including commercial fishing trips) are exempt from the fuel-excise tax under the Law on Excise Tax of 6 December 2008. The fuel-excise tax in 2007 and 2008 year was 1048pln/1000 litres (Law on Excise Tax of 23 January 2004).

Portugal

64. Through a separate exercise, Portugal reported the following fuel-tax concession to the OECD and European Environment Agency *database on instruments used for environmental policy and natural resources management - a*n Exemption for Navigation specified as "Gas oil and fuel oils for consumption in sea-coast and inland waterways navigation.".

65. However, the submission from Portugal to this exercise indicates that there are no fuel subsidies or tax concessions available to their fishing vessels.

Slovenia

66. Fossil fuel tax concessions in Slovenia are regulated by the Excise Duty Act (Official Journal of the RS, No 2/07, 25/09 and 41/09). Article 55(1) of this Act states that excise duties for fossil fuels shall not be paid for fossil fuels that are used to power fishing vessels. The implementation of the Excise Duty Act is regulated by Rules on the Implementation of the Excise Duty Act (Official Journal of the RS, No 49/04, 47/05 and 17/07). Article 42(1) of these Rules provides that natural persons that are in position of a valid fishing license and perform fishing activities can assert the right to the use of fuel from Article 55(1) of the Excise Duty Act in the form of the return of the excise duty that was paid.

67. No quantity of fuel was acquired out of the country for national fishing vessels. The conditions for granting the fuel-tax exemption do not distinguish between certain fleet segments or gear types.

Spain

68. In Spain, fuel-tax exemptions relevant to fishing vessels are governed by Real decreto 1517/2007, de 16 de noviembre (Aids granted to undertakings with fuel consumption between 1/11/2004-31/10/2005).

Sweden

69. Registered fishing vessels are exempted from the carbon-dioxide levy and from the energy tax on fuel. Most fishing vessels are able to buy tax-free fuel directly from the fuel suppliers and the suppliers have the right to make a reduction in their specific tax declarations. The Swedish tax authority does not collect any separate data on tax expenditures attributable to fishing vessels specifically, since other businesses such as trains and aircrafts as well as other maritime shipping are also exempted from the tax. For vessels other than fishing vessels, the owners pay the tax directly and request reimbursement in their declaration for tax on vessel fuel. The Swedish tax authority does not distinguish fishing vessels from other reimbursement claims. The only available data therefore refers to all professional shipping.

70. The fuel-tax expenditure is divided into two parts, the carbon-dioxide tax which is the same for all fuel types, 2883 SEK per m^3. The other part, the special energy tax, differs depending on fuel type. For vessels with an expenditure to buy green-coloured diesel the energy tax is SEK 764 per m^3. For highly taxed fuel the energy tax differs depending on the environmental standard of the fuel type. For the highest environmental standard, MK1 the energy tax is SEK 1277 per m^3. Because of this the rate of fuel subsidies and total value of all fuel subsidies are given as a range. The range is compiled by multiplying the estimated fuel consumption with the tax range ((2883+764)/1000) = SEK 3.647 per litre of fuel, (2883+1277)/1000 = SEK 4,16 per litre fuel). Table 1.2 provides an average of this calculated range. Sweden did not provide any additional fuel price support to its fishing fleet in response to the recent fuel price rises of 2008.

Volume of fuel consumed:

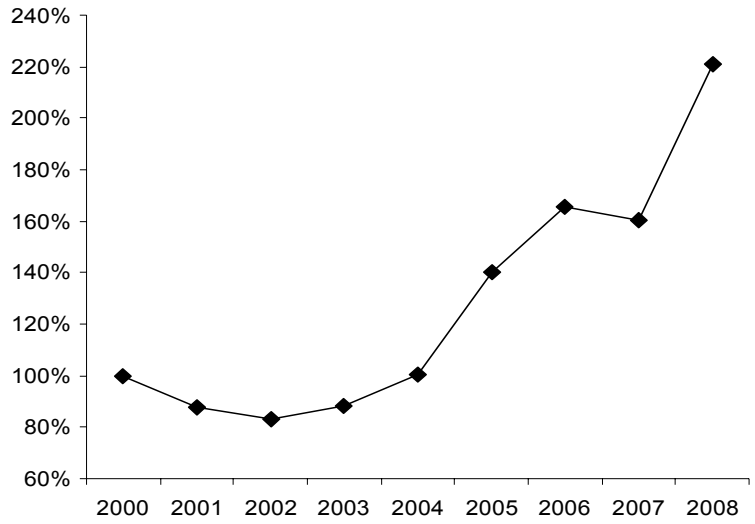
71. Data on fuel consumption are collected and estimated from a yearly survey distributed to a random sample of fishing vessels. The fuel consumption is extrapolated to the total population by using an extrapolation based on the number of days at sea in the population related to the days at sea in the sample.

72. Data are not compiled per type of fuel. Most of the fuel consumption, however, consists of diesel. Gasoline is only used for some smaller vessels.

National level market price for fuel:

73. Information on the average national fuel price is gathered and compiled from the Swedish Board of Fisheries for research vessels bunkering of diesel. The research vessels buy their diesel from the same places as other fishing vessels and are also subject to the fuel subsidy. Figure 1 shows two major shocks in fuel price in recent years.

