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An extraction ; The Export Trade of Indigenous Freshwater Fishes of Sri Lanka



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- ★ The capacity and infrastructure of research agencies such as NARA and NAQDA should also be developed to implement research on captive breeding of indigenous freshwater fish in Sri Lanka.

7. Promoting awareness and education

- ★ The results of the present research should be used to promote awareness and education among the relevant government departments (i.e., DWC, DFA, NARA, NAQDA, Customs and EDB) to highlight the issues related to this trade.
- ★ A media campaign should be initiated to promote public awareness on the issues related to wild collection of freshwater fish species, for the export trade.
- ★ Awareness and education programmes should be targeted for environmental groups (i.e., NGOs, CBOs, School Nature Clubs etc.), who can play a major role in functioning as vigilant groups to curb illegal collections from wild habitats.

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Cover - *Rasboroides vaterifloris* (Firefin Rasbora)

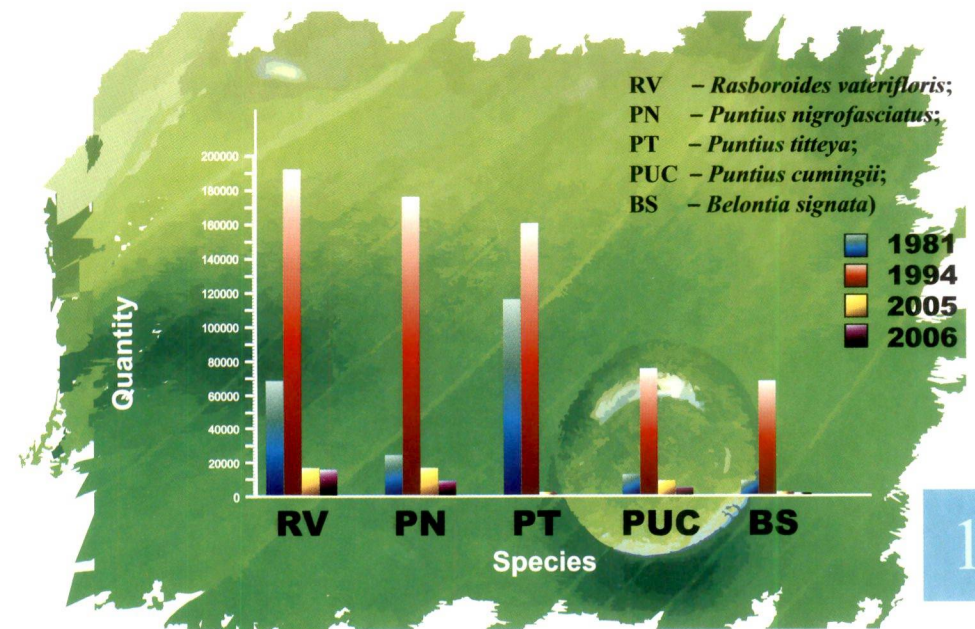


Figure Export quantities of five species of endemic freshwater fish, in year 1981, 1994, 2005 and 2006

