

# STREAM

**Support to Regional Aquatic Resources Management**

## **STREAM Journal**

**Learning and communicating about the livelihoods of fishers and farmers**

**The STREAM Initiative is supported by AusAID, DFID, FAO, NACA and VSO**

## Contents

From Resource User to Resource Manager: A Significant Change Story <i>Ruperto Aleroza as told to Jocel Pangilinan and Ronet Santos</i>	1
Significant Change with Cambodian Provincial Livelihoods Study Teams <i>Bun Hay Chheng, Tan Someth Bunwhat, Mey Chanthou and Bun Puthy</i>	3
The Community Fisheries Development Office: One Year On <i>Matt Fox</i>	5
CFDO Open for Business! <i>Louise Mackeson-Sandbach</i>	7
Stakeholders and Institutional Involvement in Aquaculture Management and Development <i>M Krishnan and Pratap S Birthal</i>	9
Fish Seed Production for Aquaculture in Southeast Cambodia: Decentralization – The Way to Go? <i>Olivier Delahaye Gamucci, Graham C Mair and Harvey Demaine</i>	11
About the STREAM Journal	13
About STREAM	14

## Note

This number of the *STREAM Journal* features four articles on work in Cambodia, while highlighting “significant change” approaches to monitoring and evaluation, and the telling of personal and organizational stories of “significant change”. *SJ1(3)* opens with a story by Ruperto Aleroza (or Ka Uper), a Filipino fisherman who writes about a SPARK study tour in Thailand. Co-authored with SPARK colleagues Jocel Pangilinan and Ronet Santos, their article concludes with a description of “significant change”.

The next three articles come from colleagues in Cambodia who are in a partnership involving the Community Fisheries Development Office (CFDO) of the Department of Fisheries (DOF), the NGO SCALE, three provincial DOF offices and Departments of Women’s and Veteran’s Affairs, and STREAM. Bun Hay Chheng, Tan Someth Bunwhat, Mey Chanthou and Bun Puthy illustrate how “significant change” is being put into practice by livelihoods study teams. Matt Fox and Louise Mackeson-Sandbach, both volunteers working with CFDO, bring us up to date on that office’s growth. Matt invokes images of Cambodian rivers and Louise shows us how two pictures are worth a thousand words.

In the fifth article, M Krishnan and Pratap S Birthal look at the role of community “focus persons” in coastal aquaculture in India. The final article takes us back to Cambodia with a report of a survey of fish seed production and decentralization, carried out by Olivier Delahaye Gamucci, Graham C Mair and Harvey Demaine of the Asian Institute of Technology.

We are pleased to report that the Khmer and Vietnamese versions of the *STREAM Journal* are now up and running, and being made available in a printed format to our partners in Cambodia and Vietnam, in particular, colleagues working at provincial levels. These other language versions can be accessed from the Virtual Library on the STREAM website. Watch out for the Nepali *SJ* coming soon!

We will continue to report on any communications links we are aware of among *SJ* readers. Ashish Kumar (India) and M E Azim (Bangladesh), each with co-authored articles in *SJ1(2)*, exchanged e-mails about the research from Bangladesh on periphyton-based aquaculture and its potential application in the Indian context. [Ashish’s e-mail address was typed incorrectly in his article. It is <ashishkumar\_1in@yahoo.com>.]

Happy reading!

Graham Haylor, STREAM Director  
William Savage, STREAM Journal Editor

---

# From Resource User to Resource Manager: A Significant Change Story<sup>1</sup>

*Ruperto Aleroza  
as told to  
Jocel Pangilinan and Ronet Santos*

## **Fisher, Community Leader and Organization President**

I am Ka Uper, 48, a fisher, and a community leader. Although I only finished elementary education, I became a councillor of Encarnacion *barangay*, a coastal village in Batangas, Philippines, from 1991 until 1993. In 1992, I became a member of SAMMACA or *Samahan ng mga Maliliit na Mangangisda ng Calatagan* (Association of Small Fishers of Calatagan), an organization that resulted from the community organizing efforts of CERD (Centre for Empowerment and Resource Development), an NGO focusing on helping small fishers. I am now the president of SAMMACA; the organization has grown into a federation with 10 chapters in nine coastal villages of Calatagan, with a membership of more than 700 small fishers.

## **Learning and Sharing about Resources Management**

Last year, I was chosen as one of twelve community leaders, NGO and local government officials from the Philippines, Indonesia and Thailand who joined a study tour in Thailand from 1-15 August, to learn about how local communities participate in natural resources management<sup>2</sup>. In northern Thailand, I observed how farmers who belong to the Northern Farmers' Network participate in watershed management in Samoeng District near Chiang Mai. In Trang, southern Thailand, I met Khun Pisit Charnoh<sup>3</sup>. I learned and shared with other small fishers in southern Thailand how they manage fish sanctuaries, rehabilitate mangrove areas, and negotiate with other users of their fishing grounds.



