Country reports

Alien aquatic species in Myanmar

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Following increasingly good experiences with aquaculture, the Department of Fisheries has imported regionally high-demand species with the intention of increasing the income of fish farmers by producing high-price fish for local and regional markets

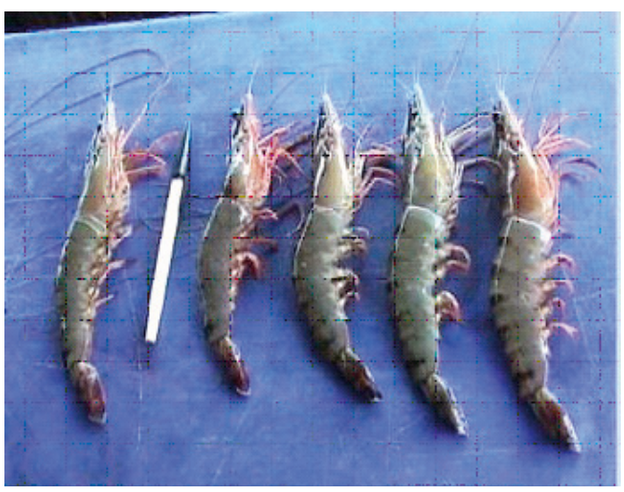
Introduction

Myanmar, contains 676 577 square kilometres in area with a population of over 50 million in 2000-2001 and has a varied climatic conditions. The northern part of the temperate region is the eastern part of Himalaya range and the mountain peaks are covered with snow the whole year round. In contrast, the southern part of Myanmar is close to the equator (10° N). The whole country is divided longitudinally by four big rivers which have a vast delta region before opening into the sea.

One fifth of the country is inundated during the monsoon and post monsoon period. These are the areas where Myanmar people get fish and aquatic organisms, a major source of low cost animal protein. It is reported that the per caput consumption of fish in Myanmar is 26 kg (2003), however this figure probably does not include fish caught and consumed locally and therefore may well be much higher.

Despite rich natural fisheries resources, the Myanmar Department of Fisheries established some pioneer forms of aquaculture in 1953. This started with tilapia and common carp, followed by gouramy in following years up to 1955. (Appendix A). The objectives of the Department of Fisheries were to introduce aquaculture technology and to initiate aquaculture industry which would take the vital portion of the fish production to feed people not only in the country but also in the region and international in future. The reasons of choosing these species were:

- the aquaculture of these fishes was already well established in many surrounding countries;
- these species can survive adverse water conditions;
- the all spawn readily in ponds with minimum manipulation by man;
- the taste was very similar to local fishes as indigenous carps, climbing perch and barbs.



Perception of alien species

Initially, Myanmar people were very reluctant to put these new species in the daily fish menu. This was occasionally due to similarities with local species, e.g. the common carp was named "Indonesian Nga Phane" when they were introduced due to its similarity to the native species "Inlay Nga Phane" (*Cyprinus carpio inthar*). Unfortunately, it is locally believed that these fish eat the dead bodies of human being that were traditionally buried in the water of the huge Inlay Lake and as a result, the alien common carp were rejected by Myanmar people. To overcome this first problem Department of Fisheries changed the name of the fish to "Shwewa Nga Ginn" which means "Golden Carp" after the name of very famous film actress which bore the same meaning as "Glorious yellowish gold" and like the actress, the exotic common carp started getting popular in the market and consequently in fish farms.

In the case of tilapia, Trichogaster and gouramy, the complaint of consumers was due to the small size and their colour. The Department of Fisheries had taken some time to convince the consumers that they had the same taste as local walking cat fish, *Clarias batrachus* and climbing perch *Anabas testudineus*.

Since the law enforcement is so strong and the self awareness is well developed, the illegal importation of exotic species is not practiced

Technical problems

At the same time of poor consumer perceptions, technical complaints were made by farmers regarding their ponds.

Common carp were causing embankment erosion as part of their feeding habits feeding habit of common carp.

The precocious maturation and frequent spawning habits of tilapia was leading to over population of small size groups in the ponds.