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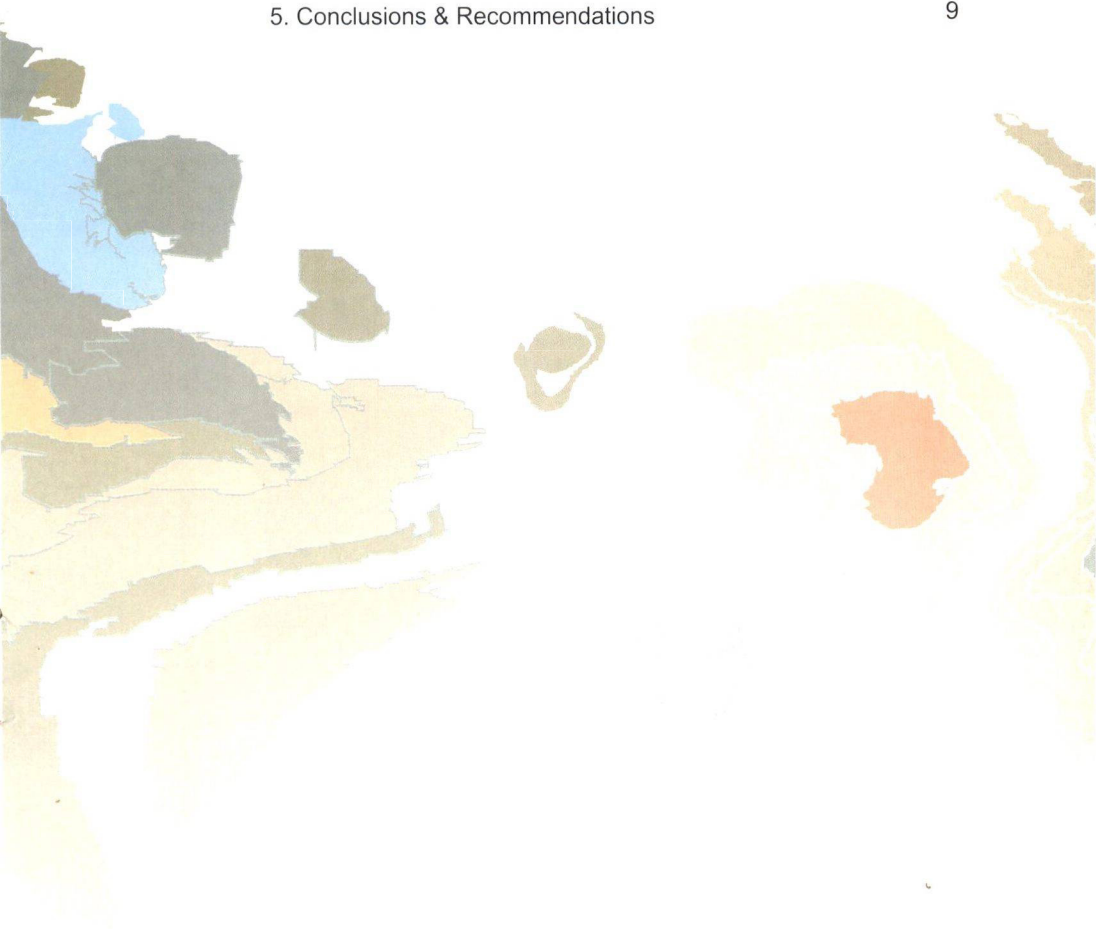
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Forward

A remarkable detection was made by Customs in the year 1981, while attempting to export certain endemic freshwater fish species without a permit. It was a landmark in the field of conservation, especially in the area of aquatic resources of this country.

In colonial period it has been taken certain steps to restrict the exports of five endemic freshwater fish species by including in the Fisheries Ordinance of 1940 as they have realized the threat posing due to over exploitation at those five species by ornamental fish trade.

But not a single institution had taken suitable steps until 1981 to enforce those regulations. Later this detection exposes the relationship of the wildlife trade in Sri Lanka and it's remarkable portion in the world wildlife trade. That is why this detection considered as a turning point in the wildlife conservation of this country.

There are certain steps been taken in this country to protect the larger and charismatic species. But no adequate measures had been taken to protect the endangered fish those conservation is very much needed. One of the major obstructions in this issue is the lack of data and poor analysis on the subject matter. The major objective of the research conducted by the author is to fulfill the particular gap.

Purpose of this extraction is to publicize the background, some data and recommendation in the monograph of "Export trade of indigenous freshwater fishes of Sri Lanka" produced by the author.

The sponsorship of the Biodiversity secretariat, Ministry of Environment to produce this booklet is greatly appreciated by the author.



This extraction is based on the monograph produced on a research conducted by the author as a requirement for a M.Sc. degree on 'Management, Access, Conservation and Trade of Species: The International Framework' at the University of Andalucia in Spain.

The research was intended to analyze and evaluate the export trade of ornamental freshwater fish in Sri Lanka, in order to understand the following aspects:

Freshwater fish species subjected to export trade, and their trade quantities; Foreign exchange earnings from the endemic freshwater fish export trade; Costs and benefits related to the exports of endemic freshwater fish; Legal, policy and institutional issues related to sustainable export trade of freshwater fish.

The study initially focused on the trade of all the freshwater fish species, including the salt water dispersants, and exotic fish species. Subsequently, the study narrowed down its focus on endemic species that have a restricted distribution in the island.

The legal, policy and institutional issues related to sustainable export trade of freshwater fish was identified through the review of relevant legislation, and also through interviews held with decision makers attached to administrative authorities and institutions related to conservation and sustainable use of freshwater ornamental fish species in Sri Lanka.

The findings of the research was used to draft a policy paper, in order to address conservation issues related to current practices associated with the export trade of ornamental freshwater fish species and facilitate a sustainable export trade of ornamental freshwater fish species in Sri Lanka.