*Ka Uper (far right second row, writing) on the study tour in Thailand*

My interactions with other small fishers from Thailand and Indonesia, through the study tour and the regional workshop under the SPARK program, has made me realize that the key to managing common pool resources (for example, a fishing ground that is also used by non-fisher users such as tourism ventures and maritime navigation) is the participation of all resource users in the decisions on what rules to apply in relation to the utilization of the resource and how these rules are implemented. I think that it is important that small fishers whose lives depend principally on fishing, and who are the most important resource user, should be involved in the establishment of these rules and their implementation. I gained a broader understanding of the importance of participation in CBNRM (community-based natural resources management).

---

<sup>1</sup> This article is an edited reprint of one which appeared in the SPARK Newsletter, Issue No 9, July 2002. Appreciation is expressed to Voluntary Service Overseas (VSO) Philippines and Environmental Science for Social Change (ESSC).

<sup>2</sup> More than 52 community leaders, local government officials and NGO leaders were selected to participate in the learning activities of SPARK last year.

<sup>3</sup> The 2002 winner of the Goldman Environmental Prize (a prize that includes a no-strings-attached award of \$125,000 and considered the "environmental Nobel Prize"), for his work to restore Thailand's coastal ecosystems in the struggle to save their livelihoods.

## Capacity and Confidence

I also learned about methods of analyzing stakeholders and managing conflicts between and among different resources users. Conflicts can happen between a local community and powerful external forces such as big business and among the people within the local community. My capacity to analyze conflicts has improved and my confidence to act on these has increased.

Our organization is presently managing three 200x100 meter fish sanctuaries funded by the local government. We are involved in a 45-hectare mangrove reforestation project funded by Oxfam, a British NGO, and PACAP, an Australian funding agency. One of our members is the chair of a bay-wide Fisheries and Aquatic Resource Management Council (FARMC) that recommends policies related to aquatic



*Ka Uper (with sunglasses, first row left) with fishers and SPARK study tour participants in a mangrove area in southern Thailand*

resources management to the local government. We are active in campaigns against illegal fishing activities with the help of members of the national media. We have convinced authorities not to approve the operation of a cement factory that would destroy our mangroves and pollute our fishing grounds. We are also involved in protecting the remaining coral reefs of Pagapas Bay in Calatagan with the support of the local government. Recently, I have been elected national council member of the National Anti-Poverty Commission (NAPC).

Whereas before most people think that coastal resources management is better left with fishery experts, we would like to prove that resource users could be resource managers as well.

*Ka Uper is the president of SAMMACA. Jocel Pangilinan is the SPARK Programme Assistant and Ronet Santos is the SPARK Programme Coordinator. Ka Uper can be reached c/o CERD, 102E R&L Mendoza Building, Kamuning Road, Quezon City, Philippines, <cerd@skynet.net>. Jocel and Ronet can be reached at <spark@qinet.net>.*

*Significant change* is a participatory monitoring system used by VSO. It "is believed to be an innovative approach to project monitoring, developed in cooperation with the Christian Commission for Development in Bangladesh (CCDB) in 1994. [It] was developed in the course of developing an evolutionary perspective on learning within organisations. The design involved the deliberate abandonment of the use of 'indicators', a central concept in orthodox approaches to monitoring. Instead, the focus of the system is on the identification of significant change as perceived and interpreted by the various participants. It relies on the use of qualitative, not quantitative, information. The approach is inductive, extracting meaning out of events that have already taken place, not deductive, making assumptions about future events. The focus of the system is flexible and adaptive, not fixed" (p 68).<sup>4</sup>

<sup>4</sup> Davies, Rick 1998 An Evolutionary Approach to Organisational Learning: An Experiment by an NGO in Bangladesh. In Mosse, David, Farrington, John and Rew, Alan (editors), *Development as Process: Concepts and Methods for Working with Complexity* (pp 68-83). Routledge Research/ODI Development Policy Studies. London and New York: Routledge.

---

## Significant Change with Cambodian Provincial Livelihoods Study Teams

*Bun Hay Chheng, Tan Someth Bunwhat, Mey Chanthou and Bun Puthy*

### **Sustainability, Livelihoods Study, Capacity-building and Significant Change**

The Cambodia fisheries domain is currently undergoing reform, with many fishing lots becoming the responsibility of communities. Many communities, however, face problems because they do not understand how to use aquatic resources sustainably, nor how to prevent their day-to-day destruction. The Cambodian government has started establishing co-management committees to protect natural resources in communities. Sustainable livelihoods studies are being carried out in villages to find issues and their solutions so that villagers can create strategies for their livelihoods, avoid problems and conserve natural resources.

