

## Self-recruiting species (SRS) from farmer managed aquatic systems – are they important to the livelihoods of rural communities?

### Background

Aquaculture in the Red River Delta is widespread and well established. The level of intensity in terms of management varies greatly from extensive to very intensive. The most common management activity in an aquaculture system is stocking hatchery produced seed and feeding. Because this requires capital investments, aquaculture is less accessible to resource poor groups of the community particularly in rural areas where most of the households have no ponds and cannot access credit (ADB, 2004). Because of these factors, resource poor households tend to depend on the natural aquatic resources that are accessible to them. Fishing is very common and important in areas where many households do not have their own ponds but have access to perennial bodies of water. The resulting pressure on wild stocks

may lead to a decline in the abundance of wild species, increase illegal fishing practices and environmental degradation.

The UK Government, Department for International Development (DFID) funded a research project through Research Institute for Aquaculture number 1 (RIA no.1) that investigated how wild aquatic animals in farmer managed aquatic systems (rice fields and ponds) were important to rural livelihoods and how these resources could be managed by farmers to increase and sustain production for the household. This research was carried out in two districts of the Red River Delta, Soc Son and Phu Xuyen. The important findings are presented to highlight the importance of such species and systems.

### What are self-recruiting species (SRS)?



#### Important SRS in Red River Delta

##### Fish species

- Climbing perch (*Anabas sp.*)
- Catfish (*Clarias sp.*)
- Snakehead (*Channa sp.*)
- Gold fish (*Carassius auratus*)
- River catfish (*Hemibagrus sp.*)
- Short eel (*Misgurnus sp.*)

##### Non-fish species

- Freshwater shrimp (*Macrobrachium sp.*)
- Snail (*Sinotaia sp.*)
- Crab (*Somanniathelpusa sp.*)



SRS are defined as aquatic animals that can be harvested from farmer managed aquatic systems without regular stocking. This may include indigenous or introduced, small or larger species. Identified SRS in Red River Delta includes exotic species (Tilapia), large (snakehead, walking catfish and river catfish) and small (*Anabas* and *Carassius auratus*) indigenous fish species and non-fish species (freshwater shrimp and crabs). Hatchery reared species such as carps, tilapia and barbs can be considered SRS when they reproduce in farmer managed aquatic systems with minimal human intervention.

### What is a farmer managed aquatic system (FMAS)?

A farmer managed aquatic system is an aquatic habitat managed by household(s) regardless of ownership. Management is not limited to activities like stocking and feeding, but covers a

broader definition that includes any form of activity undertaken in the aquatic resource with the aim of enhancing the productivity of the aquatic organisms (plants and animals) within.

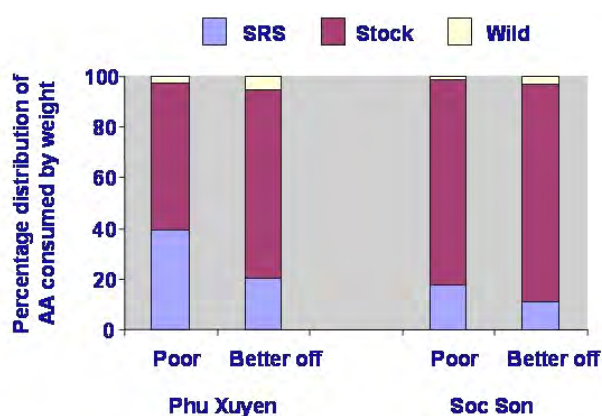
## Types of FMAS in Red River Delta

Name	Description	Management	Product Use
Rice fields	Average size: 2100 m <sup>2</sup> ; usually not stocked, contain mostly SRS	Connected to canal, household pond or lake	Mostly consumption (rice and fish)
"Lake"	Large bodies of water, usually lower part of rice paddies or in areas close to river- "oxbow" Stocks: carps, pangasius, tilapia and other SRS species	Screening, feeding, total draining, preparation (including liming)	Stocked fish mostly sold Big SRS mostly sold Small SRS consumed or given to family and friends
Canal	Water is usually for livestock and agricultural crops. Stocks: carps, pangasius, tilapia and some SRS species	Fencing using bamboos and nets Stocking of bigger size fish seeds External feeding	Big size stocked and SRS mostly sold Small size fish and non fish mostly consumed or given to others
Pond (Household & culture pond)	Average size: 283 m <sup>2</sup> Stocks: mainly 4 major carps and some SRS Location: near the house	Most of the household stocked hatchery seeds and prevent/eliminate SRS entry, use screen, dry pond use lime and pesticide. Less than 30% attract SRS (retain water, digging)	Culture Pond – mostly for selling Household pond – for consumption and for selling

### Why are SRS important?

#### **SRS as food source**

From the year long monitoring of 6 villages in the Red River Delta, data on food consumption showed that there are 6 major food groups being consumed in the area (Rice; vegetables; meat; poultry; aquatic animals; and others), where animal protein (32%) is the second most important group after rice (46%). Aquatic animals account for a quarter of the animal protein consumed and the majority, 60%, comes from FMAS. In general, the contribution of SRS to the total aquatic animal (AA) consumption by weight is most important for poorer families, with an average of 275.75g/hh/wk. However, consumption of SRS and other groups of aquatic animals varies with the season. Consumption of SRS is high during the months of April-May and August-September. During these two periods farmers are working in the rice fields where the water level is low and they are taking this opportunity to collect AA.