Many species of indigenous freshwater fishes in Sri Lanka are collected from wild habitats for export in ornamental trade, posing a serious conservation issue. However previous attempts to analyze the trade related aspects of indigenous freshwater fish species in Sri Lanka are scanty. Therefore, the present study was intended to analyze and evaluate the trade of freshwater fish in Sri Lanka, with a particular focus on endemic species.

When considering the total quantities of exported indigenous freshwater fish during the two year period, the commonest species exported was the Mono (*Monodactylus argenteus* – 138,380 individuals), followed by the endemic Stone Sucker (*Garra ceylonensis* – 112, 856 individuals) and the exotic *Trichogaster trichopterus* (110,008 individuals). According to statistics of the top 10 endemic species exported during 2005 and 2006, *Garra ceylonensis* has topped the exports in both years. It is also evident that a higher number of individual endemic species have been exported in 2005, compared to 2006. The monthly export quantities of endemic fish highlight that *Garra ceylonensis* and *Rasboroides vaterifloris* have been exported during each month of 2005 as well as 2006. Other endemic species such as *Puntius cumingii*, *Puntius nigrofasciatus* and *Puntius singhala* have also been exported in a regular manner during the two year period.

Freshwater fish are exported from Sri Lanka to 48 countries. The United Kingdom, USA, France and Germany are the leading destinations of ornamental freshwater fish exports of Sri Lanka. Of the total countries that imported ornamental freshwater fish from Sri Lanka during the study period, 27 countries import endemic fish species. The highest quantities of a distinct endemic fish species exported are stocks of 19,138 numbers of *Garra ceylonensis* to Germany in 2006. And 16,370 individuals in 2005, 19725 in 2006 were exported to Italy. It is interesting to note that when considering the quantities of five endemic freshwater fish species (*Puntius nigrofasciatus*, *Rasboroides vaterifloris*, *Puntius titteya*, *Puntius cumingii* and *Belontia signata*) exported in 1994, there is drastic reduction in their quantities exported in years 2005 and 2006.



When considering the percentage contribution of endemic freshwater fish, it is 0.31% and 0.01% of the total earnings of the ornamental fish export trade in Sri Lanka. This figure shows that the income generated from the export of indigenous freshwater fish is a negligible amount when considering the entire ornamental fish export trade. Lack of a minimum floor price for the exported indigenous freshwater fish species is a barrier to get the due foreign revenue out of this resource.

The benefit-cost ratios indicate that the export trade of *Rasboroides vaterifloris*, *Puntius titteya*, *Puntius cumingii* and *Belontia signata* are highly viable in terms of financial aspects. However, according to the future benefit-cost analysis over the 10 year period of up to 2016, it is interesting to note that the viability of the trade of these four species would decline considerably, compared to their trade during the past 10 year period of 1994-2005. This very high net benefit can be due to factors such as the existence of a monopoly among a few exporters, and as much as 98% of these indigenous fish are collected from wild habitats, whereas the collectors and suppliers are unaware of the actual value of these species in the world market, resulting in them being poorly paid by the exporters. As a whole, this export trade that depends highly on wild collections has very low overheads.

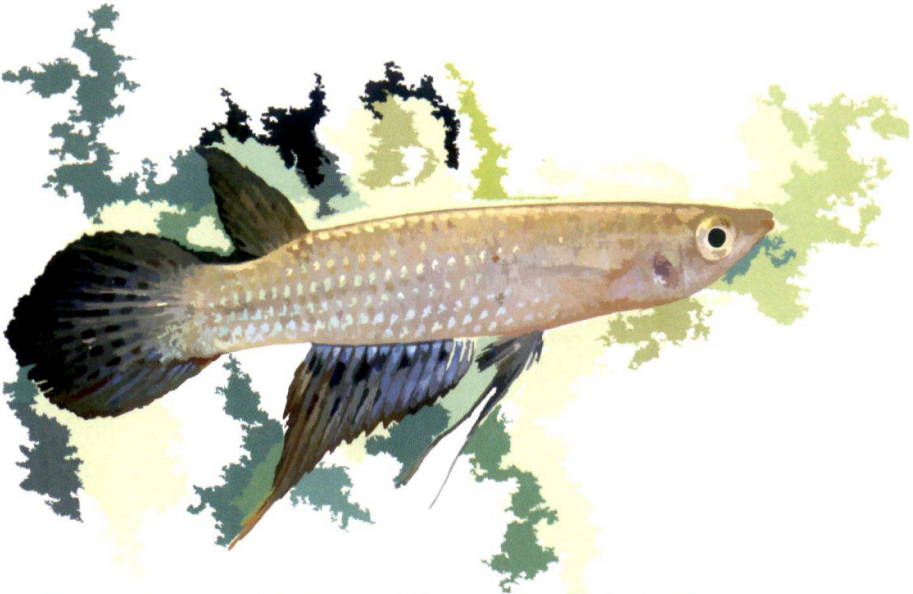
According to the information gathered in Jan/Feb 2007, wild freshwater fish stocks supply over 98% of the export quantities of ornamental fish. Of the 53 species of fish subjected to the ornamental fish trade, 9 species are considered as nationally threatened, where include 7 endemic species.