Capacity-building for the sustainable livelihoods study was carried out by a SCALE “trainer team” with provincial livelihoods study teams in Kandal, Kampong Chhnang and Kratie provinces. Villagers had opportunities to discuss and begin to resolve present and future issues related to the environment, aquatic resources and wildlife. SCALE also monitored the capacity-building process with the objective of identifying and describing the most significant changes in knowledge, attitude and field practice among staff on the three provincial teams, each with six members – four from the Department of Fisheries and two from the Department of Women’s and Veteran’s Affairs.

### **Methodology: Monitoring, Observation, Questionnaires and Reports**

During the sustainable livelihoods study, SCALE monitored the work of the teams in each province to understand their knowledge, attitudes and field practice. The “trainer team” followed up on all the PRA implementation activities in each village, such as selection of villages, facilitation methods, PRA tools used for collecting information and analyzing problems, computer use and report writing.

The SCALE “trainer team” recorded their observations about the study team members’ knowledge, attitudes and field practice, both during the sustainable livelihoods training and the PRA practice in villages. In particular, the team observed characteristics of people in each group – who worked together and how – with a special focus on women.

A pre-training questionnaire on understandings of PRA was completed by all provincial team members. A post-training questionnaire on PRA knowledge was completed three months after the beginning of the training course, at the end of the PRA practice in the second of two villages. Reports of significant change were written by each provincial team, describing what changes they had experienced and when. These were prepared through group discussion.

### **Results**

While it is not possible to include the findings of either the livelihoods study or the questionnaire in this article, these conclusions about significant changes have been drawn:

- Each team has begun to understand the use of PRA tools to collect information from villagers.
- All the teams could implement PRA themselves at the second village.
- In general, all teams worked well in groups. They understood clearly how to do PRA as a responsible and committed team.
- Men and women seemed to work well together.
- More experience is needed on PRA implementation, problem analysis, computer use and report writing.

### **Stories of Personal Significant Change**

In September 2002, a "CFDO-SCALE-STREAM Livelihoods Meeting" was held at the Department of Fisheries in Phnom Penh, to report and get feedback on the outcomes of the livelihoods studies in the three provinces. As a concluding highlight of that meeting, a volunteer from each team told stories of personal significant change.

#### *From Kandal Province*

I am Ms Bun Puthy. I work at the Department of Women's and Veteran's Affairs. Before working with STREAM, I did not know what is PRA. I always spoke a lot and educated them when I worked at villages and my attitude was as a leader to point out all the work. During the three-month period, I knew well the PRA tools and implementation, and how to collect information from villagers. I understood well how to work in groups, have good relationships among the members in a team and manage duties well for the team. Moreover, I always took care of the self-assessment in my team after finishing each PRA tool. What is important for me is that I could stay with villagers and understood well the real living standards and I analyzed all the information in the villages. Especially I was happy and wanted to continue PRA implementation in the villages because I was interested in finding out the issues and solutions for poor farmers in the villages. So, for this period, I received more experiences and my life was better for working in the office and field.

#### *From Kampong Chhnang Province*

I am Ms Mey Chanthou. I work at the Department of Agriculture in Kampong Chhnang. I realized that I did not know what are PRA tools, computer software, or how to write reports. In my attitude, I did not like to speak a lot and I never worked in villages. But when I worked with STREAM for three months I understood well the PRA tools. I could directly work with farmers. I could collect information and write reports. I knew more computer programs such as FreeHand, ArcView, Word and Excel. I listened and learned a lot closely with villagers because it was important for me to be active. On the other hand, I stayed and worked with villagers in different living standard situations. Finally, my life has been significantly changed in knowledge, attitude and practice.

#### *From Kratie Province*

I am Mr Tan Someth Bunwhat. I work at the fisheries office in Kratie. Before working with STREAM, I did not know the PRA tools and how to do action plans, how to analyze information or write reports. Contrastingly, during the three-month period, I knew how to plan and work in a team, especially with women. I improved my ability to use computers. My attitude has changed from commanding ideas into receiving ideas and issues from villagers and adapting to stay with villagers. I could communicate well with villagers and local authorities and I learned a lot from farmers. I improved my capacity.

*Bun Hay Chheng is Manager at the SCALE Research and Fish Seed Station and can be reached at <012809091@mobitel.com.kh>. Tan Someth Bunwhat is an Officer with the Department of Fisheries in Kratie Province. Mey Chanthou is an Officer with the Department of Agriculture in Kampong Chhnang Province. Bun Puthy is Deputy Director of the Department of Women's and Veteran's Affairs in Kandal Province. They can all be reached through <cfdo@camnet.com.kh>.*

---

# The Community Fisheries Development Office: One Year On

*Matt Fox*

## The CFDO Journey ...

A wise soul once remarked that the longest journeys begin with a single step in the right direction. Following worsening conflicts between family-scale and commercial fishers on the Tonle Sap (Cambodia's Great Lake), the Prime Minister announced in October 2000 that over half of the commercial fishing area would be handed back to the people. These areas (about half a million hectare) are to be managed by the fishing communities themselves, with guidance and support from the government. As one step in this process, the Community Fisheries Development Office (CFDO) of the Department of Fisheries (DOF) was created one year ago to assist in the fisheries reform process.

