

Ecolabeling and Green Certification for Effective Fisheries Management – An Analysis

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Abstract—Nowadays there is a growing environmental concern and the business communities have slowly started recognising environmental protection and sustainable utilization of natural resources into their marketing strategies. This paper discusses the various Ecolabeling and Certification Systems developed world over to regulate and introduce Fair Trade in Ornamental Fish Industry. Ecolabeling and green certification are considered as part of these strategies implemented partly out of compulsion from the National and International Regulatory Bodies and Environmental Movements. All the major markets of ornamental fishes like European Union, USA and Japan have started putting restrictions on the trade to impose ecolabeling as a non tariff barrier like the one imposed on seafood and aqua cultured products. A review was done on the available Ecolabeling and Green Certification Schemes available at local, national and international levels for fisheries including aquaculture and ornamental fish trade and to examine the success and constraints faced by these schemes during its implementation. The primary downside of certification is the multiplicity of ecolabels and cost incurred by applicants for certification, costs which may in turn be passed on to consumers. The studies reveal serious inadequacies in a number of ecolabels and cast doubt on their overall contribution to effective fisheries management and sustainability. The paper also discusses the initiative taken in India to develop guidelines for Green Certification of Fresh water ornamental fishes.

Keywords—Ecolabeling in fisheries, Fair trade, Green Certification, Sustainable Ornamental fish trade.

I. INTRODUCTION

WITH the shift from sales orientation to market orientation and consumers demand for social and environmental responsibilities, ecolabeling, traceability and certifications have become important tools for marketing the products. In principle, eco-labeling has been endorsed by the international community as one of the tools that can help improve environmental management through market-based means. However, its application to natural resource sectors has proven complicated and often controversial [1]. In the case of aquaculture and ornamental fish trade the concern is whether the fish is produced through sustainable chain of custody. The basis of developing a certification and ecolabeling system is primarily due to the various legal and policy issues which do not value environment and its resources on a sustainable manner. The unequal access and ownership of biological resources in the hands of certain vested parties under the ‘so called open access system’ has resulted in destruction of the habitat and unregulated introduction of exotic species into the natural water bodies.

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The case of the dolphin-safe label on canned tuna product shows that eco-labels have the potential to ‘tune’ a market [2]. Concern over the by-catch of dolphin in tuna purse-seine fisheries led to United States (USA) Government requirements that imported tuna be caught in a way that minimized this bycatch. Virtually all canned tuna in the United Kingdom (UK) is labeled as dolphin-safe despite the fact that the market is almost exclusively skipjack tuna. It is thus not implicated in the dolphin bycatch problem associated with the yellow fin tuna of the Eastern Tropical Pacific consumed in the USA. There were a range of different motives among processors and retailers in adopting the labeling scheme in the UK. The scheme may be more of a marketing ploy, promoted by the major processors, than an eco-label forced upon the market through consumer and environmentalist power [3]. The 1998 ‘Give Swordfish a Break’ campaign, where consumers in the United States were encouraged not to purchase swordfish was bolstered by support from high profile New York City restaurant owners and chefs and had a significant impact on trade in swordfish. A recent trend in ‘green consumerism’ has involved consumers seeking out companies and products that minimize environmental impacts [4]. Macfadyen, & Huntington [5] profile in some detail the wide range of environmental certification initiatives such the Marine Stewardship Council (MSC), the Friend of the Sea Scheme (FoS), and others. This profiling includes the main characteristics of the schemes, and where possible their extent/coverage. Detail is also provided on the claims and commitments made by retailers and fish buyers in relation to sustainable sourcing. The principal objective of product certification (and catch documentation) is to prevent, deter and eliminate illegal, unreported and unregulated fishing in accordance with the 2001 FAO International Plan of Action. Product certification does not necessarily involve a product label at the retail level. Where product certification comes with a label to inform consumers, however, it can influence consumers’ choices [6].

A. How do eco-labels work?

There are three main types of labels available on the market today.

1. Type I Ecolabel

Ecolabels that meet ISO 14024 “Environmental labels and declarations. ISO14024 defines Type I environmental labeling program as “voluntary, multiple-criteria-based third party program that awards a license which authorizes the use of environmental labels on products indicating overall environmental prefer ability of a product within a particular product category based on life cycle considerations. E.g.

standards but not excluding additional information provided within a Type III environmental declaration program [6]. [8]; General Requirements for bodies operating assessment and certification/registration of quality systems are given by [9].



Fig. 1 Singapore Green Label and New Zealand Green Label

II. Type II Environmental claim

Ecolabels that meet ISO 14021 “Environmental labels and declarations – Self-declared environmental claims. These requirements cover the use of particular words and symbols and specific requirements about accuracy, relevance, explanation and substantiation/verification of claims. Not all self claims or declarations will meet ISO 14021 requirements. The frequently seen Recycling Logo (3 chasing arrows) is an example of a Type II label.

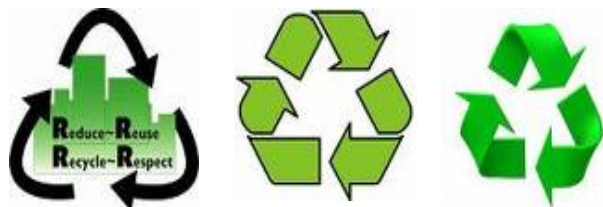


Fig. 2 Types of Recycle Logos

III. Type III labels

Though less common globally, provide a report card type assessment of products based on their entire lifecycle impact. Eco-Labels generally take a holistic look at the impact of products on the environment through analyzing their life cycles; but there are more “targeted” labels that focus on only one environmental aspect such as energy efficiency, toxicity, fuel efficiency or water usage. In Singapore the Water Efficiency Labeling Scheme (WELS) focuses on products such as washing machines, taps, faucets, etc., whereas the Energy Efficiency Label focuses on goods such as air conditioners and fridges. Both these labels are mandatory and government-regulated whereas the Singapore Green Label remains a voluntary scheme [7].



Fig. 3. a
Water Efficient Label



Fig. 3.b
Fuel Efficient Label



Fig.3.c
Energy Efficient Label

Type III labels are generally designed as declarations of quantified environment data for a product with pre-set categories of parameters based on the ISO 14040 series of

II. GLOBAL AND NATIONAL LEVEL INITIATIVES IN ECOLABELING

A. Blue Angel Program

Ecolabeling entered mainstream environmental policy making in 1977, when the German government established the Blue Angel Program. Since that time, ecolabels have become one of the more high profile market-based tools for achieving environmental objectives. Today 10,000 products and 80 product categories carry Blue Angel Ecolabel.

B. Global Ecolabeling Network (GEN)

Established in 1994. It is a non-profit association of third-party, environmental performance recognition, certification and labeling organizations to improve, promote, and develop the "ecolabeling" of products and services. “It includes information from many existing ecolabeling programs and schemes [including both GEN members and non-members]. GEN included twenty-six national and multinational member organizations that operate ecolabeling programs/schemes around the world.

C. Role of U.N. & FAO Guidelines

1. Overview

Seventy-six percent of the world’s fish stocks are classified as being fully exploited, over-exploited, or depleted, and only 1% of stocks are estimated to be recovering from depletion [10]. Agenda 21 recommended governments to promote environmental labeling in order to change consumption patterns and thereby conserving the environment for sustainable development [11]. In a landmark decision, the 26th Session of the FAO Committee on Fisheries adopted international guidelines for the ecolabeling of fish and fishery products from marine capture fisheries. The guidelines are voluntary and addressed to any Ecolabeling scheme for fish and fishery products from well-managed marine capture fisheries with a focus on issues related to the sustainable use of fisheries resources [12; [13].

2. Principle of FAO Guidelines for Marine Fisheries

Be consistent with UNLOS; UNFSA; FAO Code of Conduct for Responsible Fisheries and WTO. Recognize the sovereign rights of States and comply with all relevant laws and regulations. Be of a voluntary nature and market-drive. Be transparent, including fair participation by all interested parties.