#### **SRS as additional source of cash income**

Research Institute for Aquaculture (RIA no.1) carried out 13 months of monitoring on the utilisation of aquatic animals collected by households in rural areas of the Red River Delta. Findings show that most households consume aquatic animals that they are collecting. From the collection data, results show that more than 80% of monitored households were involved in SRS collection from the two provinces. About 65% of these households consume all their SRS catch and the remaining 34% are selling on average 83% of their SRS catch, which represents a significant source of cash income. Households that do not have a pond mostly consume their SRS collection, which comes primarily from their own rice fields and ponds belonging to others.

#### **Role of SRS in social capital**

SRS may play a role in the maintenance of reciprocal relations between local households. Provision of aquatic animals to neighbours during harvesting was observed during the household monitoring of the project. Non-fish aquatic animals (shrimp, crab) are the most common SRS that are usually given as a gift to relatives; people that help in farming activities or even just visitors to the household. During social gatherings or village festivals, snakehead, catfish and carps are prepared and offered to visitors.

## Threats to SRS

### ***Rice farming intensification and water management***

Intensive use of chemicals, such as pesticides, in rice fields and irresponsible handling/disposing of chemical containers can kill aquatic animals. If water levels in rice fields and in canals are not maintained throughout the year there is a risk of losing crucial aquatic habitats for SRS.

### ***Promotion of conventional aquaculture***

The most common recommendation in extension materials available for aquaculture is to prepare the pond properly by eradicating “weed fish” or unwanted species. These unwanted species are mostly the SRS and valuable for the poorest.

### ***Conflict over the use of water resources***

With the intensification of agriculture, maintaining water levels in the rice paddies is the top priority and therefore regulation of water in the canals does not take into account the demand of fish farmers.



### ***Limited understanding of the biology of some important SRS species***

SRS are not seriously taken into account in the development projects and very few people are aware that SRS are important and need to be conserved.

### ***Destructive collection and harvesting techniques***

Collecting large amounts of aquatic animals in a short period can be achieved either by total draining or electro fishing. Both of the techniques can affect SRS populations negatively if not regulated. Electro fishing could damage reproductive systems of SRS and total draining of ponds can kill/eradicate juveniles of SRS.



### ***Change of land use***

Construction of roads and industrial parks has negative impact on the mobility of SRS in some areas. With these infrastructures block migration paths of SRS they negatively affect the life cycle, causing problems with natural re-stocking.

## Potential management options for FMAS

With the existing factors that have negative impacts on the population of SRS, modified individual management of FMAS might have limited impact on the enhancement of the SRS population. Ideas on co-management or ‘local resource user groups’ (LRUGs) were evaluated and demonstrated perceived increased availability of SRS for all. The establishment of LRUG in the village included identification of common area, which is usually lower portion of rice paddies with enough water during the year or a portion of supply canal, and a group of households that will manage the area.



In drought-prone area of northwest Bangladesh, a management trial that incorporated SRS into carp polyculture was practiced and assessed. Results of this trial showed that farmers who deliberately stocked/encouraged SRS into their ponds stocked with carps attained 1.38 times higher overall production than farmers that excluded SRS from their systems. This result suggests that incorporating SRS in a carp stocked system provides more income. In these trials, farmers observed no negative impact on the stocked species.

## Potential group management of FMAS through LRUGs approach

FMAS – Location	Group Management	Benefits
Lower portion of rice fields – “lake”	Creating a pathway from water-bodies like lakes to the rice fields. Creating a habitat for aquatic animals (digging) in the rice fields. Limit the use of pesticide	Broodstock from lake can reproduce in the rice fields. Minimized destruction of environment from pesticide
Portion of canal	Making bamboo fence in a portion of canal and keep brood stocks of carps, tilapia or other important SRS species. The fence will keep the brood stock but allow fingerlings to be distributed in nearby water bodies and FMAS.	Increase production and will allow reproduction of SRS. Improved camaraderie among farmers
Group of HH ponds	Stocking of bigger size hatchery seeds and creating pathways for SRS to enter into the system	Increase production and will allow reproduction of SRS. Households can exchange ideas in management

### Recommendations

- **Consider SRS in agricultural, aquaculture and environmental management.**
- **Incorporating SRS production/management strategies in fishery extension messages/materials to increase awareness of the importance of these species and appropriate management for the sustainability of these species.**
- **Investigation should be done to evaluate the trade-offs of intensifying aquaculture production against loss of traditional culture systems. This should lead to a balanced promotion of aquaculture and biodiversity protection.**
- **Identify habitats that are important for SRS and develop strategies to protect these areas, whilst increasing accessibility for resource poor households.**
- **Focus on understanding the biology of some important SRS species and their interaction with cultured species to promote appropriate management.**
- **Evaluation of local resource user group (LRUG) management approach where a number of farmer managed aquatic systems are linked and SRS are present.**

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