The CFDO is responsible for the implementation, coordination and support of community fisheries. Cambodia now has over 240 community fisheries established in inland and coastal areas, many created since the reforms were announced. The DOF Director, Mr Nao Thuok, says, "The community fisheries management concept is a new one for Cambodia. However, it is considered the contemporary management system for sustainable use of fisheries resources, and has been tried for more than ten years in countries like the Philippines. We can learn from these experiences, like a baby learning to walk."



*Fisheries reforms and community-based management are providing a voice to aquatic resources users. Here, a community awaits the results of a committee election.*

In its first year, the CFDO has grown to include twenty-five staff members. They come from a range of backgrounds, with many formerly employed in the field with DOF. However, few members have had previous exposure to community-based management. Training has begun to prepare CFDO for the challenging task of implementing and coordinating community-based fisheries management. CFDO has also begun several research projects to gain a better understanding of issues affecting the implementation of co-management in poor fishing communities.

## The STREAM Initiative and Livelihoods Study

CFDO is one of the first agencies working with the regional STREAM Initiative. Within CFDO, STREAM have funded a manager to oversee the development of its Cambodia National Communications Hub, and to improve links among regional stakeholders to share knowledge and improve the exchange of information. A VSO (Voluntary Service Overseas) volunteer was also placed in CFDO to advise on management and organizational issues.

In cooperation with the Cambodian NGO SCALE, CFDO is conducting a STREAM-supported study of fisheries-dependent livelihoods in Kandal, Kampong Chhnang and Kratie provinces. The study sites include fisheries as diverse as the Tonle Sap, the Mekong River and seasonally-flooded rice fields. To better understand the lives of fishing families, Participatory Rural Appraisal methods are being used to gather information directly from resources users. A key study focus is to build research and facilitation capacities of CFDO, provincial fisheries offices and the Department of Women's and Veteran's Affairs. Reports on the fishing communities will be made available to interested stakeholders and may be used to develop further projects in fisheries communities. Through the STREAM study, participating villagers have been able to prioritize the issues affecting their livelihoods and to work towards developing solutions.

### ICLARM Livelihoods Study

Along with government agencies in Bangladesh, Lao PDR and Vietnam, the CFDO is involved in an ICLARM-funded project examining livelihoods dependent on inland fisheries. The study aims to identify the dependence of poor people on aquatic resources, characterize "poverty" and assess the vulnerability of poor people to mismanagement or failure of aquatic resources. It is anticipated that the information generated in the four countries will help aquatic resources managers and scientists understand relationships between poor people and the resource. A particular focus is on future research priorities and "entry points" for reducing poverty.

### CFDO Training

With assistance from its volunteer staff, CFDO have been busy designing and coordinating their own training program with support from NGOs and individuals involved in community fisheries management in Cambodia. Staff are participating in study tours to community fisheries in inland and coastal areas. They are involved in activities focusing on co-management concepts including boundaries, conflict, development, and sustainability and policy issues. "The training will provide our staff with the tools they need to implement fisheries co-management, and better serve fishing communities," says CFDO Chief, Mr Thay Somony.



*CFDO is helping to secure fishing rights for poor fishers through co-management.*

CFDO wishes to acknowledge the generous support and financial assistance of these counterparts: American Friends Service Committee, Cambodian Family Development Services, CBNRM and WWF, FAO Siem Reap, IDRC, MRC Capture Fisheries Project, MRC Reservoir Project, Oxfam America, Oxfam GB (Great Britain) and SADP. In addition to learning opportunities for its staff, CFDO sees these relationships as important for improving communication and coordination among community fisheries stakeholders.

### On the Horizon ...

CFDO hopes to improve its links with NGOs working in community-based fisheries management and related fields. Mr Thay Somony comments that, "NGOs play a vital role in establishing and supporting community fisheries in Cambodia ... the CFDO is keen to cooperate and coordinate more with organizations, and work together on joint projects in the future." Already, stakeholders meetings have been held with relevant NGOs. The CFDO will strive to ensure that everybody is kept "in the loop". Close working relationships with several NGOs have already begun in CFDO's first year, and it is hoped that these bonds will form the basis for effective, equitable and transparent community-based fisheries management in the long term.