Quantities of freshwater fish species exported from Sri Lanka during the period of 01st Jan 2005 – 31st Dec 2006.

Origin. I – Indigenous, En – Endemic, EX – Exotics

Family	Species	Origin	Code	Qty 2005	Qty 2006
1 Aplocheilidae	<i>Aplocheilus dayi</i>	En	AD	4873	2677
	<i>Aplocheilus parvus</i>	I	AP	3442	2040
	<i>Aplocheilus wernerii</i>	En	AW	1368	1189
2 Bagridae	<i>Mystus gulio</i>	I	MG	60	56
	<i>Mystus cavasius</i>	I	MK	125	195
	<i>Mystus vittatus</i>	I	MV	100	325
3 Balitoridae	<i>Acanthocobitis urophthalmus</i>	En	AU	9741	3819
	<i>Schistura notostigma</i>	En	SN	1269	2880
4 Belontiidae	<i>Xenentodon cancila</i>	I	XC	100	90
5 Belontiidae	<i>Belontia signata</i>	En	BS	2197	2502
	<i>Pseudosphromenus Cupanus</i>	I	PSC	1280	597
	<i>Trichogaster pectoralis</i>	Ex	TP	0	100
	<i>Trichogaster trichopterus</i>	Ex	TT	42639	67369
6 Cichlidae	<i>Etroplus maculatus</i>	I	EM	3939	1083
	<i>Etroplus suratensis</i>	I	ES	2067	790
7 Clariidae	<i>Clarias brachysoma</i>	En	CB	472	146
8 Cobitidae	<i>Lepidocephalichthys thermalis</i>	I	LT	6445	2580
9 Cyprinidae	<i>Cyprinus carpio</i>	Ex	CC	20629	37443
	<i>Devario aequipinnatus</i>	En	DA	55	200
	<i>Devario malabaricus</i>	I	DM	10211	3817
	<i>Devario pathirana</i>	En	DP	420	170
	<i>Esomus thermoikos</i>	En	ET	60	200
	<i>Garra ceylonensis</i>	En	GC	62486	50370
	<i>Rasbora atukorali</i>	I	HA	0	25
	<i>Labeo dussumieri</i>	I	LD	175	0
	<i>Puntius bimaculatus</i>	I	PB PUC/	5362	2555
	<i>Puntius cumingi+Puntius reval</i>	En	PUR	7891	4069
	<i>Puntius dorsalis</i>	I	PD	50	0
	<i>Puntius nigrofasciatus</i>	En	PN	16427	8727
	<i>Puntius Singhala</i>	En	PS	10450	8500
	<i>Puntius melanomaculatus</i>	En	MM	205	0
	<i>Puntius titteya</i>	En	PUT	2780	440
	<i>Puntius vittatus</i>	I	PV	75	1065
	<i>Rasbora dandia</i>	I	RD	300	0
	<i>Rasbora vaterifloris</i>	En	RV	15870	14825
10 Eleotrididae	<i>Butis butis</i>	I	BB	210	90
	<i>Eleotris fusca</i>	I	EF	0	20
11 Gobiidae	<i>Awaous grammepomus</i>	I	AG	150	0
	<i>Glossogobius giuris</i>	I	GG	60	0
	<i>Redigobius balteatops</i>	I	RB	500	280
	<i>Sicyopterus griseus</i>	I	SG	0	50
12 Helostomatidae	<i>Helostoma temminckii</i>	Ex	HT	15022	19638
13 Heteropneustidae	<i>Heteropneustes fossilis</i>	I	HF	850	622
14 Mastacembelidae	<i>Macrognathus pentophthalmos</i>	En	MAC	0	100
	<i>Mastacembelus armatus</i>	I	MAS	603	831
15 Monodactylidae	<i>Monodactylus argenteus</i>	I	MA	91471	46909
16 Loricariidae	<i>Pterygoplichthys multiradiatus</i>	Ex	PM	6454	16682
17 Osphronemidae	<i>Osphronemus goramy</i>	Ex	OG	150	0
18 Scatophagidae	<i>Scatophagus argus</i>	I	SA	14740	13218
19 Siluridae	<i>Ompok bimaculatus</i>	I	OB	20	60
20 Syngnathidae	<i>Microphis brachyurus</i>	I	MB	0	2
21 Tetraodontidae	<i>Tetraodon fluviatilis</i>	I	TF	1813	2518