These two problems were solved by Department of Fisheries through demonstration, showing that the common carps are to be cultured in earthen pond with clay soil deep enough to keep the water level at least one and half meter deep such that it does not reach embankment base. It was also advised to keep a pave way between embankment base and the edge of the pond about one and half meter apart.

At present due to its lower market price in market than India major carp (especially Rohu) and based on farmers own experiences, the common carp is raised only in polyculture ponds and at a lesser ratio than more preferred major carp species. In this system its role is as a detritus feeder to clean the pond bottom waste. In the case of tilapia the farmers were asked to harvest the marketable size very frequently or to stock the pond with monosex fingerlings.

The impacts of common carp stocked into reservoirs and tilapia in big tanks where there are large numbers of fish seed stocked annually are unknown. and the occurrence of adverse impacts of these fishes to the local biodiversity of aquatic habitats and ecosystem has not been observed yet.

In 1967 three new species of Chinese species carp were introduced to Myanmar water with different objectives, i.e. to eradicate the aquatic weeds and to inhibit the plankton bloom in the

fish ponds. The principle role of these species is merely to maintain their pond environment. The market value of fish is rather low due to inferior taste to the consumers and therefore they are not subject to intensive propagation. So far, no negative impact has been attributed to these Chinese carp species.

Current status

Following increasingly good experience of the potential forwith aquaculture, the Department of Fisheries has imported regionally high-demand species with the intention of increasing the income of fish farmers by producing high-price fish to local and regional markets. Among these newly introduced alien species, only African catfish (*Clarias gariepinus*) imported by the private sector has shown a threat to the local fish. In this case it has caused problems with predation of smaller fish and the nibbling of the fins and body parts of bigger fish. As a result of this, the culture of African catfish is banned in Myanmar. Catfish farmers can get hybrid catfish (*Clarias gariepinus x C. macrocephalus* and *C. gariepinus x C. batrachus*) only from Department of Fisheries hatcheries.

In 2002 Department of Fisheries gave permission to import wWhite Sshrimp (*L. vannamei*) postlarvae for culture in isolated areas under thorough strict direction from Department of Fisheries as a pilot process. Though occurrence of Taura Syndrome Virus (TSV) has not been observed and high production of four tonnes/ha has been obtained, as a preventive measure the import of *Vannamei* white shrimp is still currently suspended. The case will be considered again when better information and experiences can be obtained from other countries that have imported *L. vannamei*.

Legal and policy aspects

Myanmar, though endowed with ample natural resources, has to venture to find new trends opportunities in fish trade including and aquaculture. Accordingly, exotic fish species are introduced into Myanmar aimed at diversifying aquaculture in order to feed people with new fish species, to increase income of fish farmers and to utilize fully utilize the varied favourable topographic and climatic conditions.

According to Myanmar's four fisheries laws, fish are defined as:

> *"All aquatic organisms living the whole or a part of their life cycle in the water, and their eggs, larval fry and seeds".*

This expression also includes aquatic plants, their seedlings and seeds. As a regulatory measure, it is a compulsory to get permission from Department of Fisheries under the Law Related to Aquaculture for any aquacultural activity. In section 35 of this law, it is stated that prior approval shall be obtained from the Department of Fisheries regarding import and export of live fishes into and out of the country. Severe penalties are also mentioned; to be given out to those who are convicted under this section.

To enforce this section the Department of Fisheries is the only agency and the Director-General and Deputy Director-General of the Department the two persons conferred by the State as sole competent authorities. The Department of Fisheries explains the basic concepts of the section in terms of conservation and preventive measures, to potential importers of live fishes in order to facilitate their application. In this way the importer has to be in compliance

with this section and the regulations mandated by the Department. The Department of Fisheries is taking uttermost care to safeguard imports of alien fish to Myanmar.

To induce responsibility with overriding objectives of conservation and management among stakeholder and small holder in fisheries sector the FAO Code of Conduct for Responsible Fisheries is translated into local language and distributed to the fisheries communities through department and Myanmar Fisheries Federations (NGO).

Since the law enforcement is so strong and the self awareness is well developed, the illegal importation of exotic species is not practiced. Reports from farms show that there is no adverse impact of alien species on local wild and cultured aquatic communities their habitats and eco-system. The African catfish is the only case of an alien fish species which Department of Fisheries has taken action in time. The unsuccessful stories of some alien species reveal that they are rejected not because of their ill effects on the environment, but due to poor consumer appreciation because of their colour, taste and flavour.