3. Procedural and Institutional aspects of FAO guidelines

Guidelines for the setting of standards of sustainable fisheries, Guidelines for accreditation and Guidelines for certification.

4. Principles

Apply equally to procedural and institutional aspects. There are a wide variety of labels that could be considered to

provide environmental information. These labels range from simple 'appellation control' (name/place of origin) approaches to labels issued by external parties after lengthy analysis of the product and production processes. A further distinction can be made between single issue labels, mandatory single-issue labels, and life cycle labels [8]. According to the FAO-guidelines, one of the three principal procedural and institutional matters that any eco-labeling scheme should encompass is "the certification that a fishery and the product chain of custody are in conformity with the required standard and procedures". The "Chain of Custody" is defined by the FAO as "the set of measures which is designed to guarantee that the eco-labeled product put on the market is really a product coming from the certified fishery concerned." [14].

5. Traceability systems

The Chain of Custody should thus cover both the tracking/traceability of the product all along the processing, distribution and marketing chain, as well as the proper tracking of the documentation (and control of the quantity concerned). Chain of custody procedures are implemented at the key points of transfer. At each point of transfer, which may vary according to the type of fish or fishery product traded, all certified fish or fishery products must be identified and/or segregated from non-certified fish or fishery products. The assurance that there is a proper Chain of Custody in place is given by a third party through the certification process. According to Potts and Haward [15] certification is an emergent and important tool in dealing with illegal, unreported and unregulated (IUU) fishing.

6. Tracking and Certified Origin

In the commercial perspective, this word is applied to the tracking of a product from its production site to the consumption place, its destination. Sustainable managed natural products need traceability, as means to provide evidence of the attributes associated to these products. If a natural product offered at the market place claims to be sustainable produced, it has to be demonstrated to the general public that all these are true, and that these attributes are able to differentiate this product from the others available at the market place. The traceability system for ornamental fishes can be used either by the linking pins of the production and custodial chain (producers, transporters, intermediaries, exporters, importers, wholesalers, retailers, and consumers), or by the authorities and officials who control the certified chain of custody. This system also provides a certification of the origin of the animals, as well as the environmental conditions on which they were caught and sold to the next link of the chain

D. EU Guidelines: European Union (EU)

Implemented voluntary ecolabeling program within member countries in 1992. The European Parliament's Environment Committee has been calling for a wider use of the Community's eco-label. The committee backed a report on 17 February 2009 in response to the review of the eco-label criteria proposed by the Commission and considered by both the Parliament and the Council. The report suggests

that the award of the label should be made less bureaucratic, less costly, easier to use and more accessible to all sizes of business. The EU has developed a set of minimum standards that must be applied to fish farms wishing to supply live fish to importers. They are applied to temperate species particularly those susceptible to certain serious diseases. Generally the diseases of greatest concern affect salmon and trout; however it is worth remembering that it is the disease that is notifiable, not the species it is in. Through the application of stress measurement protocols developed at the aquarium, best handling practices and industry standards that result in minimal mortality, ethical treatment of fish and maximum market quality are possible. EU standard reforms the trade to maximize environmental stewardship, safeguard aquatic ecosystems, provide livelihoods for rural communities, preserve biodiversity and retain tropical forests to sequester greenhouse gasses responsible for climate change. It also creates a certification scheme associated with an internationally recognized entity e.g.: Forest Stewardship Council. Develop new feeds for species and work with feed companies to get better suited feeds to initial stages of ornamental fish trade networks

E. WTO, Ecolabeling & Certification

It is also important to note that the WTO system does not preclude the use of environmental measures as a basis for trade decisions. These measures should, however, be transparent and non discriminatory. These principles are embodied in the 'Rio Declaration' of the United Nations Conference on Environment and Development (UNCED) in 1992. The Rio Declaration, Principle 12, notes that "trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or disguised restraint on international trade" [16]. International voluntary certification / labeling schemes and industry-led initiatives could possibly evolve to the point of serving as de facto international standards, without intervention from any intergovernmental process [6] ; [16]. Eco-labeling initiatives within non-fisheries sectors have met with mixed success. Although the improvement in management standards is not necessary for the establishment of a certification scheme, it will be necessary for the continued credibility of the scheme with consumers. Usually a performance standard is established as a part of labeling program. After meeting or exceeding the standard, a label or logo is awarded to the product that conveys this information to the consumers. Therefore, eco-labeling is primarily product-related but is based on the broader issues and impacts related to that product. Eco-labeling has a number of strengths that includes promoting consumer choice, improving economic efficiency, and enhancing market development [17].

1. WTO Sanitary and Phytosanitary Agreement

Following are the provisions of the agreement:

- i. Members have the right to take sanitary and phytosanitary measures necessary for the protection of human, animal or plant life or health, provided that such measures are not

inconsistent with the provisions of the Agreement. Now, most of the developed countries and some

- ii. Members shall ensure that any sanitary or phytosanitary measure is applied only to the extent necessary to protect human, animal or plant life or health and it should be based on scientific principles and is not maintained without sufficient scientific evidence.
- iii. Members shall ensure that their sanitary and phytosanitary measures do not arbitrarily or unjustifiably discriminate between Members where identical or similar conditions prevail, including between their own territory and that of other Members.
- iv. Sanitary and phytosanitary measures shall not be applied in a manner, which would constitute a disguised restriction on international trade.

F. FAO/NACA/UNEP/WB/WWF International Principles for Responsible Shrimp Farming

The International Principles have been developed by the Consortium on Shrimp farming and the Environment, which consists of the Food and Agriculture Organization (FAO), the Network of Aquaculture Centers in Asia-Pacific (NACA), the Global Program of Action for the Protection of the Marine Environment from Land-based Activities of the United Nations Environmental Program (UNEP/GPA), the World Bank (WB) and the World Wildlife Fund (WWF). The principles address topics including: Farm Siting; Farm design; Water use; Broodstock and postlarvae; Health management; Food safety Social responsibility.

G. World Wildlife Fund (WWF)

Founded—1961, Mission of WWF is to conserve nature. They undertake about 13,000 projects in 157 countries and support ecolabeling and certification programs. WWF's Experiences with Certification Programs include:

- Rainforest Marketing—1980s
- Forest Stewardship Council—1990s
- Marine Stewardship Council—1990s
- Marine Aquarium Council—1990s
- Protected Harvest—2000
- Climate Savers—2000s
- New program for IT industry—2007

H. Forest Stewardship Council (FSC)

(Source: <http://www.fsc.org/>)

FSC is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world's forests. FSC is widely regarded as one of the most important initiatives of the last decade to promote responsible forest management worldwide. FSC is a *certification system* that provides internationally recognized standard-setting, trademark assurance and *accreditation* services to companies, organizations, and communities interested in responsible forestry. FSC is nationally represented in more than 50 countries around the world.

I. National Level Initiatives

Now, most of the developed countries and some developing countries including India have established ecolabeling programs. Today, there are approximately thirty-five ecolabeling schemes/programs in existence around the world and others in development or contemplated. Many other environmental performance certification, labeling and recognition schemes and initiatives (e.g. self declarations and claims, etc.) have also entered the marketplace mainly for non fishery products. The Ministry of Environment and Forests had launched the scheme of labeling of environment friendly products in 1991. The scheme identified 16 categories of consumer products for eco-criteria and labeling. So far criteria for 14 categories of products have been finally notified by the Government. The manufacturers of these categories of products can apply to the Bureau of Indian Standards, if their products are meeting the relevant standards notified, for the award of eco-logo. The scheme could not become popular because of lack of adequate response from the manufacturers

1 Objectives of the scheme

- i. To provide an incentive for manufacturers and importers to reduce adverse environmental impact of products
- ii. To reward genuine initiatives by companies to reduce adverse environmental impact of their products.
- iii. To assist consumers to become environmentally responsible in their daily lives by providing information to take account of environmental factors in their purchase decisions.
- iv. To encourage citizens to purchase products which have less harmful environmental impacts.
- v. Ultimately to improve the quality of the environment and to encourage the sustainable management of resources.