Although there is legislation available to regulate the freshwater ornamental fish trade, a major drawback is the lack of implementation of them. A major legal and institutional issue is a lack of a specified mechanism to monitor wild collections of freshwater fish. Inadequate coordination among the conservation (*contd*)



Evaluation of Policy issues



(i.e., Department of Wildlife Conservation), regulating & enforcement (Customs Department, Fisheries Department) and trade facilitating (Export Development Board) agencies is a major institutional issue that hinders the sustainable trade of freshwater fish. On the other hand, the institutions responsible for research related to aquaculture development have not been able to determine suitable captive breeding techniques to breed the endemic freshwater fish species that are in high demand in the export trade.



When considering the legislative analysis and institutional evaluations related to the ornamental freshwater fish trade, it is clearly apparent that there are several legislative loopholes that present the proper regulation of the trade to ensure its sustainability, while enforcement of existing legislation is also a clear inadequacy.



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Whereas institutional aspects are concerned, lack of capacity of trained staff and lack of coordination between relevant institutions also act as barriers to ensure the sustainable operation of this trade.



Furthermore, a lack of a mechanism to implement conservation activities targeting the threatened freshwater fish is also an issue that needs to be addressed in the future.



In the absence of certain laws, the most needed intervention towards addressing conservation issues related to this trade is to formulate new legislation addressing the loopholes of the existing legislation.



Evaluation of Policy issues cont..



A total of 17 species of freshwater fish which are protected under the Fauna & Flora Protection Ordinance and the same 12 species that were included in 1993 FFPO and *Malpulutta kretseri* are prohibited from exports under Fisheries & Aquatic Resources Act.



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Although these species are not exported. however, all the eight species listed as restricted from exports under the Fisheries and Aquatic Resources Act, are exported regularly.



The present survey revealed that 53 species of fresh water fish, which belongs to 21 families, have been exported during the period of 01 January 2005 to 31 December 2006. These include 47 indigenous species and 18 species of endemics, including the highly collected *Garra ceylonensis*, of which trade has increased considerably over the past decade. A considerable portion of the exported indigenous freshwater fish are supplied through wild collections, which has low overheads, leading to high profit margins for the few exporters involved in the trade. Many endangered endemic fish species are in the export trade, where nine out of nationally threatened species are currently being exported, including 2 critically endangered species. Among the countries that import ornamental freshwater fish from Sri Lanka, the United Kingdom, USA, France and Germany are the lead importers. Other than the endemic fish, *Monodactylus argenteus*, a salt water dispersant is on top of the exported indigenous fishes of Sri Lanka. A fluctuation of the exported quantity of the different species can be observed on a monthly basis. The present Sri Lankan ornamental fish trade is about 4% of the world supply. Indigenous fresh water fish species of Sri Lanka constitute about 2% of the island's export ornamental fish trade. Lack of a minimum floor price for the exported indigenous freshwater fish species is a barrier to get the due foreign revenue out of this resource. The sole income from the ornamented fish trade was LKR 733,006,524.00 in 2005 and LKR 929,844,220.00 in 2006. Of this, the revenue from the earnings of endemic fresh water fish of Sri Lanka is about 0.16 % of the income of the Ornamental fish trade. Considering the latter factor and the current conservation status of endemic species, commercial collection of endemic ornamental species from wild habitats for the export trade is a highly unsustainable activity that would drive the nationally threatened endemic species towards extinction. Based on the findings of the present survey, the following recommendations are made to ensure that the future export trade of indigenous freshwater ornamental fish species in Sri Lanka is conducted in a sustainable manner.