Every year in Cambodia, the Tonle Sap (Great Lake) fills to the brim, fed by the Mekong River swollen with monsoon rains. The Tonle Sap River changes direction, expanding the lake eight-fold and triggering the mass spawning migrations of the fish that will sustain the Kingdom for another year. Every November, people take time out from their busy working lives to witness and celebrate this change of flow, and reflect on the season past. Meanwhile, as the river reverses its flow and the lake recedes, another change of direction is occurring with equally important consequences for the people of Cambodia's fishing communities. The move towards a community-based fisheries management approach will be closely watched by the Kingdom's fisherfolk, while the CFDO staff busily plans for the journey ahead.

*Matt Fox is an Australian Youth Ambassador for Development (AYAD) in the CFDO, Phnom Penh. He can be reached at <cfdo@camnet.com.kh>.*



---

## CFDO Open for Business!

*Louise Mackeson-Sandbach*

Towards the conclusion of a VSO volunteer's work, a placement review and report are completed by the volunteer, his or her employer and close associates. This process also involves the writing of a "significant change" story, which is shared with colleagues for discussion, revision and selection as part of the placement report – and then given a "headline" which is this contribution's title. These two "then" and "later" photographs were submitted as part of the report, and are accompanied by excerpts from Louise's "significant change" story.

### Then



*Over the period of the placement, a significant change has taken place in the atmosphere in the office. That is what this significant change is about – the change to the atmosphere, motivation and confidence of the staff and office.*

Later



*The office has a good working culture ... there is a good relationship between the staff and it seems like a fun place to work. Increased activities and attendance have created a good atmosphere in the office – staff are beginning to work well together as a team, both men and women.*

*Louise Mackeson-Sandbach worked as a Management Advisor with the Community Fisheries Development Office (CFDO) at the Department of Fisheries in Phnom Penh from February to November 2002. Her placement was made possible through the Business Partnership Scheme of Voluntary Service Overseas (VSO). Louise has now returned to the UK and her position with the Accenture company. She can be reached at <louise\_mackeson@hotmail.com>.*

---

# Stakeholders and Institutional Involvement in Aquaculture Management and Development

*M Krishnan and Pratap S BIRTHAL*

## **Needs in Coastal Aquaculture**

In a recently concluded project in India (Krishnan et al., 2001), our team conducted intensive surveys into aquaculture farming practices in Nellore District of Andhra Pradesh State and Cuddalore District of Tamil Nadu State. In addition to completing the project, the team had the opportunity to identify some distinct needs that require attention to make coastal aquaculture a major economic activity. These include:

- Building up the awareness of district authorities of various departments regarding the potential of coastal aquaculture as a source of sustainable livelihoods in rural areas,
- Identifying “focus persons” to advise farmers on organizing resource use strategies at field level, and
- Generating more urgency on the part of state fisheries department authorities and allied departments to assist farmers in registering their farms in light of regulations of the Aquaculture Authority<sup>5</sup>.

## **Problems in the Development of Coastal Aquaculture in India**

Development of coastal aquaculture in India is hampered by existing disputes among farmers and a lack of capable community leaders. Successful schemes of nationalized banks in the agriculture sector – like micro-credit – have yet to catch on in the aquaculture sector. Often in dispute are land ownership rights, water inlets and outlets in canal systems, timing of water intake and release for water exchange, bar mouth problems and rights over usage of wastelands. Lack of technical awareness and independent efforts of enabling agencies, and poor extension services, are also major problems, as are land lease policies. Dual and short lease terms and high lease value also impede faster development. Social stigma attached to aquaculture, vandalism of ponds, poor training facilities at grassroots levels and sometimes insignificant women’s involvement also contribute to slower growth of this sector.

## **The Need for Integrated Effort**

Under the changing WTO (World Trade Organization) scenario, aquaculture in India is getting a boost from innovative production strategies like contract farming for marginal farmers, which helps increase total production. Contract farming, as against corporate farming, could provide enormous scope for coastal aquaculture, where the majority of shrimp farmers belong to the category of “marginal farmers” – those farming less than a hectare of water area. The underlying principle of contract farming is a “buy-back” arrangement. Marginal farmers find this to be a convenient arrangement, since inputs, which often include technical guidance, are provided to them and the final output is purchased at the farm gate.

There is an urgent need to generate awareness on the part of district authorities about the potential of coastal aquaculture. Departments dealing with revenue, agriculture, irrigation and public works, electricity boards, the local lead bank and the National Bank for Agriculture and Rural Development (NABARD), and insurance companies, all need to be educated about the emerging diverse elements of coastal aquaculture. Awareness-building exercises to educate these professionals should not necessarily be top-down. Efforts must be made with the administrative heads of these agencies to

---

<sup>5</sup> The Aquaculture Authority has been set up by the Government of India under Section 3(3) of the Environment (Protection) Act 1986 to deal with the situation created by shrimp culture in the coastal areas. Please see [www.aquaculture.tn.nic.in](http://www.aquaculture.tn.nic.in) for details.

identify and train those under their authority that have a penchant for extension work. The Village Level Extension Worker (VLEW) may not always be the best choice.