Figure 2.1. Index of fuel-prices in Sweden (2000=100))



United Kingdom

74. Weekly fuel prices are collected from a number of suppliers to the fishing industry around the UK. From this information, an annual average duty-free price is produced. UK-wide averages are available only, as prices from Welsh and Northern Ireland suppliers are not available.

75. A combination of bottom-up techniques (from a 2005 and 2006 fleet survey) and a top-down estimation using MFA figures for 2007 and 2008 fleet activity, was used to estimate the volume of fuel consumed. The UK estimates were calculated as follows:

- The Seafish fleet survey for 2005 and 2006 give estimates of total expenditures by the UK fleet on fuel.
- For 2005 and 2006, the estimated total UK fleet spent on fuel was divided by the price per litre, to provide an estimate of total litres used by UK fleet in those years.
- MFA fisheries statistics contain figures giving total kW days at sea expended by the whole UK fleet, per year.
- The UK's estimate of fuel volume for the UK, divided by total UK kW days at sea in the same year (2005/2006 average), provides an estimated average of fuel volume required per kW day at sea for the UK fleet, with the assumption that figure remained stable for 2007/2008.

76. National estimates of fuel consumption were derived through MFA fisheries statistics that indicate the volume of landings into each of the UK nations. It was assumed that vessels from one nation landing into another will even out to a net effect of zero. The total UK volume of landings per kW day at sea were estimated from the MFA figures for 2007 and 2008. Each UK nation's volume of landings then provides the required kW days at sea per nation, for 2007 and 2008. The figure for average UK fuel volume per kW day at sea (2006 figure, assumed to remain stable in 2007 and 2008) was applied to give estimated fuel volume per nation.

Non-European Union OECD Member Countries

Australia[9]

77. The fuel tax credit rate for the following activitie4s is 38.143 cents per litre.

78. If the fisher is undertaking commercial fishing operations, you can claim for taxable fuel (for example, diesel or petrol) the fisher uses for any of the following activities, provided these activities are not connected with sport, recreation or tourism:

- Taking, catching, capturing of fish;
- Processing fish on board vessels;
- Fish farming;
- Constructing ponds and tanks or other structure to contain fish to be farmed, as long as this is done by the fish farmer or a contractor or subcontractor to the farmer;
- Pearling;
- Operating a dedicated mother vessel in connection with eligible fishing operations;
- Sailing a vessel to or from a port for the purpose of refitting or repairing the vessel or its equipment;
- Undertaking trials connected with the repair or refit.

Canada

79. Both federal and provincial taxes apply to fuel in Canada.

- The federal excise tax rate is 4 cents per litre on diesel for all users, with a full expenditure for many sectors of the economy. For marine vessels (fishing or otherwise), the full rebate on the excise tax is available when they proceed outside of Canadian inland waters (i.e. further than 12 nautical miles from the coast). There is no access to data on how many vessels proceed beyond 12 nautical miles from shore, and therefore there is no way of knowing how many claim this federal rebate or the total amount of rebates claimed.

- Canada manages its fisheries in six Regions: Newfoundland and Labrador, Maritimes, Gulf, Quebec, Central and Arctic, and Pacific. The Maritimes and Gulf Regions do not align exactly with provinces. Each province levies its own taxes on diesel fuel, and a general fuel tax expenditure available to many sectors (to be defined), including fisheries. The exemption is from the full amount of the excise tax in four regions (Newfoundland and Labrador, Maritimes, Gulf, Québec). In the Pacific Region, there is also a general fuel tax exemption available to many sectors, including fisheries, for diesel fuel.

80. As data on fuel consumption by fleets is available by region, Canada has approximated each Region's tax rebate by taking the average of the rates (per litre) in its constituent provinces. The Maritimes

[9] *Source* : Australian Taxation Office (2009). Fuel tax credits for business. Available at: http://www.ato.gov.au/content/downloads/BUS76594nat14584.pdf

Region includes parts of both New Brunswick and Nova Scotia, so the tax exemption rate was calculated using the average of the rates in these two provinces. Gulf Region includes parts of New Brunswick, Nova Scotia and Prince Edward Island. The tax exemption rate was estimated using the average of the rates in these three provinces. Fuel consumption values are estimates only. Those on the Atlantic coast (all Regions except the Pacific) are based on surveys of fishers in 2004. Those in the Pacific Region are based on surveys and economic models from 2007. Estimates from those years are used for both 2007 and 2008.

Chile

81. Chile responded that no subsidies are applied to fossil fuels in the fishing sector, and is keen on keeping that policy in the future.

Table 2.2. Total volume of fuel consumed by national Chilean fishing vessels

Year	Total volume of fuel consumed (lt.)	Fuel Market price CL$/lt.	Currency Annual average. (CL$/US$)
2008	167.284.589	440,5	522,46
2009	203.763.242	276,6	559,61

82. In order to obtain an estimate of the fuel consumption of the fleet, the following methodology was used (Box 2.1).

1. The estimate has been made only for the industrial fleet, as the small-scale fleet does not have data to make a sound and reliable estimate.

2. The total fuel consumption corresponds to the annual corresponds to each vessels operating in the national fishing fleet.

3. The consumption of each vessel is estimated on two components. The first is the fuel consumption when the vessel is conducting fishing operations; the second is the consumption of the vessel when in port (basic consumption).