2. Operation of the Scheme

There are three committees involved:

i. Steering Committee

To determine the product categories for coverage under the scheme, formulate strategies for promotion, implementation, future development and improvements in the working of the scheme, determine the product categories to be taken up under the scheme, create mass awareness for promotion and acceptance of the scheme and formulate strategies for future development of the scheme.

ii. Technical Committee

Set up in the Central Pollution Control Board. to identify the specific product to be selected and the individual criteria to be adopted, including, wherever possible, inter-se priority between the criteria if there be more than one, classifying products as environmental-friendly, Set-up sub-committees for each product category, if required, to draft the Ecomark criteria, recommend the most appropriate criteria and parameters to designate various products as environment-friendly and review from time to time, the implementation of the scheme by Bureau of Indian Standards (BIS). The Central Pollution Control Board has become the member of Global Eco-labeling Network (GEN) since March 2000. The Bureau of Indian Standards has to assess and certify the products and draw up a contract with the manufactures, allowing the use of the label, on payment of a fee. It has to

incorporate the criteria into the Indian Standards and certify the product for award of the Ecomark, review, suspend or cancel a license for the use of the Ecomark

J. The sustainable seafood movement

The sustainable seafood movement is active in the USA and the EU, primarily, although also in the small markets of Canada, Australia and New Zealand. The sustainable seafood movement uses the market, via consumers, chefs and the supply chain, to influence demand for seafood. Generally, these movements are initiated and run by environmental non-governmental organizations (NGOs), or at least private non-profit organizations. Among the tools being used are: boycotts, consumer guides to sustainable seafood (such as wallet cards), and labeling. A detailed analysis of the costs and benefits of each approach is reported by Roheim and Sutinen [18].

III. SCHEMES OF ECOLABELS

Ecolabel represents a Life Cycle Assessment (LCA) to assess the environmental impact of the product from “cradle to grave” [19]. It can be classified broadly into organic and non organic Schemes [20]. According to Poulain [8] a further distinction can be made between single issue labels, mandatory single-issue labels, and life cycle labels.

A. Organic Schemes

Schemes of International Federation of Organic Agricultural Movements; Naturland Organic Standards – Germany; BioGro New Zealand Production Standards; KRAV Kontroll A B Organic Standards –Sweden; Debio Organic Aquaculture Standards-NORWAY. Organic aquaculture includes the farming of various fish species in freshwater, saltwater and brackish water. The standards cover salmonoids (salmon, trout, rainbow trout and char), perch, pikeperch and cod.

B. Non Organic Schemes

i. Fundacion Chile Code of Good Environmental Practices

Well Managed Salmonoid Farms. No social or poverty emphasis is considered. No certification or use of labels is also involved. Global Aquaculture Alliance is the leading international organization dedicated to advancing environmentally and socially responsible aquaculture and a safe supply of seafood to meet growing world food needs. Develops the Best Aquaculture Practices certification standards and encourages the use of responsible aquaculture practices. GAA also works to improve production and marketing efficiencies, and promote effective, coordinated regulatory and trade policies

ii. Marine Stewardship Council (MSC)

The history of eco-labeling in the fisheries sector is relatively short and actual experiences of eco-labeling are limited, [21]. For fisheries, the most well-known eco-certification scheme is that of the Marine Stewardship Council (MSC). Eco-labeling in fisheries gained increased impetus with the development of the non-government MSC in 1996. The MSC has developed a Standard, consisting of

For a fishery to be certified to the MSC Standard, an independent third party assessment is undertaken by an accredited certifier hired by the client (e.g., a fishery industry or association). The MSC eco-labelling scheme conforms to the FAO Guidelines. Globally there are 26 MSC certified fisheries producing over 2000 products bearing the MSC eco-label. An additional 68 fisheries are involved in the MSC assessment process at various stages MSC-labeled products are sold in more than 36 countries worldwide. The global market for MSC-labeled products grew nearly 100% to reach a retail value of close to US\$ One Billion. According to MSC it is the only ecolabel that is structured to have the greatest impact on the sustainability of fisheries and marine ecosystems themselves [22].

iii. Seafood Choices Alliance (SCA)

(<http://www.seafoodchoices.com/home.php>) Seafood Choices Alliance is an international program that provides leadership and creates opportunities for change across the seafood industry and ocean conservation community. Founded in the United States in 2001, its aim is to make the seafood marketplace environmentally, economically and socially sustainable. Activities focus on issues, including: Climate Change, Sustainable Fishing Practices & Responsible Aquaculture, Traceability and Illegal, Unreported, & Unregulated Fishing.

iv. Marine Aquarium Council (MAC) & MAC Certification, (<http://www.aquariumcouncil.org/default.aspx>)

MAC certification program is a means to promote the sustainability of marine ornamental fish populations and coral reef ecosystems through market mechanisms. Millions of coral reef fishes are collected each year for sale on the international aquarium market. Several marine ornamental species are biologically unsuitable for large-scale exploitation, yet their trade continues largely unmonitored [23]. MAC has created a third-party certification program to assure compliance with standards designed to support sustainability. It became operational in late 2001, and by 2002 itself it started conferring some Certifications. According to information published by MAC, the most important objectives of the program are to: develop core standards to assess marine ornamental practices; create a system to verify the implementation of standards and certify qualified products and practices; provide a framework that allows the industry to conduct responsible collection, handling and transporting practices as well as to generate accurate data for the management of marine ornamental activities; and support responsible management through education and training for industry participants Three sets of criteria for certification, or “core standards”, have been developed by MAC and are used in assessments by accredited independent certifiers. The criteria deal with coral reef conservation, as well as with the health and sustainability of wild fish stocks. The core standards applied in this program are:

iv. a. Ecosystem and fisheries management

Addresses “in-situ” habitat, stock and species management, and conservation in the collection area by verifying that management is conducted according to principles ensuring marine ecosystem conservation and stock sustainability.

iv. b. *Collection, fishing and holding*

Focuses on harvesting fish, coral, live rock and other coral reef organisms and related activities (e.g. handling, holding, packaging and transport prior to export) by verifying that the collection, fishing, and pre-exporter handling, packaging and transport of marine aquarium organisms do not harm the health of the collection area, the sustainable use of the marine aquarium stocks or the optimal health of the harvested organisms.

iv. c. *Handling, husbandry and transport*

Addresses the handling, husbandry, packing and transport at points along the commercialization chain in an attempt to ensure the optimal health of organisms during the commercialization process, as well as the differentiation of labeled products and practices from uncertified ones. (One important point is that a certified product must pass from one MAC certified industry operator to another.) As of mid-2007, 63 industry operators were MAC Certified

iv. d. *Cost Benefit Analysis of MAC Certification*

Costs and benefits of MAC certification to United States marine aquarium retail operations were examined in a case study of four firms in 2002, and the study concluded that the program had “definite financial advantages for retailers”. The advantages were derived from lower mortality rates and through increased levels of efficiency with respect to store operations. The stores cooperating in the case study did not charge price premiums for MAC certified specimens. Contrary to expectations, about 50% were not familiar with the MAC ecolabeling program [24]; [25].

iv. e. *Industry Standard for the Live Reef Food Fish Trade*

This is developed in response to concerns over the potentially negative impacts of this trade on fish stocks, ecosystems and fishing communities. The Standard aims to provide guidance to all participants and managers on: management best practices, operational best practices with respect to targeting and catching fish, and management and maintenance of fish health; handling, holding and transportation best-practices. The Standard has been divided into 3 parts dealing with the: Capture of Wild Live Reef Food Fish, Live Reef Food Fish Aquaculture Trading and Consumption of Live Reef Food Fish

iv. f. *The Federation of European Aquaculture Producers (FEAP) and Code of Conduct* (<http://www.feap.org/code.html>.)

