

## TRAINING AND INFORMATION ACTIVITIES AND ACCOMPLISHMENTS OF THE SEAFDEC AQUACULTURE DEPARTMENT, 1988-1991

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One of the mandates of the SEAFDEC Aquaculture Department is the development of human resources and dissemination and exchange of information in aquaculture to promote the aquaculture industry in Southeast Asia. The Department receives trainees from SEAFDEC Member Countries (Thailand, Malaysia, Singapore) and other countries for short-term training programs. AQD also disseminates and exchanges information on aquaculture research and technology through symposia, seminars, workshops, video programs, and publications.

### **Training programs**

The training activities of SEAFDEC/AQD consist of degree and non-degree programs (Table 1). The collaboration with UNDP/FAO Network of Aquaculture Centres in Asia and the Pacific Region (NACA) and the University of the Philippines - Visayas (UPV) has graduated 18 participants in the one-year *Senior Aquaculturists Training Course*. The participants were granted the degree Master of Aquaculture by UPV.

The short-term (4-7 weeks) training courses regularly offered at present are: (1) Fish Nutrition, (2) Marine Fish Hatchery, (3) Fish Health Management, (4) Aquaculture Management, (5) Culture of Natural Food Organisms, and (6) Shrimp Hatchery/Nursery Operations. These courses are 80-90% practical or laboratory work and 10-20% lectures. A total of 429 government workers and aquaculture technicians [386 from Member Countries (Philippines, 287) and 43 from other countries] completed the 29 sessions of training courses offered by SEAFDEC/AQD from 1988 to 1991 (Table 1). This number includes those who trained in courses previously offered by the Department (Brackishwater Pond Culture, Freshwater Aquaculture, and *Artemia* Culture).

Beginning 1989, the training program of SEAFDEC/AQD focused on the priority courses identified at the *Seminar on Training Requirements in Fisheries and Aquaculture* held in Thailand in 1988. Also, the demand for training shifted from shrimp hatchery /culture to marine fish hatchery, fish health management, and fish nutrition. This was gauged from the number of training course

Table 1. Number of participants in training courses and seminars conducted by SEAFDEC/AQD in 1988-1991\*

Program	1988	1989	1990	1991	Total
NACA training		18			18
Short-term courses	144	116	83	86	429
Individual training					
Internship	59	43	17	21	140
Student					
Practicum	49	45	42	48	184
Seminars/workshops					
International	23			188	211
National	1,309	600	-	616	2,525
TOTAL	1,584	847	193	986	3,610

\* See Annex 1 for details

applications and industry feedback. The shift was partly caused by the collapse of the shrimp industry in 1988, renewing interest in fish culture and subsequently, hatchery production of fry. Shrimp hatchery operators in the Philippines requested SEAFDEC/AQD through the Regional Agricultural and Fishery Council (RAFC) Region VI to conduct training on milkfish fry production. In response, two training sessions on milkfish larval rearing were conducted in 1990 with funding support from the International Development Research Centre (IDRC) of Canada. This was attended by 17 participants: private shrimp hatchery operators and technicians (13) and Department of Agriculture extension workers (4).

The Department has been offering individual training (internship and student practicum). Internships in nutrition and feed development, chemical/proximate analyses, disease diagnosis, plankton culture, instrumentation, and other laboratory work are arranged for individuals or groups from SEAFDEC Member Countries. Practicum training is designed for graduating students in fisheries and related fields to satisfy the 400 hours requirement. It aims to provide students practical knowledge in aquaculture to supplement their theoretical orientation in school by assisting in ongoing research and verification studies at AQD. A total of 135 trainees from the national government and private sectors, and five from other countries underwent internship training at AQD. Also, 184 graduating students in fisheries and related fields from various schools took their practicum at AQD (Table 1).

Pursuant to the directive of the Philippine President to formulate a program for out-of-school youth to engage in productive endeavors during summer, 103 trainees availed of the Summer Youth Training Program implemented by AQD.

The International Seminar/Workshop on Teaching Strategies and Curriculum Development for Adult Learners funded by IDRC of Canada and the

Aquaculture Development in Southeast Asia (ADSEA '91) sponsored by SEAFDEC/AQD and the Government of Japan have been conducted by the Department. In addition, AQD conducts extension activities in the form of outreach/on-site seminars; a total of 2,525 local aquaculturists, technicians, and fish farmers have attended these seminars.