Box 2.1. Estimating fuel consumption in Chile

Chile estimated fuel consumption in the fishing sector as described below; validation of the model was carried out by evaluating real data of a 10-vessel fleet, which was compared with real consumption regarding the consumption determined by the model.

$$\text{Consumption in operation} = \frac{(N°\text{days} * 24 * \text{Const Yield} * \text{Main Engine Power} * 0.85)}{1000}$$

Where,

N° days= Number of days in operation
Constant Yield= Yield of fuel of the main engine (115 gr./HP*hrs.)
Main Engine Power= Main Engine Power (HP)
24= day-to-hour-conversion constant (hr/day)
0.85= fuel density constant (0.85 gr/cm3)
1000= conversion constant (cm3 to lts)

$$\text{Consumption in port} = \frac{(\text{Nº days} * 24 * \text{Const Yield} * \text{Aux Engine Power} * 0{,}85)}{1000}$$

Where,

N° days= Number of days in port
Constant Yield= Yield of fuel of the engine (115 gr./HP*hrs.)
Aux Engine Power= Auxiliary Engine Power (HP)
24= day-to-hour-conversion constant (hr/day)
0.85= fuel density constant (0.85 gr/cm3)
1000= conversion constant (cm3 to lts)

Source : Chilean country submission (2010)

Iceland

83. Iceland provided data on the fossil fuel usage of domestic fishing vessels (marine diesel oil and heavy fuel oil) from the Icelandic National Energy Authority (http://www.nea.is/) on. The figures apply to fuel sold, but would reflect fuel usage in general.

84. The Icelandic submission notes that no fuel-tax subsidies or exemptions apply to the fishing fleet. Vessels as well as other vehicles that do not use the road system in Iceland are not subject to a levy/tax for road usage, but that would not be an exemption, but a special levy on vehicles using roads.

Japan

85. A tax exemption for heavy fuel oil (type A) in Japan is applied not only to fishing activities, but also to the use of heavy fuel oil by the agriculture and forestry sectors. There is also a special-purpose tax on light oil; the revenue generated is used for the construction and maintenance for public roads in Japan. For this reason, light oil consumed by any industrial activity that does not use roads is exempt from this tax. This exemption is available to all vessels (not only fishing vessels), as well as other industrial activities such as agriculture, forestry, and railways that are not road users.

Table 2.1. Annual Consumption of fuel by the fishing sector, by fuel type (1,000 kiloliters)

	1990	1995	2000	2005	2007
Heavy fuel oil type A	3,934	2,782	2,803	1,730	1,590
Light [diesel] oil	848	930	856	486	431

Source : Fisheries Agency of Japan.

86. As noted above, the tax exemption for fossil fuels is applied to various sectors of the economy, including agriculture and forestry; it does not target the fisheries sector. In particular, the tax on light oil in Japan is a special-purpose tax whose revenue is used for the construction and maintenance for public roads in Japan. Based on this institutional taxation arrangement, this exemption is applied to all vessels that do not use public roads, and is not granted exclusively to fishing sectors. The Japanese submission notes that this means that this fuel-tax exemption has not been established to promote or support any particular industry. This treatment is closely related to the national financial and administrative system including its overall taxation system. In this respect, the Japanese submission states that whether the analysis is

intended for overfishing or climate change, singling out the fisheries sector and dealing with it separately from the national financial system upon which the tax exemption is based, is not considered to be fair and appropriate treatment.

87. Observations included in the Japanese submission regarding taxation and the fishing industry:

- As noted above, the fuel-tax exemption is not aimed at increasing fish production. It neither contributes to overcapacity nor to over-fishing. Figure 2.2 shows that fish production in the Japanese coastal and offshore area (excluding Japanese sardine, whose stock fluctuates regardless of fishing pressure), has been fairly constant since 1990. This suggests that serious overfishing has not been observed in the Japanese EEZ. This fact further indicates that, even if fisheries subsidies exist in Japan, they have not contributed to overfishing. This represents Japan's position that fish resource sustainability will be realized through appropriate fisheries management, regardless of the fisheries subsides applied.

- In order to verify this contention, an econometric analysis was conducted which examined the relationship between subsidies and fish production in Japan. The results of analysis[10] did not find a significant causal relationship between fisheries subsidies and overcapacity or overfishing.

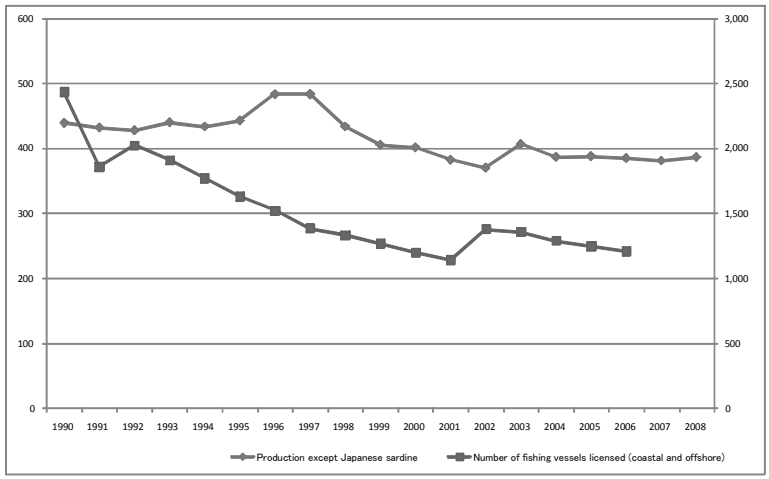
- As shown in Figure 2.2, there is a declining trend in the number of licensed coastal and offshore fishing vessels mainly operating within the Japanese EEZ. This fact also supports the assertion that fisheries subsidies in Japan have not contributed to the over-capacity of its fisheries.