### **Importance of “Focus Persons”**

We discovered that there were a few people who were actively involved in coastal aquaculture activities in the two study districts. They worked in the fisheries departments, or were university professors or individuals who commanded respect in the community, for example, *Panchayat* (village-level government body) presidents. Their involvement was actually intense and infectious. They were themselves unaware of the wealth of knowledge they possessed and the contribution that they would be able to make to their village and district if they were given the right training, exposure and of course, importance. Their performance at the time was constrained by official procedures they necessarily had to follow and the need to be in the office, though they were more comfortable in the field. Their potential contribution to the development of coastal aquaculture may have great significance, given the near total absence of NGOs trained in coastal aquaculture in India.

The role that these “focus persons” could play in gaining the confidence of farmers and helping them to register their farms with the Aquaculture Authority cannot be over-emphasized. These focus persons are already available in the identified villages and blocks. They can be used for confidence-building exercises in the area of their influence. Being natural leaders and local personalities, they also have the added advantage of personal level contact in all related departments that could be harnessed for the final objective of organized and sustainable coastal aquaculture development.

### **Entrepreneurs and Resource Managers**

Coastal aquaculture, like any other economic activity, is a function of the factors of production. Land reform, legislation, revenue and classification are state concerns, while unskilled labor is a local issue in coastal aquaculture. Proven entrepreneurial skills are available in this sector, with leaders emerging mainly from the processing sector. Institutional and non-institutional capital is a function of education, ability and willingness to invest. Therefore, the sector needs the back-up of all the institutions involved.

Coastal aquaculture is overcoming a poor reputation in India. The build-up of negative publicity in the 1990s is slowly giving way to a measure of understanding, if not tolerance, of coastal aquaculture in remote villages. Appropriate management practices have led to the stabilization of yields at sustainable levels and control of disease occurrence. The resilience of the farming community to adopt such practices shows the capacity of this sector to maintain a positive factor-product relationship in the long term.

### **Reference**

Krishnan M, Birthal, Pratap S, Ponnusamy, K, Kumaran, M and Singh, H 2001 *An Economic Evaluation of Brackishwater Aquaculture Systems in India*. Final Report. ICAR-AP Cess Fund Project, Central Institute of Brackishwater Aquaculture, Chennai, and National Centre for Agricultural Economics and Policy Research, New Delhi.

*Dr M Krishnan is a Senior Scientist (Economics) at the Central Institute of Brackishwater Aquaculture in Chennai, India. He can be reached at <mahadevak@hotmail.com> or <emkay1957@yahoo.co.in>. Dr Pratap S Birthal is a Senior Scientist (Economics) at the National Centre for Agricultural Economics and Policy Research in New Delhi, India. He can be reached at <psbirthal\_ncap@iasri.delhi.nic.in>.*

---

# Fish Seed Production for Aquaculture in Southeast Cambodia: Decentralization – The Way to Go?

*Olivier Delahaye Gamucci, Graham C Mair and Harvey Demaine*

## **Background**

Fish is an important part of the Cambodian diet and is mostly supplied from capture fisheries. However, these may already be fully exploited and are unlikely to meet the rapidly expanding demand. Therefore, aquaculture is likely to play a major role in the future food security of the country, for which an adequate supply of quality seed is an important prerequisite. In general, infrastructure in Cambodia is still underdeveloped, farmers have a limited personal mobility and mobile trading networks are only present in the more developed areas. Rural farmers require seed to be available locally and at the right time to coincide with their stocking requirements. Availability of appropriate species and of good quality seed (i.e., well managed and genetically superior) are also issues of growing importance. Currently, seed supply in Cambodia is still mainly based on a limited number of relatively large hatcheries located in the more developed areas, with centralized but poorly developed distribution systems. As a consequence, seed supply in rural areas is largely inadequate.

## **The Study Context**

In order to identify the opportunities and constraints of Cambodian seed production, an extensive survey was carried out from January to April 2002 in four selected provinces of southeast Cambodia. The study mainly focused on developing a systematic description of the seed production system, covering technical, institutional, physical, economic and networking aspects.

## **The State of the System: A Case for Decentralization**

The study showed that the different types of seed producers could generally be classified into four categories ranging from government or donor-funded centralized systems to smaller-scale seed producers. Examinations of critical issues showed that the more centralized public systems were not financially sustainable, failed to effectively deliver seed to many rural areas and were, to some extent, constraining further development of the private sector through competition. Decentralized systems were more able to cope with the existing situation in rural areas and meet the needs of rural farmers.