Table 2 shows the number of trainees from Member Countries and other countries and supporting agencies. SEAFDEC fellowship fund contributions from the Government of Japan have been granted to 150 participants from SEAFDEC Member Countries. Of the other supporting agencies, the Government of Netherlands supports the most number of participants from SEAFDEC Member Countries.

### Library, documentation, and publications

Library holdings as of 31 December 1991 consisted of 10,158 monographic volumes, 5,042 pamphlets, 2,359 SEAFDEC publications, and 3,634 journal volumes, which were accumulated from gifts and exchanges, purchases, and paid subscriptions. Readership at the Library averages eight readers per hour, mostly students, researchers, faculty members, and practitioners from other institutions.

The Brackishwater Aquaculture Information System (BRAIS) Project which started in 1984 with funding from IDRC of Canada was completed in 1989. Total database entries include over 5,000 bibliographic entries with abstracts on brackishwater aquaculture and related subjects, 47 institutions registry, and 202 scientists registry. The BRAIS networking activities include acquisitions of 4,308 materials from national centers in Indonesia, Malaysia, Thailand, and the Philippines.

The Southeast Asian Fisheries Information System (SEAFIS) Project of the SEAFDEC Secretariat has implemented some of its activities at AQD. These

Table 2. Number of participants in SEAFDEC/AQD short-term training courses by country of origin and sponsors (1988-1991)

Sponsors	MAL	PHIL	THAI	SING	Other*** countries	TOTAL
SEAFDEC*	40	72	46			158
IDRC	-	-	-	-	4	4
FAO	-	-	-	-	14	14
Netherlands	1	3	1	-	1	6
Other agencies**	-	2	4	-	9	15
Gov't/private inst.	4	212	-	1	15	232
Total	45	289	51	1	43	429

\* Fellowship fund contribution of the Government of Japan. \*\* USAID, CIDA, BADDC, ADB, and World Bank. \*\*\* See Annex 2 for details.

Table 3. SEAFDEC/AQD in-house publications (1988-1991)\*

	1988	1989	1990	1991	Total
Regular publications					
Asian Aquaculture (quarterly)	2	6	3	3	14
Aqua Farm News (bimonthly)	7	6	5	5	23
Aqua Dep't News (fortnightly)	21	25	24	21	91
BRAIS Newsletter**	3	2	-	-	5
Information Alert**	5	-	-	-	5
Annual Report	2		2	1	5
SUBTOTAL	40	39	34	30	143
Extension manuals***					
Extension pamphlets and leaflets	-	10	3	1	14
Monograph	-	3	14	1	18
Abstracts	-	-	2	1	3
Proceedings and compilations	3	4	1	-	8
Others					
Brochures and directories***	3	8	4	7	25
Video tapes	4	-	-	-	4
Posters	1	1	1	1	4
SUBTOTAL	11	9	7	9	36
<b>TOTAL</b>	<b>57</b>	<b>65</b>	<b>60</b>	<b>41</b>	<b>223</b>

\*List of 1988-1991 publications appears in Annex 3. \*\* Discontinued in 1989.

\*\*\*Includes reprinting.

**REFERENCES**

- Southeast Asian Fisheries Development Center. Aquaculture Department. Annual Reports (1988-1990). Tigbauan, Iloilo.
- Southeast Asian Fisheries Development Center. The Secretariat. 1988. Training Requirements in Fisheries and Aquaculture in Southeast Asia. Report of the Seminar Held in Hua Hin, Thailand, 29-30 March 1988. Bangkok. (SEC/RM/53)