The basic aims of the Federation are to develop and establish a common policy on questions relating to the production and the commercialization of aquaculture species on a professional basis and to make known to the appropriate authorities the common policies envisaged above. Membership of the Federation is restricted to National

National Associations for defined species (e.g. the United Kingdom has National Associations for Trout, Salmon.) while others have National Associations for all species (e.g. Italy and France have National Aquaculture Associations that incorporate all species). At present, the FEAP is composed primarily of Associations concerned with finfish production. This Code of Conduct for European Aquaculture was agreed by the FEAP in 2000 and contributed to the development of National Codes of Practice by many European Aquaculture Associations and was incorporated into the European Code of Sustainable and Responsible Fisheries Practices. This was adopted by the Advisory Committee on Fisheries and Aquaculture in 2003. No certification or use of labels is issued by the Federation. The Code of conduct is expected to help fish farmers to contribute actively towards the balanced and sustainable development of aquaculture and help them make their best efforts to assure the transparent development of the activity to benefit the consume

iv.g. *Aquaculture Certification Council, Inc* (<http://www.aquaculturecertification.org/>)

It is a nongovernmental body established to certify social, environmental and food safety standards at aquaculture facilities throughout the world. This nonprofit, nonmember public benefit corporation applies the Global Aquaculture Alliance Best Aquaculture Practices standards (BAP) in a certification system that combines site inspections and effluent sampling with sanitary controls, therapeutic controls and traceability. Part of ACC's mission is to help educate the aquaculture public regarding the benefits of applying Best Aquaculture Practices and the advancing scientific technology that directs them. By implementing BAP standards, program participants can better meet the demands of the growing global market for wholesome seafood produced in an environmentally and socially responsible manner. Aquaculture Certification Council, Inc. offers a primarily "process" certification. Successful participation in the Best Aquaculture Practices program is visually represented by limited use of the BAP certification mark.

iv. h. *Shrimp, Catfish, and Tilapia Farms*

As shrimp, catfish, and tilapia farms complete the Best Aquaculture Practices certification program, their status is designated on the Certified Facilities page. Upon successful completion of certification, each approved facility receives a certificate that states it has met Best Aquaculture Practices standards. The facility's status is then updated here. Pending means the facility has taken steps and is in the process of recertification. If steps have been taken to recertify, the facility is given up to two months after there certification date to finish up and still remains certified.

iv. i. *National Standards and Codes*

There are also many national standards and codes of conduct that address environmental and social issues. Some are developed by a specific industry alone while others are developed by wider coalitions that may include governments

It is a voluntary code based strongly on the GAA codes and which is a set of principles and processes that provides a framework to meet the industry's goal for environmental, social and economic responsibility.

iv. k. In Vietnam a national code on shrimp farming

It is being developed by Government/Danida, which to some extent is expected to include social issues, but will focus on sustainability issues

iv. l. International Marinelife Alliance (IMA)

This is an example of a very specific, mandatory scheme to reduce ecosystem impact of fishing, and conducted in close co-operation with small-scale stakeholders. The use of sodium cyanide, dispensed from plastic bottles, to stun aquarium and larger reef fish destined has caused widespread reef destruction across the Philippines. The method requires little in the way of investment in fishing gear (or skill) and yet the rewards are high, as the demand (principally from China and Taiwan) is immense. Any attempt to alter the fishing practices of cyanide-fishers clearly demanded an innovative response. It is estimated that more than five million producers around the world benefit from Fair Trade terms and the producer support and capacity building that are provided.

Other Groups Involved in Ecolabeling: International Social And Environmental Accreditation and Labeling (Iseal) Alliance

It is the global association for social and environmental standards. Working with established and emerging voluntary standard systems ISEAL develops guidance and helps strengthen the effectiveness and impact of these standards. It also works with companies, non-profits and governments to support their referencing and use of voluntary standards. ISEAL Codes of Good Practice builds an understanding of good practices for standards systems and sets internationally applicable good practice guidance for the implementation of credible standards systems. These Codes of Good Practice are applied by leading standards systems and are an ISEAL membership requirement.

A. Fair Trade. (<http://www.fairtrade.net/>):

The International Federation for Alternative Trade (IFAT) is the international network of Fair Trade organizations. It includes some 111 producer groups, export marketing organizations and brands in 35 Latin American, African and Asian countries. It includes 15 Fair Trade organizations in USA and Canada, Australia, New Zealand and Japan; in Europe it includes 3,000 Fair Trade shops ("World Shops") affiliated to the Network of European World Shops and 53 Fair Trade organizations in 11 European countries, including the European Fair Trade Association (EFTA). It is a Certification organization.

i. What is Fair Trade?

Fair Trade is a trading partnership, based on dialogue, transparency and respect that seek greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalized producers and workers – especially in

the South. Fair Trade organizations (backed by consumers) are engaged actively in supporting producers, awareness raising and in campaigning for changes in the rules and practice of conventional international trade.

ii. Charter of Fair Trade Principles

The two international Fair Trade standard setters, the Fair Trade Labeling Organizations (FLO) and the World Fair Trade Organization (WFTO) agreed in January 2009 on common principles to define Fair Trade. The Charter of Fair Trade Principles aims to provide a single international reference point for Fair Trade through a concise explanation of Fair Trade principles and the two main routes by which they are implemented: Product certification Fair Trade route (otherwise known as Fair Trade Product Label) covering mostly agricultural products and Integrated Fair Trade supply chain route (no product label / the Fair Trade certification is for organizations and not for products) The Charter clearly shows that Fair Trade cannot be confused with the undefined concept of Fair Trade and with the various sustainable and ethical trade schemes that have developed in the recent years. The Charter also confirms that Fair Trade is not simply a label. While most Fair Trade agricultural products coming into Europe are Fair Trade-labeled products, the concept of Fair Trade goes beyond the product labeling initiatives. The Fair Trade certification for organizations is a very valuable tool to ensure public and private buyers that products have been produced according to the Charter of Fair Trade principles

iii. WFTO's 10 Standards of Fair Trade

IFAT prescribes 10 standards that Fair Trade organizations must follow in their day-to-day work and carries out continuous monitoring to ensure these standards are upheld: 1. Creating opportunities for economically disadvantaged producers; 2. Transparency and accountability; 3. Capacity building; 4. Promoting Fair Trade 5. Payment of a fair price 6. Gender Equity; 7. Working conditions; 8. Child Labour; 9. The environment; 10. Trade Relations

iv. IFATs Code of Practice

It is based around issues of: commitment to fair trade, ethical issues, transparency, working conditions, equal employment, concern for people, concern for the environment, respect for the producer's cultural identity, education and advocacy, and working relationships.

*B. The Global Marine Aquarium Database (GMAD)-
<http://www.unep-wcmc.org/marine/GMAD>*

To support the certification process, UNEP-WCMC, MAC and members of various aquarium trade associations began collaboration in 2000, to address the need for better information on the international trade in marine aquarium species and created the Global Marine Aquarium Database (GMAD). Fifty-eight companies, approximately one-fifth of the wholesalers in business, and four government management authorities provided data to GMAD during 2000-2003. In August 2003 the dataset contained 102,928 trade records concerning 7.7 million imported and 9.4 million exported animals, covering a total of 2,393 species of

fish, corals and invertebrates, and spanning the years 1988 to 2003. of ornamental fish exports from Israel where koi herpes virus

IV. FRESH WATER CERTIFICATION

There is no body or process equivalent to MAC in the freshwater sector. However, a number of local and national initiatives have been developed with the aim of certifying the trade in freshwater ornamentals or establishing mechanisms to promote a sustainable trade e.g. in Brazil, Cameroon

A. Green Fish Tracking For Cardinal Tetra Of Amazona, Brazil (Project Piaba)

The middle Rio Negro – the primary fishing grounds for live ornamental fish in the Amazon Basin – exports approximately 20 million live fish annually, generating about US\$3 million for the local economy [26]; [27]. The cardinal tetra accounts for over 80 per cent of ornamental fish exports from Brazil [28]. The trade in ornamentals (primarily cardinal tetra (Fig.4.) and discus) contributes at least 60 per cent of total revenues in Barcelos, a community 400 km upriver from Manaus with a population of 16,000. An estimated 1000 local fishermen make their living from the fishery, with entire families, including women and children, typically being involved in collection, sorting, handling and transportation [29]. The user of this system is only required to go to the specific website on-line and provide the number-code that identifies the product (a set of individual ornamental fishes). The user will then visualize in the screen the location where the fishes were caught, in a satellite image of Mamirauá and Amanã Reserves (Amazonas state, Brazil). A click on this point will show relevant information about this particular set of ornamental fish (date of collection, water quality at the time, which caught them, when they were sold, the buyer and the destiny of the shipment, among others). Ornamental fish trade in the Latin American region is documented by FAO [27].