88. Further observations as part of the Japanese submission regarding taxation and amount of fuel consumption indicate:

- Annual consumption of fuel by the Japanese fishing fleet has declined over time despite the fuel-tax exemption. Given the relatively high share of fuel as part of a fisher's operations, further aggravated by rising prices, fishers are not inclined to increase the amount of fuel consumed by their fishing activities even if increased catch is expected.

[10] Yagi, et al. A time-series data analysis to examine effects of subsides to fishery productions in Japan "*The Japanese Society of Fisheries Science*" (2009) 75:3-11

Figure 2.2. Fisheries production (excluding sardine) by coastal and offshore fishing vessels and the number of licensed vessels)



Source: Fisheries Agency of Japan

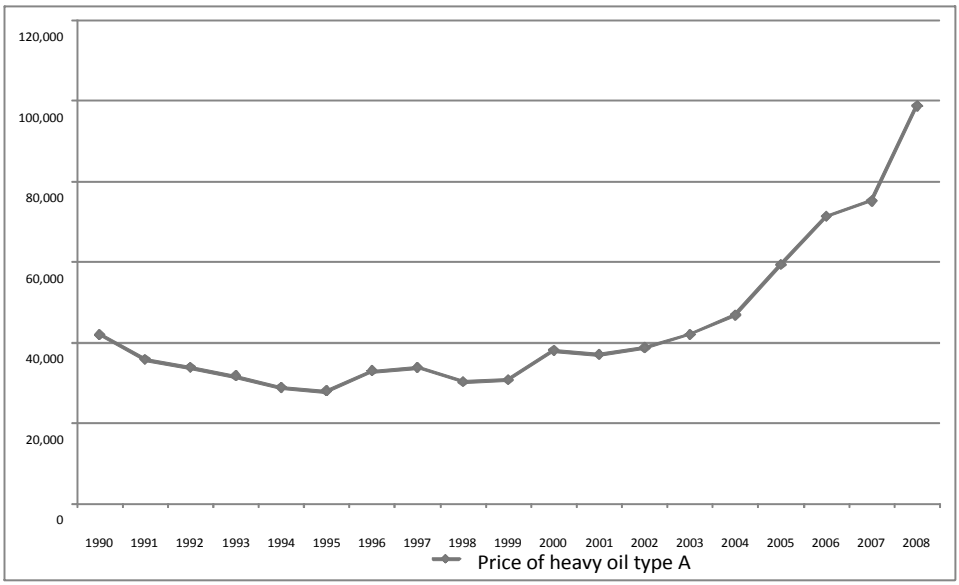
89. In response to the steep rise in the price of fuel between 2004 and 2007, the government of Japan introduced an emergency program to encourage energy-efficient fishing operations. This was introduced in the second half of 2007 in order to prevent the collapse of fishing operations. Under certain conditions, this program can support up to 90% of the incremental increase in the oil price, compared with the base-price of December 2007. As the price of fuel oil significantly declined after the introduction of this program, the number of fishers which participated in this program was very limited. Consequently, the total amount of the nominal financial transfer from the government to fishers under this program was limited to about JPY 30 million (approximately USD 0.33 million). In a general sense, however, the share of the fuel price in fishers' operations remains significantly high throughout the marine capture fishery sectors, as shown in the Table 2.2. In addition, the retail price of fuel oil doubled from 2004 to 2007 (Figure 2.2). The Japanese submission claims that there was a strong and legitimate need for the government to introduce such an emergency measure in order to prevent the collapse of fishers operations.

Table 2.2: Ratio of fuel price in fisher's operations (Japan)

Type of Fishing		Small trawler	Gillnet	Offshore trawler	Coastal squid
Ratio of oil	2005	22.6	16.6	18.7	23.3
Price/total Expenditure (%)	2007	29.6	22.4	25.0	30.5

Source: Fisheries Agency of Japan

Figure 2.3. Trend in the price of heavy fuel oil, type A in Japan



Source : The National Federation of Fisheries Co-operative Associations

Korea

90. A submission from Korea has not been received to date.

91. Through a separate exercise, Korea reported the following fuel-tax concession to the OECD and European Environment Agency *database on instruments used for environmental policy and natural resources management* which may be applicable to the fisheries sector; at the time of publishing this paper, Korea has been requested to review this reported fuel-tax concession and possible implications for fishing vessels.

- An Exemption for Navigation specified as "Oil and its products used for deep sea fishing vessels, or vessels in international navigation."

New Zealand

92. New Zealand does not provide any sector-specific fuel subsidies for its fishing sector, but in the interests of transparency they have provided some details on a refund (Motor Vehicle Excise Duty Refund) for which fishing vessels may be eligible. The New Zealand submission notes that it will be apparent from the nature of the programme, and the very small proportion of estimated refunds to the fishing sector, that the design and application of the programme is directed elsewhere; namely across the economy as a whole and to all forms of commercial transport within the economy. Operators of commercial fishing vessels may be eligible for a Motor Spirits Excise Duty Refund.[11] This is an economy-wide programme which provides for a refund on the excise duty and the goods and services tax charged on motor spirits that are used:

- as fuel in an exempted vehicle;

[11] Further information on this program is available at: http://www.nzta.govt.nz/resources/factsheets/14/excise-duty.html

- as fuel in a road user charges-licensed vehicle;
- as fuel in a commercial vessel;
- for commercial purposes other than as fuel in any motor vehicle, vessel, or aircraft.