## Annex 1. Number of participants in training courses and seminars, 1988-1991

	1988	1989	1990	1991	TOTAL
<b>Degree program</b>					
UNDP/FAO/NACA-UPV- SEAFDEC/AQD Senior Aquaculturists Training Course (Masters in Aquaculture)	-	18(1)*	-	-	18(1)*
<b>Short-term training courses</b>					
Brackishwater Pond Culture	45(2)	14(1)	-	-	59(3)
Freshwater Aquaculture	10(1)	-	-	-	10(1)
Prawn Hatchery	55(3)	41(2)	10(1)	17(1)	123(7)
Marine Finfish Hatchery	11(1)	18(1)	14(1)	16(1)	59(4)
Fish Health Management	8(1)	17(1)	17(1)	14(1)	56(4)
Fish Nutrition	-	14(1)	12(1)	12(1)	38(2)
Aquaculture Management	-	-	13(1)	14(1)	27(2)
<i>Artemia</i> Culture	15(1)	-	-	-	15(1)
Culture of Natural Food Organisms	-	12(1)	-	13(1)	25(2)
Milkfish Hatchery	-	-	17(2)	-	17(2)
<b>T O T A L</b>	<b>144(9)</b>	<b>116(7)</b>	<b>83(7)</b>	<b>86(6)</b>	<b>429(29)</b>
<b>Other training programs</b>					
Internship Training	59	43	17	21	140
Summer Youth Training	-	25	51	27	103
Practicum Training for Fisheries Students	49	45	42	48	184
<b>Seminars</b>					
<b>1. International</b>					
Workshop on Teaching Strategies and Curriculum Development for Adult Learners	23(1)				23(1)
Aquaculture Development in Southeast Asia (ADSEA)				188	188(1)
<b>2. National Outreach Seminars</b>					
Pond Culture and Management	35(1)				35(1)
Prawn Hatchery Operation and Management	50(1)		-	-	50(1)
Feed Development and Fish Nutrition				16(1)	16(1)
Freshwater Aquaculture	8(1)	-	-	-	8(1)
Outreach Seminars for local small-scale fish farmers	1200(28)	600(9)		616(10)	2416(47)
<i>Artemia</i> Workshop	16(1)	-	-	-	16(1)

\* Figures in parentheses indicate number of training courses and seminars conducted.

Annex 2. Number of participants in SEAFDEC/AQD short-term training courses by country of origin and sponsors, 1988-1991

	SEAF- DEC*	IDRC of Canada	FAO	Nether- lands	Other funding agencies	Other govern- ments or private org.	TOTAL
<b>Member Countries</b>							
Malaysia	40	-	-	1	-	4	45
Philippines	72	-	-	3	2	212	289
Thailand	46	-	-	1	4	-	51
Singapore	-	-	-	-	-	1	1
<b>Other Countries</b>							
Vietnam	-	-	6	-	-	-	6
Indonesia	-	1	3	1	2	-	7
India	-	-	-	-	2	1	3
Sri Lanka	-	2	-	-	3	6	11
Uganda	-	-	-	-	-	1	1
Nigeria	-	-	-	-	-	3	3
Tonga	-	-	2	-	-	-	2
Kiribati	-	-	1	-	-	-	1
Kenya	-	1	-	-	-	-	1
Papua New Guinea	-	-	2	-	-	-	2
United Arab Emirates	-	-	-	-	-	1	1
China	-	-	-	-	2	-	2
Mauritus	-	-	-	-	-	1	1
Yap State	-	-	-	-	-	1	1
Iran	-	-	-	-	-	1	1
<b>TOTAL</b>	<b>158</b>	<b>4</b>	<b>14</b>	<b>6</b>	<b>15</b>	<b>232</b>	<b>429</b>

\*Fellowship fund contribution of the Government of Japan.

Table 1. Number of private hatcheries and nurseries, by province

	1986	1987	1988
<u>Central region</u>			
1. Bangkok	-	1	1
2. Samut Prakan	6	-	-
3. Samut Sakhon	5	14	18
4. Samut Songkran	6	9	9
5. Phetchaburi	2	5	11
	19	29	39
<u>Eastern region</u>			
1. Chachoengsao	4	415	1,200
2. Chonburi	11	171	200
3. Rayong	4	10	19
4. Chanthaburi	6	3	14
	25	599	1,433
<u>Southern region</u>			
1. Prachuab Khirikhan	1	-	6
2. Surat Thani	1	-	15
3. Nakhon Si Thammarat	3	15	27
4. Songkhla	4	8	11
5. Krabi	-	1	1
6. Phangnga	-	3	6
7. Satun	-	2	2
8. Phuket	8	29	102
	17	58	170
<b>Total</b>	<b>61</b>	<b>686</b>	<b>1,642</b>

The hatcheries in Thailand can be divided into three main groups. The first includes hatcheries that produce only nauplii, located in two main parts of the country where natural broodstock of shrimp can be collected (Phuket in the south and Chonburi in the east). The nauplii are supplied to other hatcheries that nurse them until postlarval stage (PL5). The second group of hatcheries is the big group located throughout the country, especially in central Thailand (Chachoengsao, Chonburi, and Supanburi provinces). The third group comprises the nurseries that grow PL 5 up to PL 15-30 or to sizes that farmers order. Most of the shrimp hatcheries are developed for the giant freshwater prawn (*Macrobrachium rosenbergii*), small-scale, and operated by families.