1. Policy and legislative interventions

- ★ The export of wild-collected stocks of nationally threatened indigenous freshwater fish species should be legally banned.
- ★ The current legislative loopholes related to unsustainable ornamental fish trade should be addressed through revising the schedules of Fauna & Flora Protection Ordinance, and also addressing the discrepancies between the Fisheries Act and the FFPO.
- ★ The nationally threatened freshwater indigenous fish species subjected to the export trade should be proposed to be included to CITES Appendix 1 (the 2 critically endangered species and the endangered species) and Appendix 2 (the vulnerable species). The DWC, as the CITES management authority, should play a lead role in this, with the support of other relevant agencies and institutions. This should be proposed at the next meeting of the CITES -COP.
- ★ The Fisheries Department should strictly regulate the issue of export permits on restricted fish, and should refrain from issuing transport permits for transportation of endangered fish species.
- ★ The countries having similar problems on ornamental fish export trade should get together to make a proposal to the World Customs Organization on creating better commodity codes (i.e. HS codes) for ornamental fish and also change the unit of measurement on live fish from kilogram to number of fish exported.
- ★ In the event of exporting wild collected indigenous freshwater fish species, a "Cess" should be collected from the exporters and this income could be diverted towards the implementation of conservation activities targeting threatened freshwater fish and their habitats.
- ★ In order to ensure the due foreign revenue from this trade, a minimum floor price for the exported indigenous freshwater fish should be established by the Department of Fisheries in collaboration with the EDB and DWC.



2. Institutional interventions

- ★ A mechanism should be established to closely monitor the export trade of indigenous ornamental fish species, with the participation of all relevant government (i.e., DWC, Customs, EDB, DFA, NARA, NAQDA, Universities) and non-governmental (i.e., IUCN, YZA) agencies. Such a monitoring mechanism should consider the species and their quantities exported and the source of their origin should be verified. (i.e., whether stocks are wild collected or captive bred.)
- ★ The EDB should create a mechanism to facilitate ornamental fish export traders and breeders who are willing to initiate captive breeding programmes targeting indigenous freshwater fish, for export purposes. Such facilities may include concessionary loans and tax exemptions etc., to establish relevant infrastructure needed to facilitate captive breeding.
- ★ The Customs Departments in the South Asia region could establish a better monitoring system to monitor the trans-boundary movement of ornamental fish.
- ★ A link could be established between the Customs Department and the Ministry of Environment to utilize the revenue generated from the Cess fund (proposed earlier).

3. Research interventions (to be promoted through NARA, NAQDA and Universities)

- ★ Research should be initiated to assess the status of wild populations of *Monodactylus argenteus* and *Garra ceylonensis*, which are heavily exploited at present for the export trade.
- ★ The wild population status and distribution of the rare and threatened *Devario pathirana*, *Macrognaathus pentophthalmos* and *Sicyopterus grisseus* should be determined through an island-wide survey.
- ★ Government agencies such as NARA, NAQDA and Universities should initiate research (through partnerships with foreign institutions that has the relevant technology) on the captive breeding of indigenous freshwater fish that has a high demand in the export trade. They should also focus on enhancing the ornamental quality of captive bred stocks, to capitalize on trade opportunities in the world market.



4. Conservation of wild habitats of freshwater fish species

- ★ Community-based conservation programmes should be initiated to conserve especially the habitats of endemic (and 'point endemic') species occurring outside protected areas. These should target in conserving the "point endemics", i.e. *Puntius asoka* in a tributary of Kelani river (Kottelat et al., 1989), *Puntius bandula* in Galapitamada, *Devario pathirana* in Opatha, *Schismatogobius deraniyagala* in Yatiyanthota, *Sicyopus jonklaasi* and *Stiphodon martenstyni* in Athweltota, and *Sicyopterus griseus* in Yogama (Pethiyagoda, 2006). The revenue generated from the earlier proposed "Cess fund" could be used for this purpose, especially to support community-initiated conservation programmes.
- ★ The ornamental fish exporters, who generate large profits from this trade, should be encouraged to invest on such conservation activities, as part of their corporate, social and environmental responsibility related activities.

5. Recovery of threatened wild populations

- ★ Scientific species recovery plans should be prepared for the nine species of nationally threatened freshwater fish that have been subjected to the ornamental fish trade.
- ★ As highlighted by previous researchers, re-introduction of captive bred populations to wild habitats should also be pursued. However, such captive breeding programmes should be carefully planned in a scientific manner, to ensure that the existing wild populations are not subjected to potential genetic changes, and also avoid them being exposed to diseases.

6. Capacity development

- ★ The role of Department of Wild Life Conservation as well as the Customs Department in the regulation of endemic freshwater fish trade should be strengthened, through developing capacity of the staff to identify freshwater fish species and their habitats. Field identification manuals should be developed to facilitate this process.

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