93. Diesel, the principle fuel used in fishing vessels, is not eligible for a refund. The refund is only available for petrol, LPG and CNG.

94. A maximum estimate for refunds for commercial fishing vessels is NZD 435 306 in 2007, and NZD 436 681 in 2008, representing approximately 1.25% of the total of the programme.

95. Estimates are not available for total fuel use of the New Zealand fishing fleet in 2007 or 2008, but total fuel use in 2005 is estimated to have been 216 million litres. This figure was determined in 2009 using the following two converging methods:

- Direct method. A letter was sent to every vessel operator in the fishing industry seeking quantitative data on 2005 fuel consumption. The replies that were received represented nearly two thirds of the industry's installed capacity when expressed in terms of kilowatt-hours. Based on calculated estimates of total consumption, nearly 70% of the total consumption for 2005 is known from actual figures derived from this survey.

- Indirect method. The Ministry of Fisheries holds information on the engine size (the kilowatt output) and the time spent at sea for each vessel in the fishing fleet. This information was compared with the actual fuel consumption of vessels, where that information was known from the direct survey. This comparison allowed a correlation to be drawn between kilowatt-hours and actual litres consumed, from which a conversion factor was derived to allow the calculation of fuel use where only kilowatt hours are known.

96. These two approaches were drawn together by using the conversion factor to estimate consumption from kilowatt-hours, based on information held by the Ministry of Fisheries, where direct survey information was not available.

Norway[12]

97. Fuel taxation in Norway consists of several different elements, each meant to address different issues within the overall taxation policy. The rate of fuel subsidies provided in Norway's response to the OECD includes the base tax on mineral oil and the carbon-dioxide tax, which are both refunded for fishing within the Norwegian economic zone; fishing vessels are completely exempt from the base tax on mineral oil and the carbon-dioxide tax. The taxes are described below.

- Base tax on mineral oil: The base tax is intended to correct any adverse effects arising from the introduction of an electricity tax in the year 2000. The base tax thus counteracts the tax incentives to the use of fossil fuels for heating. The tax is levied on all mineral oil, with the following exceptions: all mineral oil where a diesel tax applies, and jet fuel. Mineral oil used for the following purposes is also exempt: international shipping, goods and passengers traffic in international waters, construction on the continental shelf, supply shipping, high-seas fishing, and production in the fishmeal industry. The tax is refunded for fishing within the economic zone. High-sea fishing is exempted from these taxes. (Source: Garantikassen for fiskere).

12 The figures and description given below is without prejudice to Norway's view on whether or not these constitute a subsidy within the meaning of the WTO Agreement on Subsidies and Countervailing Measures

- Carbon dioxide tax: A carbon dioxide tax is levied on all mineral oil, with the exemption of mineral oil used for international shipping, international flight, and fishing within the economic zone and high-seas fishing. The tax is fully refunded for fishing within the economic zone, whereas vessels fishing in high-seas are exempt from the tax.

- Petrol and diesel tax: A petrol tax is levied on all petrol. This tax is intended to capture the negative externalities from the use of motor vehicles such as: accidents; congestion; noise pollution; road wear; and environmental pollution (except carbon-dioxide emissions). A complete exemption from the tax is given for all petrol used by airplanes, boats, and snowmobiles in areas without roads. Petrol used for technical purposes, medical purposes and for the exploitation of national resources in the oceans outside of Norwegian territory is also exempt from the petrol tax.

98. The tax rate on petrol and diesel tax was not included in the Norwegian submission to the OECD. This tax is intended to capture the negative externalities arising from the use of land-based motor vehicles such as: accidents; congestion; noise pollution; road wear; and environmental pollution (except carbon dioxide emissions). All petrol used by airplanes, boats, and snowmobiles in areas without roads is exempt from the tax. Similarly, the diesel tax is levied on all diesel used for the propulsion of motor vehicles and is also meant to capture the negative externalities from the use of motor vehicles. In the Norwegian tax structure, these taxes are not levied on the use of fossil fuel as such, but on the use of the national road network. Thus, no relevant data regarding fishing vessels exists for these taxes.

99. The NOx tax applicable for each undertaking is based on calculated emissions with the rate in 2008 being NOK 15.39 /kg, and for propulsion engines it applies only to those with an installed engine power over 750 kW. High-seas fishing, international shipping and international air transport are completely exempt from the tax. In addition, an agreement to reduce emissions was signed by the authorities and several industry organizations, effective from 2008. This agreement allows undertakings whose activity falls within the limits of the agreement to pay a reduced tax rate of NOK 11 /kg for offshore oil activity and NOK 4 /kg for fishing, national and international shipping, supply shipping, industrial production, air transport and other sectors included in the agreement. Revenues from this tax are hypothecated to a fund that financially supports investments in emission-reducing measures. The agreement is set to expire in 2011. It has not been possible to calculate any possible subsidy elements for the fishing fleet.