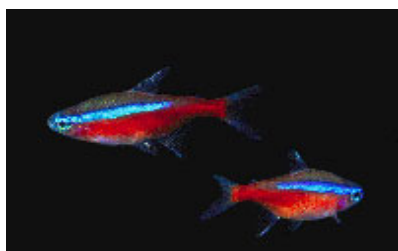


Fig. 4. Cardinal Tetra (*Paracheirodon axelrodi*)

B. Sustainable Ornamental Fish Initiative of New England Aquarium

Scott Dowd, a cardinal tetra fish researcher of New England Aquarium, introduced wild tetra fish certified as “fair trade” fish, with sustainable farming practices and with fair pricing schemes for the farmers. The Aquarium engages in science and market-based efforts to affect a substantial shift in the way that the global trade in ornamental fish is conducted, working to make it more sustainable, and a vehicle for aquatic conservation, poverty alleviation, education and ecosystem stability. An example of the impacts of disease on the industry can be seen by the records

came to prominence during the spring of 1998. Compared to 1997 the quantity of ornamental fish exported (in terms of freight weight) to the UK reduced by 30%, 43% and almost 60% in 1999, 2000 and 2001 respectively. Indications of a recovery only became evident during 2002 [26]; [28]; [30].

c. Legality of Genetically Modified Organisms (GMO)

Transgenic species or Genetically Modified Organisms contain genetic materials from more than one species. GMO fishes currently being sold in the trade is having jellyfish genes transplanted into them to enhance their color and make them glow. Sterile Medaka from Taiwan and Zebra Danios from the USA have been modified to glow green or red. Ornamental Aquatic Trade Association (OATA) sees this as an unwelcome move and says that GM fish cannot find any place in the market. These fish are illegal to import or sell in many jurisdictions (such as the EU, Australia, Japan, and Canada) due to general restrictions against genetically modified animals. According to the reports of OATA, there is a strong opposition to GM Technology in Europe especially in the U.K. [31]. The Green Peace demanded a global rejection of the world's first application to commercially produce Genetically Engineered (GE) fish, and a global ban on all releases of genetically engineered organisms into the oceans. Researchers at Purdue University in Indiana, the United States, estimate that 60 fertile GE fish introduced into a natural population of 60,000 could annihilate the natural stock in 20-30 years. GMO fish are likely to dominate future fish farming by growing over two times faster than regular fish and being up to 30% more efficient with feed than regular fish. This would also make the GMO fish 350% more efficient with feed than cows are. The FDA said genetically engineered animals, created for human use or consumption, will be regulated in the same way as veterinary drugs, meaning they will go through a safety review process. Aqua Bounty of Massachusetts is hoping to market its genetically engineered salmon, which grows to maturity in less time than wild or farmed salmon, but it awaits approval. Aqua Bounty has stipulated that it will market only sterile, all female advanced hybrid salmon. There can be no gene flow to wild salmon because sterile fish can not reproduce; they claim (Fig. 5.)

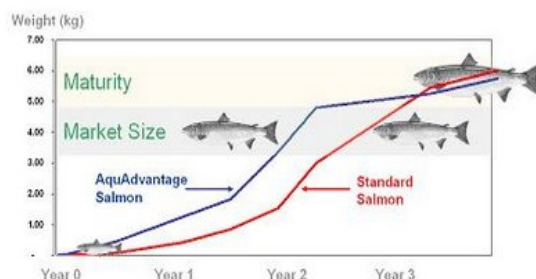


Fig. 5. Growth pattern of genetically modified and Standard Salmon (Source: Aqua Bounty, USA)

Although not originally developed for the ornamental fish trade, Zebra Danios (Fig. 6.) are the first genetically modified animals to become publicly available. Fluorescent Zebra Danios were originally created to help detect pollutants in waterways.



(Source: www.glofish.com)
 Fig. 6. Genetically modified Zebra Danio

d. Dragon Fish Farm Registration Scheme

The Dragon fish, *Scleropages formosus*, is also known as Asian Arowana. It is one of the most sought-after ornamental fish by hobbyists. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has classified the fish as one of the most highly endangered species and listed it under CITES Appendix 1. For animals or plants listed under this category, their commercial import, export and sale are normally prohibited in all member countries unless the specimens concerned are bred in captivity or can be artificially propagated, or used for non-commercial purposes such as research, teaching, breeding or propagation. The Agri-Food & Veterinary Authority, which is the CITES authority in Singapore, is entrusted with the responsibility to ensure that all Dragon fish exported from Singapore are farm-bred. To ensure good management of Dragon fish stocks for sustained production and to regulate recruitment of new stock, the Authority implemented a Scheme for the registration of Dragon fish farms. The Scheme, known as "Dragon Fish Farm Registration Scheme", registers all Dragon fish farms in Singapore so that proper documentation of the farm production and sales can be maintained and a certain standard of farm management is practiced. All the Dragon fish stocks of all generations will be electronically tagged and documented and the farmer will rear the different year classes of fishes in separate tanks.

e. Qian Hu Corporation Limited, Singapore

Qian Hu is an integrated "one-stop" ornamental fish service provider ranging from breeding of Dragon fish, farming, importing, exporting and distributing of ornamental fish as well as manufacturing of aquarium and pet accessories and distributing them to local and overseas customers. The farm successfully acquired ISO 9002 certification for its conditioning and packaging operations in December 1996 which is possibly the first ornamental fish farm in the world to receive such an award. The farm was also awarded the ISO 14000 for its environmental management system, and was conferred the prestigious Singapore Quality Award (SQA) in 2004 for business excellence.

V. GREEN CERTIFICATION (THIRD PARTY) IN FRESH WATER ORNAMENTAL FISH TRADE

The aim of the Certification is to produce ornamental fish by capture and culture methods in an eco-friendly manner at all stages of the chain of custody. It should keep the well

being of the primary and secondary stake holders with cost effective production and low energy consumption. It should guarantee healthy, good quality fish with substantial saving in quarantine period and mortality of the fish at the final destination. The process will result in value addition with better color, body shape, finnage, packaging and post sales service package for the customer to maintain the fish in good health.

A. Indian Initiatives

Marine Products Export Development Authority (MPEDA), Government of India MPEDA has appointed a National Level Task Force to develop Guidelines for Green Certification of Fresh Water Ornamental fishes from India. The Task Force has submitted its report recently to MPEDA [32]. The guidelines set standards for the value chain system for the marketing of ornamental fish collected from the wild and from the farms. It is recommended to be introduced on voluntary basis after proper wetting by various national and international agencies and the public. There are number of key decisions to be taken up before introducing a Tradable Green Certificate (TGC). How can the stakeholder distinguish between TGC fish from other fishes in the trade or marketing channel? Even though the introduction of the certification process is voluntary how long it can continue this position? TGC quotas have to be fixed in a gradual manner. Cost benefit analysis has to be done. If there is no benefit for green certified fish no body will venture for it. What would be the environmental value of the System? These aspects have to be addressed before introducing green certified fish to the market.

i. Green Certificate Obligations

Obligations should be introduced at different stages of production and marketing as follows (Fig. 7.) 1.Collection point; 2.Secondary holding facility; 3. Wholesalers; 4. Retailers and 5. Exporters [32].