*Larger-scale seed production at Toul Krasang, operated by SCALE (left) and a small-scale farmer-managed hatchery in a rural area (right), the two extremes of the seed production system*

The small-scale seed production sector is still in its infancy, often utilizing extremely limited facilities and infrastructure, but managing most of the challenges successfully. The sector is innovative, flexible and more able to provide basic extension support to farmers. A lack of technical and financial support, combined with inadequate access to specialized inputs, is the main constraint for rural hatcheries. Genetic management of broodstock was shown to be critically inappropriate for all the seed producers, including the larger hatcheries, underlining the likelihood of genetic degradation resulting from genetic drift, inbreeding and hybrid introgression occurring and affecting culture performance in the foreseeable future. Public or NGO hatchery production retains a larger production volume than

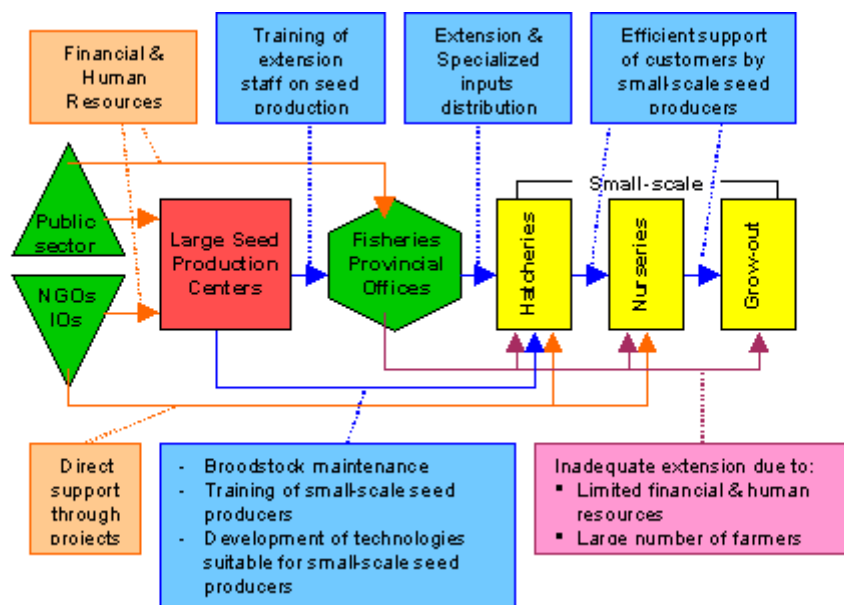
small-scale seed producers, but these hatcheries are subject to fierce competition, being mostly concentrated in a limited area, and face static or decreasing trends in demand. On the other hand, smaller-scale seed producers report an increasing demand for seed, with limited competition, as aquaculture development now mainly takes place in rural areas.

### Centralized and Decentralized Seed Production Strategies

At the early stages of aquaculture development, with scarce resources and skills, centralized seed production strategies are often justified. Today, it is now apparent that farmers in southeast Cambodia would benefit from a move towards a decentralization of supply. Such a strategic shift has taken place with success in other Asian countries, where private entrepreneurs now dominate fish seed production. Progressively, as fish markets and infrastructure develop in rural areas, seed demand will increase and become critical in terms of quality and species, encouraging the emergence of commercially-oriented seed producers and the establishment of middlemen networks. Under such an evolution of fish seed supply systems, large centralized government and NGO hatcheries can switch their roles from being the major supplier of seed, to ensuring widespread availability of quality seed and broodstock.

### Decentralizing Seed Supply

Decentralization of seed supply could be achieved by promoting the development of a small-scale seed distribution network throughout the country (see figure). Public or NGO hatcheries' resources should be used to support the private sector, rather than constraining it through competition by overproducing seed. Extension activities from NGO or provincial offices should be targeted primarily at small-scale seed producers, providing training on the different aspects of aquaculture and on the transfer of technology, to build an efficient chain of support from the producers to their clients. However, this will only be possible if clear decisions and strategies are put in place by policy-makers, requiring consultation among stakeholders in Cambodian aquaculture development.



*Building a small-scale decentralized seed distribution network (blue)*

*Olivier Delahaye Gamucci is with SEAFDEC Secretariat, Bangkok, Thailand, and was formerly an AIT masters student. Graham C Mair and Harvey Demaine are with the Asian Institute of Technology, Bangkok, Thailand. The authors can be reached through Olivier Gamucci at <odega@seafdec.org> or through Graham Mair at <gcmair@ait.ac.th>.*

---

## About the STREAM Journal

**Published by** STREAM – Support to Regional Aquatic Resources Management

Network of Aquaculture Centres in Asia-Pacific (NACA) Secretariat  
Suraswadi Building  
Department of Fisheries Compound  
Kasetsart University Campus  
Ladyao, Jatujak, Bangkok 10903  
Thailand