100. The consumption figures reported in Table 1.2 are estimates of the total volume of fuel consumed in Norway and include foreign vessels fuelling in Norway and Norwegian vessels fuelling for fishing in the high-seas. Estimates of fuel acquired in third countries by Norwegian vessels are 29 million litres for 2007 and 28 million litres for 2008. The reliability of the estimates is uncertain and stem from changes in reporting procedures from the oil companies where, inter alia, it is difficult to distinguish the sales between the petroleum industry, shipping, fisheries and distributors. The estimate of the fuel acquired abroad is based on a 30-year analysis, and the reliability of the estimate is uncertain. (Source: Statistics Norway (SSB)).

Turkey

101. Fuel subsidies have been provided since 2004. The subsidy is provided to fisheries through fuel-tax relief. The fossil fuels used are subject to a special tax, namely the Private Consumption Tax. No tax relief was launched due to economic crisis.

102. National level fuel market price: Marketing average price on July 2, 2007, in Istanbul & Marketing average price on July 1, 2008, in Istanbul

Table 2.3. Total share of fuel-tax relief rate as a % of fuel oil consumption, by year (Turkey)

2004	2005	2006	2007	2008
28%	31%	32%	30%	30%

Table 2.4. Number of fishing vessels benefitting from fuel-tax relief, by year (Turkey)

2004	2005	2006	2007	2008
2357	3195	3674	3907	4131

United States

103. The Amount of Fuel Used By U.S. Commercial Fishing Vessels in 2007 and 2008: Economists at each of the six National Marine Fisheries Service (NMFS) Fisheries Science Centres and at the Office of Sustainable Fisheries provided estimates of the amount of fuel used and landings by fishery for the most recent year(s) that fuel use or expense data were available. In most cases, the fisheries were defined by species or species group and gear. That information was used to calculate the litres of fuel used per metric ton of landings by fishery, and those estimates were used with fishery-specific landings estimates for 2007 and 2008 to estimate the amount of fuel used in each of those two years. Although the litres per metric ton of landings can vary by year, better proxies of the litres of fuel used in 2007 and 2008 for those fisheries were no available.

104. The estimates for some fisheries are based on trip level data on the amount of fuel used and/or expenses on fuel that are collected on an ongoing basis. This is done with economic add-ons either to at-sea observer programs or to logbook programs. The estimates for the other fisheries for which fuel data were provided for this report are based on annual fuel use and/or expense data that are collected each year, periodically (*e.g.*, each two to three years), on a less frequent but regular basis, or on an ad-hoc basis. In addition, there are some fisheries for which such data were not proved for this report. The fisheries for which no fuel use data were provided for this report presented more of a problem. Those fisheries include a number of Federally-managed commercial fisheries and most commercial fisheries that are not Federally managed. The fuel use estimates for the two largest components of those fisheries (i.e., the Gulf of Mexico and Atlantic menhaden fisheries and much of the groundfish fishery off Alaska) were estimated using the landings from those fisheries and estimates of the litres per metric ton of landings from somewhat comparable fisheries. The fuel use estimates for all other commercial fisheries combined were generated using the aggregate landings for those fisheries and the median of the estimated litres of fuel per metric ton of landings for all the fisheries for which fuel use data had been provided. The landings estimate for all other fisheries is the difference between the total landings of U.S. commercial fishing vessels as reported in Fisheries of the United States, 2008 (FUS 2008) and the sum of the landings for the individual fisheries with fuel estimates in Tables 1 and 2, respectively, for 2007 and 2008. Before determining that difference, the landings for scallops and clams were converted from the round (live) weights used in this assessment to be comparable with the landings reported in FUS 2008 that typically are reported in round (live) weight for all items except univalve and bivalve molluscs, such as clams, oysters, and scallops, which were reported in weight of meats (excluding the shell). The other fisheries accounted for about 21 percent of the total commercial landings by U.S. commercial fishing vessels in 2007 and about 23 percent of that total for 2008; and the fuel use estimates for the other fisheries, which probably are the least certain part of the total fuel use estimates, accounted for about 41 percent of the total fuel use estimate for 2007 and 43 percent of that total for 2008. It is estimated that about 1.4 billion litres (L) and 1.3 billion L of fuel were used by U.S. commercial fishing vessels in 2007 and 2008, respectively. This was predominantly diesel fuel.

105. The estimates of the fuel used per metric ton of landings ranged from less than 10 L for the West Coast coastal pelagic species fishery, which is principally a purse seine fishery, to about 3,000 L for the Federally managed (i.e., offshore) Gulf of Mexico shrimp trawl fishery. In their 2005 article, *Fuelling Global Fishing Fleets*, Peter Tyedmers, Reg Watson and Daniel Pauly note a similar variability across fisheries.

106. The scale of direct fuel inputs, however, can range widely. Purse seine fisheries for small pelagic species, such as herring and menhaden, that are destined for reduction to fish meal and oil, typically use under 50 L of fuel per tonne of fish landed. In contrast, fisheries targeting high value species like shrimp, tuna, or swordfish frequently consume in excess of 2000 L per tonne of landings.

107. Fuel Subsidies: Federal taxes paid on fuels are credited to the Highway Trust Fund (HTF). The HTF was established by the Highway Revenue Act of 1956 as a mechanism to finance an accelerated highway program, including construction of the Interstate Highway System. Initially, the revenues of the HTF were intended for financing highways, with the taxes dedicated to the HTF paid by the users of highways. Now, tax revenues directed to the HTF are derived from excise taxes on highway motor fuel and truck related taxes on truck tires, sales of trucks and trailers, and heavy vehicle use; and those tax revenues are also used for the Mass Transit Account and the Leaking Underground Storage Tank Trust Fund.