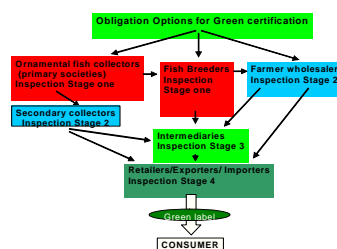


Fig. 7. Obligation options for Standardization and Certification under Green Certified Chain of Custody

ii. Functions and Operations of Green Certifications

Ramachandran has listed a number of requirements to make Green Certification operational [33]; [34]; [35]. To make the Green Certifications operational a number of functions and Agencies (to fulfill the responsibilities) are required. They are broadly as follows: 1.Issuing certificates (An Issuing Agency is required) 2.Verification of the issuing process (a Verifying / Accreditation Agency is required) 3.Registration of Certification and Trade (a Registration Body is required) 4. Exchange market (An Electronic Exchange) 5. Accounting of the Certificates (An Accounting agency) 6.Withdrawing of Certificates from Circulation.

Once decision is taken on the Certification process and the Certificates, standardization is required. After standardization the implementation on trail basis may be done in the initial period followed by making it mandatory after a period of voluntary acceptance of the Green Certification system. Identify Geographic Indicators and create a National and company BRAND IMAGE. the goals of green certification are to expand and diversify market through green certification, improve ornamental fish marketing management practices in the whole of India, identify opportunities for coordination of ornamental fish collection, breeding, farming, intermediary activities, retailing, and export management among the different state in India, coordinate on eco-regional assessments, the designation of protected zones/ sanctuaries, breeding seasons, fishable grounds, rare species & IUCN classification, inventories; and ecological niche mapping, improve public understanding and confidence in fish resource management practices in public water bodies by providing an independent, government-accredited audit of those practices, preferential marketing opportunities and price skimming possible, increase in revenues through increasing sustainable harvesting and marketing of fishery resources and access to new markets is possible, once management plans and other requirements of certification are in place, it may be able to increase the sustainable ornamental fish marketing revenues through green products marketing while simultaneously meeting green certification sustainability conditions and requirements. All actors at the various stages of the marketing channels should use appropriate promotional strategies to project the "National Green Certified Brand Image" with the Green Logo exhibited in appropriate places in the packages. The success of any promotional activity will rest on the ability to differentiate the Green Certified product from that of "Non Green" Certified products of the competitors.

VI. DISCUSSION

A. At present governments have not been extensively involved in fisheries certification issues and developments have been strongly driven by the private sector and the NGOs. However, government involvement in certification has included the initiation of, and support for, a number of specific mandatory import/export schemes relating to sustainability. Other public policy initiatives of relevance to certification include the ongoing international developments and negotiations at the World Trade Organization to reduce subsidies, due to their potentially negative effects on sustainability. Many certification schemes and national management instruments refer to international codes of conduct, such as the FAO Code of Conduct for Responsible Fishing (CCRF), to which countries have signed up. Certification schemes themselves also typically require the assessment process to consider compliance with national laws, and in many cases governments thus define at least the minimum requirements for certification. Governments can play a crucial role in defining and supporting sustainable management practices, and in assisting with capacity development of those wishing to engage in certification schemes as described by Macfadyen, & Huntington [5].

Baumüller, [36], reports the impacts of various environmental factors on fisheries and its development in Thailand. He describes the various regulations in force in Thailand including the Certification process for shrimp producers. The technical paper by Wessells, [6], provides information on the theoretical foundation, institutional arrangements and relationship with international trade law of ecolabeling programs for fish and fishery products. It also discusses trade access concerns with ecolabeling programs and examines their operational features including certification criteria, certification costs and chain of custody. The effectiveness of eco-labels depends on a variety of factors that can be grouped in two classes, namely consumer awareness of the label and consumer acceptance of the label [37].

B. A survey by the American Marinelife Dealers Association in 1997 found that 82% of the hobbyists surveyed thought dealers should only stock sustainably caught fish, while 100% agreed that dealers should be able to provide information about the country of origin, time in holding and feeding behavior of any specimen sold. The understanding of environmental issues exhibited by the majority of consumers in the ornamental market will make it easy for them to understand the link between the certification programs and associated environmental benefits. Hall & Bellwood state that the consumer may receive financial benefits through the purchase of organisms that are in better condition and may live longer in their tanks [38].

C. The UNEP noted ecolabeling as an environmental policy tool and as a potential trade barrier. It focused on five well-known ecolabeling programs that incorporate environmental requirements: the Blue Angel program in Germany and the program associated with the Forest Stewardship Council (FSC), the Marine Stewardship Council (MSC), Fair-trade Labeling Organizations International (FLO) and the International Federation of Organic Agriculture Movements (IFOAM). The study shows that some ecolabels survived on the basis of their attractiveness to environmentally conscious consumers alone, evidence suggests that ecolabeling is most useful when it is developed in conjunction with complementary policy initiatives. The uptake of the Blue Angel label for reduced-noise construction machinery, for example, was linked to the enactment of regulations that permitted the use of this machinery near hospitals and other sensitive sites, and at specific times of the day. Supportive government procurement criteria have also played an important role in the spread of the FSC label in Germany, the Energy Star label in the US, and others. What these examples have in common is the existence of an economic incentive. But a range of incentives and incentive mechanisms are possible. In some cases incentives are derived from a price premium; in others they are derived from the predictability of future revenues or market access. Sometimes the incentive is provided by consumers, at other times by private companies and often by government policy. The benefits of the incentive may accrue to producers, middlemen or (frequently) the final retailer. The study states that what is

important is not that consumers are willing to pay more for ecolabeled products, but simply that one of the market actors in the value chain has a financial incentive to promote ecolabeling [39].

D. Certification of shrimp producers is carried out in Thailand by the Department of Fisheries (DOF). Shrimp processors can apply for the “Thai Quality Shrimp” label by providing the DOF with CoC farm, distributor and processor certificates. Priority has been given to ensuring compliance with food safety standards as a prerequisite for gaining access to overseas markets [40]. However, while adoption of GAP guidelines has been fairly widespread (about two thirds of Thailand’s shrimp farms), CoC certification remains very limited with just 107 of approximately 30,000 shrimp farms certified (as of September 2006). This difference has been attributed to the fact that farmers expect greater market-related benefits (in the form of consumer acceptance and demand) when complying with food safety standards (GAP) than with environmental standards [41]. Despite increasing acceptance of eco-labeling there is considerable debate about whether certification and labeling are tools for market promotion, for achieving environmental policy objectives, achieving social policy objectives or all three. There is also debate on what criteria would label need to fulfill in order to avoid contravening World Trade Organization (WTO) rules. Voluntary private eco-labeling schemes are unlikely to be challengeable at WTO, as long as they do not discriminate between domestic and foreign products [42]. Developing countries do fear the risks of certification being applied as a non-tariff trade barrier – eco-labels might become yet another barrier of entry into the lucrative fish markets of the developed states. . An analysis of the Blue Angel Certification criteria from a life-cycle perspective strongly suggests that the Blue Angel criteria fail in their fundamental task of differentiating environmentally superior products. At best, the improvement differentials represented by the Blue Angel criteria represent an insignificant percentage of total expected environmental burdens from the overall system [43]. The overall impression based on a regional study in the ASEAN Region shows that that there are some vague ideas about what eco-labeling is. Its scope and definition is not yet clearly understood by the stakeholders at large. Hence, there are both positive and negative views on eco-labeling from various stakeholders. According to the study most of the countries consider eco-labeling as an environmental management tool to encourage more responsible practices. It is seen as an opportunity to add value, particularly to traditional products, and to facilitate the access to potential markets where a premium price can be expected. However, many countries look at eco-labeling as a regulation imposed by importing countries to discriminate ASEAN products – this might create a non-tariff barrier to trade. A great concern over the feasibility and practicality of eco-labeling principle and criteria is given to multi-species fisheries in ASEAN. More importantly, ecolabeling markets are not yet certain and premium price of eco-labeled products are not guaranteed. All countries raise a common concern regarding the practical approaches of eco-labeling implementation in terms of principle and criteria development as well as certification procedures. Costs associated with certification

systems are also raised as a major issue of consideration, especially to small-scale producers [44].