### Editorial Team

Graham Haylor, STREAM Director  
Le Thanh Luu, STREAM Vietnam National Coordinator  
William Savage, STREAM Communications Specialist  
Sonia Seville, STREAM Philippines National Coordinator  
Thay Somony, STREAM Cambodia National Coordinator

### Purpose

The *STREAM Journal* is published quarterly to promote participation, communication and policies that support the livelihoods of poor aquatic resources users in Asia-Pacific, and to build links within the aquatic resources management and other sectors across the region. The *STREAM Journal* covers issues related to people whose livelihoods involve aquatic resources management, especially people with limited resources, and government, non-governmental and international practitioners who work with them in communities. Such issues include learning, conflict management, information and communication technologies, aquatic resources management, legislation, livelihoods, gender, participation, stakeholders, policy and communications.

Another equally important purpose of the *STREAM Journal* is to provide an opportunity for seldom-raised voices to be heard and represented in a professional publication that is practical yet somewhat academic. The contents of the *STREAM Journal* should not be taken as reflecting the views of any particular organization or agency, but as statements by individuals based on their own experience. While authors are responsible for the contents of their articles, STREAM recognizes and takes responsibility for any editorial bias and oversights.

### Distribution

The STREAM Journal is available in three formats:

- An electronic PDF version which is printed and distributed by the STREAM Communications Hubs in each country,
- A version which can be accessed and downloaded in PDF format from the STREAM Website at [www.streaminitiative.org](http://www.streaminitiative.org), and
- A printed version which is distributed by the NACA Secretariat.

### Contribution

The *STREAM Journal* encourages the contribution of articles of interest to aquatic resources users and people who work with them. The *STREAM Journal* also supports community-level colleagues to document their own experiences in these pages.

Articles should be written in plain English and no more than 1,000 words long (about two A4 pages of single-spaced text).

Contributions can be made to William Savage, STREAM Journal Editor, at <[savage@loxinfo.co.th](mailto:savage@loxinfo.co.th)>. For more information, contact Graham Haylor, STREAM Director, at <[ghaylor@loxinfo.co.th](mailto:ghaylor@loxinfo.co.th)>.

## About STREAM

Support to Regional Aquatic Resources Management (STREAM) is an Initiative designed within the five-year Work Programme cycle of the Network of Aquaculture Centres in Asia-Pacific (NACA). It aims to support agencies and institutions to:

- Utilize existing and emerging information more effectively
- Better understand poor people's livelihoods, and
- Enable poor people to exert greater influence over policies and processes that impact on their lives.

STREAM will do this by supporting the development of policies and processes of mediating institutions, and building capacity to:

- Identify aquatic resources management issues impacting on the livelihoods of poor people
- Monitor and evaluate different management approaches
- Extend information, and
- Network within and between sectors and countries.

The STREAM Initiative is based around partnerships, involving at the outset a coalition of founding partners (AusAID, DFID, FAO and VSO) supporting NACA. It has adopted an inclusive approach, reaching out to link stakeholders engaged in aquatic resources management and supporting them to influence the Initiative's design, implementation and management.

The partnerships' work is coordinated in each country through National Coordinating Teams comprising the National Coordinator (a senior national colleague agreed with the government) and the Communications Hub Manager (a full-time national colleague supported in the first two years by STREAM), and linking a range of national stakeholders. The Communications Hub is provided with hardware, software, training, information-technology support, and networking and human resources support, and links national stakeholders through an Internet-based virtual regional network.

National coordination is guided by an annually-reviewed Country Strategy Paper (CSP) drawn up by the Coordinator and Hub Manager in consultation with stakeholders with whom they regularly network. A CSP identifies key issues, highlights regional linkages, proposes and prioritizes key actions, and seeks funding for these from STREAM and elsewhere (with STREAM support).

The STREAM Regional Office (at the NACA Secretariat in Bangkok) directs the Initiative, provides a regional coordination function, and funds and manages cross-cutting activities dealing with livelihoods, institutions, policy development and communications, the four results-based STREAM themes.

STREAM implementation is an iterative process, initially operating in Cambodia, the Philippines and Vietnam, and expanding within Asia-Pacific where opportunities exist to tackle poverty and promote good governance, as experience is gained, lessons are learned, impact is demonstrated and additional funding is secured. STREAM's communications strategy aims to increase impact by ensuring that existing knowledge and expertise inform ongoing change processes around the region, and that the lessons learned are disseminated throughout Asia-Pacific. The *STREAM Journal* and the STREAM website are components of this strategy.

### **STREAM National Communications Hub Managers**

Cambodia: Sem Viryak <cfdo@camnet.com.kh>

Philippines: Elizabeth Gonzales <streambfar-phil@skyinet.net>

Vietnam: Nguyen Song Ha <nguyensongha@fpt.vn>

---