108. Because the Federal fuel tax is in principle a highway user tax, those that use diesel or other fuels for non-highway uses can receive an income tax credit for most of the Federal fuel taxes they pay as part of the cost of the fuel they purchase for nontaxable purposes. That tax credit can be claimed using the Internal Revenue Service Form 4136 (Credit for Federal Tax Paid on Fuels). The following types of nontaxable uses, including a boat engaged in commercial fishing, are identified in the instructions for that tax form:

- On a farm for farming purposes
- Off-highway business use (for business use other than in a highway vehicle registered or required to be registered for highway use)
- Export
- In a boat engaged in commercial fishing
- In certain intercity and local buses
- In a qualified local bus
- In a bus transporting students and employees of schools (school buses)
- For diesel fuel and kerosene (other than kerosene used in aviation) used other than as a fuel in the propulsion engine of a train or diesel-powered highway vehicle (but not off-highway business use)
- In foreign trade
- Certain helicopter and fixed-wing aircraft uses
- Exclusive use by a qualified blood collector organization
- In a highway vehicle owned by the United States that is not used on a highway
- Exclusive use by a non-profit educational organization
- Exclusive use by a state, political subdivision of a state, or the District of Columbia

- In an aircraft or vehicle owned by an aircraft museum
- In military aircraft

109. The Federal fuel tax is now USD 0.244 per gallon of diesel fuel and USD 0.184 per gallon of gasoline. This includes a USD 0.001 tax per gallon that goes to the Leaking Underground Storage Tank Trust Fund. However, the tax credit per gallon is USD 0.243 and USD 0.183, respectively, for diesel fuel and gasoline because there is no tax credit for the USD 0.001 per gallon tax levied to support the Leaking Underground Storage Tank Trust Fund. This means that, with respect to the Federal fuel taxes, there is not a subsidy for commercial fishing boats. The income tax credit they can receive is intended to exempt them from the part of the Federal fuel tax that is a highway use tax, just as it exempts other non-highway uses of most of the Federal fuel tax.

110. State and local motor fuel excise tax rates in coastal states ranged from about $0.08 to $0.32 per gallon for diesel fuel and gasoline as of January 1, 2008. Typically, these fuel taxes are intended to be road or highway use taxes; therefore, to the extent that they do not apply to commercial fishing vessels or other non-road uses, such concessions are not subsidies. However, an assessment of any subsidies associated with state and local fuel taxes was beyond the scope of this brief report.

OECD Accession Countries

Estonia (Accession)

111. Data provided has been included in Table 1.2.

Russia (Accession Country)

112. Subsidies to fisheries organizations (legal entities) and individuals have been provided for a one-year period to partially compensate their expenses on loan interest payment received from Russian credit institutions in 2009 for material and technical supplies and fishing vessel equipment.

113. A considerable number of the vessels in the Russian fishing fleet have reached a critical level of depreciation. Russian fishing vessels consume far more volumes of diesel oil when conducting fishing operations as compared to modern, technologically advanced vessels of foreign fishing companies. For example, a domestic fishing vessel consumes about 400 litres of diesel oil to harvest one tonne of resources, whereas the corresponding figure for foreign fishing vessels is about 200 litres of diesel per tonne of catch.

114. The Russian submission notes that there has been a recent increase in the price of diesel oil used by fishing vessels. This has resulted in the escalation of costs incurred by Russian fishing organizations during fish harvesting, which in turn leads to an appreciation of domestic fishery products (price) and a decrease in their competitiveness as compared to the same seafood products produced abroad.

Non-OECD economies

Latvia (EU member state)

115. The law "On excise tax" exempts marked oil products used by ships from taxation, other than those used for private recreation and entertainment purposes. The State Revenue Service is responsible for the collection of excise taxes.

116. The information provided as part of this exercise includes only uncollected excise taxes from marked diesel sold to ships in the country; the ships eligible to use marked fuel without paying the tax include not only the national fishing fleet, but also warships, transport ships, and pilot boats. Ships used for private and recreational purposes are not eligible for this rebate. There is no data on value of subsidies for the amount of fuel consumed on the high-seas.

Thailand (COFI Observer)

117. Thailand stated that no such subsidy as outlined in the OECD questionnaire has been available to fishing vessels in 2007 and 2008.

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ANNEX 1: DATA REQUEST

General Comments and Definitions

118. The goal of this exercise is to estimate the total benefit fishers may receive from governments regarding the price of fossil fuels. The term "fuel subsidy" (to fishers) refers to any government intervention regarding fossil fuels that reduce the cost and/or increase revenues of commercial fishers, regardless of whether or not they involve direct financial transfers.

119. For the purpose of this exercise, a fuel subsidy (to fishers) is defined broadly as a rebate, refund, expenditure[13] or reduction (to fishers) from Value Added Taxes (VAT) and other such direct fuel taxes that are normally levied by the government on fuel users in the economy; price controls that suppress fuel prices below normal market prices; and, programs that provide direct transfers or payments.

120. It is recognized that there will be cases of fossil fuel subsidies as defined here that may be considered as working towards "green purposes" and not be considered as such inefficient; should this case arise for any country, it would nevertheless be appreciated if countries would provide the data specified in this request, along with the description of the program[14].