Stocking of open waters

With the intension of rehabilitation of natural resources and creation of the new fisheries, the Department of Fisheries has practiced culture- based capture fisheries through stocking of hatchery bred fish seed into natural and man-made water bodies. Local indigenous species such as *Labeo rohita, Cirrhina mrigala, Catla catla* are stocked into open waters, either to enhance existing fishery production or to revitalize depleted fisheries. Alien species such as catfish common carp and tilapia are stocked to create new fisheries and to increase the value and profitability of a fishery. To control the over-growth aquatic vegetation and plankton the grass carp and silver carp are commonly stocked in certain areas and farm ponds.

Stocking for recreational fishing has not been undertaken yet.

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Need for regional and international action

It is obvious that well documented information and examples of the risks related to these activities is limited and that collaboration and deliberation among the countries through regional fisheries bodies is very seldom. A number of international code and protocols are provided and developed by various institutions from different areas, but these mostly focusing on disease risks associated with introduction and transfer of live aquatic animals.

Internationally more effort and attention has focused on farming practices, feeds, economics, disease, water management and very recently genetically improvement of cultured species.

Transboundary movement and aquatic animal health

Though alien species have been introduced into Myanmar for aquaculture since 1953, the first occurrence of disease due to transboundary movement was only observed in 1984. The disease was Epizootic Ulcerative Syndrome (EUS) and it appeared that it spread from border areas adjoining Thailand (where it had already appeared) possibly through the trading of live or dead fish that were infected, across the long border. The species most severely affected

species were snake head, eel, catfish and barbs. EUS appeared to become less of a problem with time, affecting 35 townships in 1984-85 and reducing to 11 townships in 1989-90. More recent occurrences of EUS are unknown in subsequent years.

The second major transboundary disease occurred in tiger shrimp, *Penaeus monodon* and was due to White Spot Syndrome Virus (WSSV). This virus is still causing serious problems in the shrimp farming industries. The DOF has set up Disease Diagnostic Laboratories with technical assistance from regional FAO office under TCP/MYA/ 2523 project. Currently the laboratory is equipped with PCR and the technical assistance and training are provided by FAO, SEAFDEC, NACA and AAHRI.

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Present status of national animal health strategy development and implementation

PARTICIPATION IN REGIONAL ACTIVITIES

Since 1998 up to very recently Myanmar has implemented FAO Regional Technical Cooperation Programme TCP/RAS/671 and 9605 "Assistance for the Responsible Movement of Live Aquatic Animals" with close collaboration with Network of Aquaculture in Asia-Pacific.

Myanmar took part in development of Asian Regional Technical Guidelines for the Responsible Movement of Live Aquatic Animals and Beijing Consensus and Implementation Strategy. Myanmar also committed to develop National Strategies on Aquatic Animal Health Management. Mean while Myanmar took part in regional workshop in Bangkok in 1998 and 200 in Beijing and Capacity and Awareness building on Import Risk Analysis (IRA) for Aquatic Animal held in Bangkok in 2002.

To keep up with the fast developing aquaculture sector in Myanmar, a national workshop on "Developing the National Strategy Framework on Aquatic Animal Health Management" was held in Yangon from 10-11 April 2002 attended by Deputy Minister for Ministry of Livestock and Fisheries and Chaired by Director General of Department of Fisheries. The workshop was attended by over one hundred persons representing Department of Fisheries, various Universities, Myanmar Fisheries Federation, Myanmar Academy of Livestock and Fisheries, OIE and FAO. Dr M. B. Reantaso (Aquatic Animal Health Specialist – NACA) and Dr S. Chinabut (Director, Aquatic Animal Health Research Institute) were external resources expert Deliberation and preliminary assessment on the formulation of Myanmar's National Strategy Framework on Aquatic Animal Health Management were made through working group. The workshop recommended the formation of "Committee on Aquatic Animal Health Management (CAAH) by DOF, including related representatives from as many sectors as possible. CAAH will issues relating to forming and implementing of the "National Strategy". At present CAAH has already been established and development of the National Strategy framework is ongoing process base on the available resources Aquaculture Law (1998) and other international agreement. The National Strategy will be integrated into long term and short term national aquaculture development plan in the future.