E. Study of Brécard and his colleagues, [45], shows a significant connection between the desire for eco-labeling and seafood features, especially the freshness of the fish, the geographical origin of the fish and the wild vs farmed origin of the fish. Moreover, they prove the major role played by the fish price. They demonstrate that the ecological issue regarding fisheries is highly connected to consumer information, intrinsic motivation and socio-economic status: the typical “green fish consumer” is a young woman, well educated, well informed on the state of marine resources and not very trusting of the regulation of the fisheries according to the study.

F. Unmonitored trade in marine ornamental fish (Banggai cardinal fish) in Indonesia is reported by Lunn & Moreau [46]. In such a situation the involvement of MAC to protect coral reefs and coral reef based fishery is well appreciated. Costs and benefits of MAC certification to United States marine aquarium retail operations were examined in a case study of four firms in 2002, and the study concluded that the program had “definite financial advantages for retailers” The advantages were derived from lower mortality rates and through increased levels of efficiency with respect to store operations [47].

G. A study among the hobbyists shows that they gave considerable importance to conservation of coral reefs and wild stocks, and showed a particularly high level of involvement in, and knowledge about, their hobby. About 80% reported keeping marine ornamental fish as their primary hobby, 59% were members of an aquarium society, 88% had researched the specimens they keep, and more than 60% had paid more than 50 US dollars (USD) for a single fish. Contrary to expectations, about 50% were not familiar with the MAC ecolabeling program [24]; [48].

Gardiner & Viswanathan, [49], report that critiques from developing countries of ecolabeling, as currently formulated, focus on five general areas: a) legitimacy and credibility; b) a mismatch between certification requirements and the reality of tropical small-scale fisheries; c) potential distortions to existing practices and livelihoods; d) equity and feasibility; and e) perceived barriers to trade. They suggest that ecolabeling as currently practiced is unlikely to be widely adopted in Asian countries. Certification may have sporadic success in some eco-conscious, or niche, markets but it is unlikely to stimulate global improvement of fisheries management. The paper argues that to avoid the controversy that accompanies ecolabeling, the focus should be on revision of national fisheries management and not on an ad hoc approach to individual fisheries. Improvements in fisheries management, the equitable treatment of fishing sub-sectors and stakeholders within management schemes, and the prospect of reaping increased value-addition from fisheries all require government acceptance of needs and actions. Governments should be encouraged to enter into broad coalitions to improve aspects of fisheries management, and to enhance efforts to develop locally relevant indicator systems for fisheries and for the ecosystem approach. Governments of developing countries must also first address the difficult questions of access to and tenure arrangements

for their fisheries, as these are essential prerequisites for successful certification and product labeling.

H. Ramachandran, [33]; [34], has described the various environmental factors influencing the ornamental fish trade and said that a proper environmental scan is necessary for the successful marketing of ornamental fishes. He highlighted the impact of various forces like International regulations, including trade and non tariff barriers, National and state Acts, Regulations and Rules and the fishing rights for collection of fish from the wild on ornamental fish industry in India [50]. He has listed the prerequisite for introducing Green Certification Program for success. He has also analyzed the various Ecolabeling and certification schemes in existence [35]. Paying for sustainable management will be costly, but it will go some way toward acknowledging the real environmental costs of fish harvesting. True pricing of fish in the world market will be of advantage to developing countries in trade terms. Sustainable fisheries management will be of advantage to all. The primary downside of certification is the cost incurred by applicants for certification, costs which may in turn be passed on to consumers. The issue was complicated by competition among certification systems. As the cost to the consumer tends to increase with the rigor of certification requirements, certification programs need to take into account consumers' willingness to pay for products that are 'environmentally friendly'. "The findings of WWF assessment reveal serious inadequacies in a number of ecolabels and cast doubt on their overall contribution to effective fisheries management and sustainability.

VII. CONCLUSION

The growth of seafood ecolabels over the last ten years attests to the strong demand from consumers and seafood companies who want seafood from better fisheries. "But with the proliferation of ecolabels and the variability of these schemes there is a real risk of confusion and lack of confidence in seafood ecolabeling among buyers and consumers". In addition to the classical marketing mix components of Product, Price, Promotion and Place, other essential components like, Process, People and Policy have to be given greater attention in the ornamental fish industry. The "Personality" of the ornamental fish is a dominant part of the Product development. Judicious use of the "5 Ms" (Men, Money, Materials, and Machines & Markets) within the internal environment will help to improve the quality of ornamental fishes and for cutting down costs. The mortality is one of the important factors which decide the marketability of the fishes. The fish also should be free from diseases and is stress free for long survival. The Green Certification would help to sustain the ornamental fish resources in addition to boost the product image. Development of a National / Industry brand concept for all Green Certified fish will help to have better access to national and international market. Geographical Indication of the origin of the fish has been registered as per the prevailing law of the country to protect original genetic constituency and native identity of the fish.

- [1] Deere, Carolyn L. Eco-labeling and Sustainable Fisheries, IUCN: Washington, D.C and FAO: Rome, 1999.
- [2] Teisl, M.F., Roe, B. and Hicks, R.L. Can Eco-labels Tune a Market? Evidence from Dolphin-Safe Labeling, *Journal of Environmental Economics and Management*, 2002, 43, 339-359.
- [3] Brown, J. An account of the dolphin-safe tuna issue in the UK, *Marine Policy*, 2005, 29, 39-46.
- [4] Wynne, R.D.) The emperor's new eco-logos?: a critical review of the Scientific Certification Systems environmental report card and the Green Seal certification mark programs. *Virginia Environmental Law Journal* 1994, 14: 51- 149.
- [5] Macfadyen, G. & Huntington, T. Certification and Sustainable Fisheries. Poseidon/United Nations Environment Program, 2008, 91p.
- [6] Wessells, C.R.; Cochrane, K.; Deere, C.; Wallis, P.; Willmann, R. 2001. Product certification and ecolabeling for fisheries sustainability. FAO Fisheries Technical Paper. No. 422. Rome, FAO. 2001. 83p
- [7] Anon. 2009. Elements, News letter of Singapore Environmental Council, Issue No. 1 of 2009, pp. 3-11
- [8] Poulain, F. Recent Trends in Environmental Labeling and Certification in Fisheries, Forestry and Organic Agriculture. Information Paper prepared for the Expert Consultation on the development of International Guidelines for Eco-labeling of Fish and Fish Products from Marine Capture Fisheries, October, Rome Italy, 2003, 14-17, 32 pp.
- [9] ISO.Guide 62, General Requirements for bodies operating assessment and certification/registration of quality systems, International Organization for Standards, Geneva, Switzerland, 1996.
- [10] FAO. The State Of World Fisheries and Aquaculture, 2006, FAO. Rome, 2007.162 p.
- [11] UNCED. United Nations Conference on Environment and Development (UNCED), 3-14 June, Rio de Janeiro, 1992.
- [12] FAO. Committee on Fisheries, Sub-Committee on Fish Trade: Outcome of Expert Consultation on Eco-labeling. Ninth Session, February 2004, Germany, FAO, Rome, 2004, 4 p
- [13] FAO. Guidelines for the Ecolabeling of Fish and Fishery Products from Marine Capture Fisheries, FAO, Rome, 2005, 90p.
- [14] FAO. Report of the Technical Consultation on the Feasibility of Developing Non-Discriminatory Technical Guidelines for Eco-Labeling of Products from Marine Capture Fisheries, Rome, Italy, 21-23 October FAO Fisheries Report No.594. 1998.
- [15] Potts, T. & Haward, M. International Trade, Ecolabeling, and Sustainable Fisheries – recent issues, Concepts and Practices, *Environment, Development and Sustainability* 2007, 9: 91-106.
- [16] Birnie, P.W. and Boyle, A. Basic Documents on International Law and the Environment, Oxford, Clarendon Press, 1995, 375 p.
- [17] IISD. Global Green Standards: ISO 14000 and Sustainable Development Winnipeg, International Institute for Sustainable Development, 1996, 100 p.
- [18] Roheim, C.A. and J. Sutinen. "Trade and Marketplace Measures to Promote Sustainable Fishing Practices," ICTSD Natural Resources, International Trade and Sustainable Development Series Issue Paper No. 3, International Centre for Trade and Sustainable Development and the High Seas Task Force, Geneva, Switzerland, 2006.
- [19] Staffin, Elliot... "Trade Barrier or Boon? A Critical Evaluation of Environmental Labeling and its Role in the 'Greening' of World Trade." *Columbia Journal of International Environmental Law*, 1996, 21:205-286.
- [20] UNCTAD/FIELD. Legal and Policy Issues in the Market Access Implications of Labeling for Environmental Purposes, Project on Building Capacity for Improved Policy Making and Negotiation on Key Trade and Environment Issues, Sub Regional Brain Storming Workshop on Trade and Environment Issues Contained in the Paragraphs 31 and 32 of the WTO Doha Ministerial Declaration, UNCTAD/FIELD, 30th July to 1st August, Bangkok, 2003, 24 p.
- [21] Phillips B., Ward T., Chaffee C. Eco-labeling in Fisheries: What Is It All About? Blackwell Science, Oxford, 2003.
- [22] MSC. Marine Stewardship Council Annual Report-2007-08, London, U.K., 2008, 28 p.
- [23] Lunn, K.E. & Moreau, M.A. Unmonitored trade in marine ornamental fishes: the case of Indonesia's Banggai cardinal fish (*Pterapogon kauderni*), *Coral Reefs*, 2004, 23 (3) 344-351.
- [24] Alencastro,A.L., Degner,R.L. and Larkin,S.L. Hobbyists' preferences for marine ornamental fish: A discrete choice analysis of ecolabeling and selected product attributes SPC Live Reef Fish Information Bulletin #15, 2005, pp.19-22.