121. This analysis is focussed on the commercial fishing sector; the term "fishing fleet" refers to vessels in the fish harvesting sector (marine and inland).

122. Data is requested for the years 2007 & 2008, or the most recent years for which data is available. Data is requested as whole numbers in national currency; any conversion of monetary values into another currency or unit (e.g. millions, thousands) will be undertaken by the Secretariat. Volume (weight) is requested in litres.

123. Fuel subsidies should be reported at both the national and sub-national levels. The type of fuel used by the fishing fleets should also be specified (diesel, gasoline, biofuels etc.).

Specific Request

124. Member countries are requested to provide data as outlined in Table 1, based on the information detailed in this section. A brief description of each type of subsidy/program is also requested (e.g. its nature and how it operates).

1: Value of the Fossil Fuel Subsidy

125. The value of the fuel subsidy to all fishing fleets and the relevant authority as indicated in legislation or otherwise should be provided. This value may be represented as follows, depending on data capture and availability in Member countries; where possible, responses to both Option A and Option B is requested:

13 . An expenditure from a fuel tax to fishers may either be specified directly in the legislation or may be represented by cases where there is an economy wide tax that is not applied to fishing vessels.

14. This may include programs whereby authorities allow fishers to make payments to a general fund for a specific purpose (*e.g.* use of greener technology for fishing vessels) in lieu of a tax collected by government that reverts to the state's treasury.

Option 1.A: The rate of the fuel subsidy per litre of fuel. In cases where there are different and varying sub-national level fuel subsidies in addition to a national level subsidy, these should be provided as well, with a distinct accounting for each level.

AND

Option 1.B: The aggregate foregone revenue to the national accounts for taxes not collected.

Considerations:

126. Where available, further details regarding the breakdown of the fuel subsidy by fishing fleet (e.g. inshore, offshore, high seas) or by gear type etc. can be provided, should the fuel subsidy be applicable in only certain cases.

127. Any additional one off fuel price supports provided to the fishing fleet, for example in response to the recent fuel crisis of 2008, should be reported separately and indicated as such, including the end date of such programs.

2: Volume of fuel consumed

128. The total amount [volume] of fuel consumed by all fleets, expressed in litres should be provided. Should the volume be estimated, the details of the methodological approach taken should be provided.

Consideration:

129. In cases where there may be different and varying sub-national level fuel subsidies, the breakdown in the volume per jurisdiction should be provided, if possible.

3: National level market price for fuel (Optional)

130. If readily available, countries are requested to provide a national average market price for fuel.

Country	**Country Level**	**Unit** [Currency]	**1.A. Rate of fuel subsidies** (price per litre)		**1.B. Total value of all fuel subsidies**		**2. Total volume of fuel consumed by national fishing fleets** (litres)[Error! Reference source not found.]		**3. National level fuel market price** (price per litre)		**Brief description of subsidy, scope**
			2007	**2008**	**2007**	**2008**	**2007**	**2008**	**2007**	**2008**	
Country A	National	ABC									
	Region 1	ABC									
	Region 2	ABC									

1. Where applicable and if known, indicate through a footnote whether or not some quantity of fuel is acquired out of country for national fishing vessels and an approximation of that amount (%).
2. Please provide additional information if the fuel subsidy is applicable only to certain fleet segments/gear type and duration of the program (start and end dates).
3. Please attach a description of each subsidy/program, the type of fuel used (e.g. diesel).
4. This includes budgeted (direct transfers) and unbudgeted (market mechanisms) subsidies.

ANNEX 2: G-20 LEADERS' STATEMENT - THE PITTSBURGH SUMMIT

Preamble

(Agreement ...) To phase out and rationalize over the medium term inefficient fossil fuel subsidies while providing targeted support for the poorest. Inefficient fossil fuel subsidies encourage wasteful consumption, reduce our energy security, impede investment in clean energy sources and undermine efforts to deal with the threat of climate change. [paragraph 24]

Main Text

Enhancing our energy efficiency can play an important, positive role in promoting energy security and fighting climate change. Inefficient fossil fuel subsidies encourage wasteful consumption, distort markets, impede investment in clean energy sources and undermine efforts to deal with climate change. The Organization for Economic Cooperation and Development (OECD) and the IEA have found that eliminating fossil fuel subsidies by 2020 would reduce global greenhouse gas emissions in 2050 by ten percent. Many countries are reducing fossil fuel subsidies while preventing adverse impact on the poorest. Building on these efforts and recognizing the challenges of populations suffering from energy poverty, we commit to [paragraph 29]:

- Rationalize and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption. As we do that, we recognize the importance of providing those in need with essential energy services, including through the use of targeted cash transfers and other appropriate mechanisms. This reform will not apply to our support for clean energy, renewables, and technologies that dramatically reduce greenhouse gas emissions. We will have our Energy and Finance Ministers, based on their national circumstances, develop implementation strategies and timeframes, and report back to Leaders at the next Summit. We ask the international financial institutions to offer support to countries in this process. We call on all nations to adopt policies that will phase out such subsidies worldwide.

We request relevant institutions, such as the IEA, OPEC, OECD, and World Bank, provide an analysis of the scope of energy subsidies and suggestions for the implementation of this initiative and report back at the next summit [paragraph 30].