As a legal framework the existing Aquaculture Law designates Director General of the DOF as the competent authority to issue relevant/ directives and notifications. Since there is no specified provision on alien species included in the law it is deemed that the law should be revised.

Under the strict regulations and efficient legislative measures coupled with expertise from various sector and collaborated activities only minor problem and constraints are expected which can be solved through responsibility and self awareness.

Present status of aquatic animal disease reporting

To enhance the technical administration processes the DOF has deployed offices in strategic areas where the fishery is intensive. The staff has to monitor the fishery activities and has to report back to head office. Normally the status and information on fisheries including fish health status in their jurisdiction are reported back to relevant section including fish health unit. DOF have good quality and eligible staff working on Health Management and data gathering activities but they are insufficient to cover the whole sector.

Since there is a significant increase in the number of species and in larger volume of production with little or no awareness of downstream consequences, Myanmar feels that harmonized principles, guidelines and sound technology are urgently needed and that the effective use of International Mechanism for the Control and Responsible use of Alien Species in Aquatic Ecosystem is very crucial for sustainable use of aquatic resources.

Recommendation

Introduction of alien aquatic species should be only made prior to consideration for safeguarding natural resources and ecosystems.

If some species, that may not cause negative impact to conservation of fishery resources and ecosystem, are decided to be introduced, studies on prior quarantine and reliable reporting should be conducted.

The culture of alien aquatic species should be facilitated through good aquaculture practice (GAP) and / or environment friendly aquaculture practices.

An introduced alien species should be genetically upgraded through high health management and screening method so as to sustain specific pathogen free (SPF) parent stock.

Introduction of *Penaeus vannamei* to Asia and the Pacific region is still questionable. Myanmar is deliberating if it should be allowed to import. In this regard, the workshop is requested to set up the solution.

Collaboration among regional and global scientists should be implemented to study cause and effect on conservation of ecosystem prior to introduction of alien aquatic species.

Appendix A

Alien Species in Myanmar according to FAO Database on Introductions of Aquatic Species

Genus	Species	Origin	Year of first introduction	Reason for introduction	Who was responsible	Ecological effect	Socio-economic effect
Oreochromis	*mossambicus*	China	1953	Culture	Government	Unknown	Beneficial
Cyprinus	*carpio*	Indonesia	1954	Culture	Government	Unknown	Beneficial
Trichogaster	*pectoralis*	Thailand	1954	Culture	Government	Unknown	Beneficial
Osphoronemus	*gouramy*	Indonesia	1955	Culture	Government	Unknown	Beneficial
Ctenopharyngodon	*idella*	China	1967	Culture	Government	Unknown	Beneficial
Aristichthys	*nobilis*	China	1967	Culture	Government	Unknown	Beneficial
Hypophthalmichthys	*molitrix*	China	1967	Culture	Government	Unknown	Beneficial
Oreochromis	*niloticus*	-	1977	Culture	Government	Unknown	Beneficial
Oreochromis	*aureus*	-	1977	Culture	Government	Unknown	Beneficial
Cyprinus	*carpio*	Israel	1978	Culture	Government	Unknown	Beneficial
Pangassius	*hypothalamus*	Thailand	1982	Culture	Government	Unknown	Beneficial
Clarias	*gariepinus*	Thailand	1990	Culture	Private	Adverse	Adverse
Clarias	*macrocephalus*	Thailand	1990	Culture	Government	Unknown	Beneficial
Barbodes	*gonionotus*	Thailand	1996	Culture	Government	Unknown	Beneficial
Notopterus	*chitala*	Thailand	1997	Culture	Government	Unknown	Beneficial
Litopenaeus	*stylirostris*	Thailand	2000	Culture	Private	Unknown	Beneficial
Piractus	*ranchypmum*	Thailand	2001	Culture	Government	Unknown	Beneficial
Litopenaeus	*vannamei*	Thailand	2002	Culture	Private	Unknown	Beneficial