The Department of Fisheries has surveyed the increasing number of shrimp hatcheries: 61 in 1986; 686 in 1987; 1,642 in 1988; and 2,000 in 1992 (Table 1). Seed production is estimated at 8-20 billion postlarvae per year, enough to meet the demand of shrimp farms in the country.

6. Proceedings and Compilations of AQD Research Publications (5)
  - 6.1 *Perspectives in Aquaculture Development in Southeast Asia and Japan* (1988)
  - 6.2 *Culture and Use of Algae in Southeast Asia* (1990)
  - 6.3 *Collected Reprints: Research Publications (1976-1986) Vol. 1A Finfishes; Vol. 1B Crustaceans and Bivalves* (2nd edition 1988)
  - 6.4 *Collected Reprints: Research Publications (1986-1991)*
- Posters (4)\*\*
  - 7.1 *Important Penaeid Prawns/Shrimps of the Philippines* (Poster No. 1, reprinted 1988)
  - 7.2 *Life Cycle of Prawn* (Poster No. 2, revised 1989)
  - 7.3 *Anatomy of Adult Penaeid Prawns/Shrimps* (1990)
8. Video Tapes (5)
  - 8.1 *Biology and Ecology of Penaeus monodon* (revised 1988)
  - 8.2 *Hatchery Production of Nursery Prawn Fry* (revised 1988)
  - 8.3 *Prawn Feed Preparation* (revised 1988)
  - 8.4 *Prawn Processing* (revised 1988)
  - 8.5 *Caring for Milkfish Larvae* (1992)
9. Brochures (25)\*\*
  - 9.1 *AQD Information Brochure*
  - 9.2 *SEAFDEC Brochure*
  - 9.3 *Aquaculture Training Program*
  - 9.4 *List of AQD Research Publications*
  - 9.5 *List of AQD Senior Staff*
  - 9.6 *Publication Catalogue*
  - 9.7 *Brochure on Business Opportunities in Aquaculture*
  - 9.8 *List of Publications and Video Tapes*
  - 9.9 *Personnel Profile*
10. Directories (2)
  - 10.1 *Directory of Brackishwater Aquaculture Scientists*
  - 10.2 *Directory of Brackishwater Aquaculture Institutions*
11. Monographs (4)
  - 11.1 *Biology and Culture of Siganiids*
  - 11.2 *Biology and Culture of Penaeus monodon*
  - 11.3 *Biology of Milkfish (Chanos chanos)*
  - 11.4 *Seaweeds of Panay*

\*Discontinued in 1989. \*\*Includes reprinting.

## Discussion

The technical issues discussed by the workshop participants include:

- Fish eggs: disposal program of AQD, monitoring survival
- Performance of pond-reared as against wild shrimp broodstock: nauplii production and size, spawning period
- Philippine Government support to NBBP
- Feeding trials for grow-out culture of shrimp; performance and cost of AQD formulated feeds as against commercial feeds
- Possibility of AQD commercially marketing and producing its feed formula. Constraints include limited AQD facilities and technical knowledge of small-scale fishermen, and bias towards large-scale feed millers. Organizing fishfarmers into cooperatives to produce their own feeds has been suggested.
- Soft-shelling in shrimp; blue shrimp
- Status and direction of AQD's seafarming project
- Need for more research for the development of fish broodstock: sex ratio; stocking density; number of eggs and spawning per season
- AQD's research on fry criteria: physiology or disease and survival correlation
- Research on locally-available feed ingredients: constancy in supply, possibility of tapping other government and non-government agencies
- Stocking density of shrimp in hatchery

Training gap noted:

- Technicians skilled in disease diagnosis