- [25] MAC. Marine Aquarium Council Member's report on activities to Vol.4, No:3, 2010 [44] Bjerner, M., Boonyaratapalin, M., Mungkung, R and Wennberg, N. Study on Eco-labeling of Aquatic Products: General view and future considerations for the ASEAN region, Regional Technical Consultation on International Fish Trade Related Issues Bangkok, Thailand, 20-22 February, 2006, 21 p.
- [26] Chao, N. L., Petry, P., Sonneschien, L, Tlusty, M. Conservation and Management of Ornamental Fish Resources of the Rio Negro Basin, Amazonia, Brazil. (Project Piaba, Bio-Amazonia Conservation International, 1295 William St. Baltimore, 1230-1800 USA, 2001, 250 p.
- [27] FAO. Ornamental fishing in Latin America – Status, Trends and Challenges Ahead, Commission for Inland Fisheries of Latin America, Eleventh Session, FAO, , 1-4, September, Manaus, Brazil, 2009.
- [28] Chao, N.L & Prang, G. Aquarium Sciences and Conservation, Vol. 1 (2), 1997, pp. 105-111.
- [29] Prang, G. Avimento and the ornamental fishery of the Rio Negro Brazil: Implications of sustainable resources use. In: Chao, NL, Petry, P, Prang, G, Sonneschien, L and Tlusty, M (Eds) (2001). Conservation and management of ornamental fish resources of the Rio Negro Basin, Amazonia, Brazil. Edua, Manaus. 2001, 302pp
- [30] Schaefer, A. S. Conservation and Management of Ornamental Fish Resources of the Rio Negro Basin, Amazonia, Brazil—Project Piaba, Copeia, 2003, (3):672-675.
- [31] OATA. Genetically Modified Ornamental fish: “an unwelcome addition to the Market place”, <http://www.ornamentalfish.org/index.php>, Ornamental Aquatic Trade Association, Westbury, 2010.
- [32] Silas, EG, Ramachandran, A. et al. Report of the Task Force on Guidelines for Green Certification of Ornamental Fish, as the Member of the National Task Force of Marine Products Export Development Authority, Ministry of Commerce, Government of India, 2010, 86 p.
- [33] Ramachandran, A. Scanning of Ornamental Fish Marketing Environment and Development of Strategies for expansion and diversification of markets, paper presented in the International workshop on Green Certification of Ornamental Fish, 14th to 18th October, organized Marine Products Export Development Authority, project PIABA, Brazil and UNCTAD, Kochi, India, 2008.
- [34] Ramachandran, A. Market Enhancement and Value Addition of Ornamental Fishes through proper Market Mix Strategies and Certification, In: Kurup et al (Eds.), Ornamentals Kerala 2010 Souvenir Government of Kerala and Ministry of Agriculture, Government of India, Cochin, India, 2010, pp.83-92.
- [35] Ramachandran, A. An overview of the significance of Ecolabeling and Green Certification in Ornamental Fish Trade, Paper presented in the International Seminar on Ornamental Fish Breeding, Farming and Trade, organized by Government of Kerala and Ministry of Agriculture, Government of India, 13-15th February Cochin, India, 2010.
- [36] Baumüller, H. Fisheries – Environmental impacts of trade liberalization, International Institute for Sustainable Development (IISD), Winnipeg, Manitoba, Canada, 2007, 5 p.
- [37] Wessells, C.R., Johnston, R.J. & Donath, H. Assessing consumer preferences for ecolabeled seafood: the influence of species, certifier, and household attributes. American Journal of Agricultural Economics, 1999, 81: 1084–1089.
- [38] Hall, K.C. & Bellwood, D.R. Histological effects of cyanide, stress, and starvation on the intestinal mucosa of Pomacentrus coelestis, a marine aquarium fish species. Journal of Fish Biology, 1995, 47: 438–454.
- [39] UNEP, <http://www.unep.ch/ETB/publications/Ecolabelpap141005f.pdf-22-2-2010>.
- [40] Suwanrangi, S. “Experiences in the Application of HACCP for Export and Local Markets: The case of Thai Fisheries,” in E. Hanak, E. Boutrif, P. Fabre and M. Pineiro (eds.), Food Safety Management in Developing Countries. Proceedings of the International Workshop, CIRAD-FAO, December 11–13, 2000, Montpellier, France, CIRAD-FAO. CIRAD CD-ROM, Montpellier, France, 2002.
- [41] Pongthanapanich, T. and E. Roth. “Toward Environmental Responsibility of Thai Shrimp Farming through a Voluntary Management Scheme,” IME Working Paper 70/06, Department of Environmental and Business Economics, University of Southern Denmark, 2006.
- [42] (Potts, T & Haward, M. International Trade, Eco-labeling and Sustainable—Recent Issues, Concepts AND Practices, Environment, Development and Sustainability JI., 2007, 9 (1), 91-106.
- [43] Rhodes, S.P. Analysis of Blue Angel environmental seal-of-approval criteria for workstation Computers The IEEE International Symposium on Electronics and the Environment, ISEE; Orlando, FL; USA; 01-03 May, 1995, pp. 295-300.
- [44] Brécard, D., Hlaimi, B., Sterenn Lucas, S., Perraudeau, Y., and Salladarré, F. Determinants of demand for green products: An application to eco-label demand for fish in Europe, Ecological Economics, 2009, 69 (1), pp. 115-125.
- [45] Lunn, K.E. & Moreau, M.A. Unmonitored trade in marine ornamental fishes: the case of Indonesia's Banggai cardinal fish (*Pterapogon kauderni*), Coral Reefs, 2004, 23 (3), 344-351.
- [46] Anon MAC Certified chain of custody from reef to retail becomes reality, SPC Live Reef Fish Information Bulletin #11, 2003, p. 56.
- [47] Alencastro, L.A. Hobbyists' preferences for marine ornamental fish: discrete choice analysis of source, price, guarantee and ecolabeling attributes. Unpublished Master of Science thesis. University of Florida, Gainesville, Florida, 2004, 110 p.
- [48] Gardiner, P.R. & Viswanathan, K.K. Ecolabeling and fisheries management, Vol. 27, World Fish Centre, Penang, Malaysia, 2004.
- [49] Ramachandran, A. Acts, Legislations and Fishing Rights - Impact on the Development of Ornamental Fish Industry in India, paper presented in the International workshop on Green Certification of Ornamental Fish, 14th to 18th October, organized Marine Products Export Development Authority, project PIABA, Brazil and UNCTAD, Kochi, India. 2008.