

**Southeast Asian Fisheries Development Center**

**Aquaculture Department**

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# Fisheries education and training in Asia

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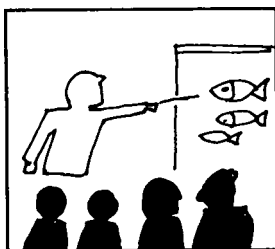
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# Fisheries education and training in Asia



**Historical development.** If one word were to embrace the education and training systems in Asia, it would be **diversity**.

Countries like Australia, India, Malaysia, Singapore, and Sri Lanka followed British educational traditions in view of their previous colonial ties. Malaysia recently changed the language of undergraduate education from English to Bahasa Malaysia while India went on to follow the American Land Grant Universities system. Indonesia did not adopt a Dutch system, using instead an American group of advisors, while the Philippines closely followed American university programs. Thailand had an American group reformulate the education programs in (*inter alia*) fisheries at Kasetsart University.

China began modest fisheries schools for two private companies in 1904 and 1906, and the first public fisheries schools after the 1911 revolution. Other countries developed their fisheries education after World War II. In Australia, it was in the form of courses for returned soldiers, but a fisheries degree was not offered until 1980. In India, two fisheries training courses began in 1945, but not until 1961 were national institutes established; university-level courses started in 1969. Before World War II, only extension courses were available in Indonesia. A "study program" of the Department of Agriculture in Indonesia started shortly after the country's independence in 1945. The University of Indonesia began two Departments of Fisheries (marine and inland) during 1960-62, which became the Faculty of Fisheries of Bogor Agricultural University in 1963. Now 16 universities in Indonesia offer fisheries degrees. In the Philippines, a postsecondary school of fisheries began in 1946. The Philippine Institute of Fisheries Technology under the Bureau of Fisheries was elevated to a college under the University of the Philippines in 1958, and began awarding the

B.S. degree. Since then, there was an explosion of Philippine institutions offering fisheries courses at various levels - 66 in 1986.

Other countries have even more recent histories of fisheries education. In Singapore, formal fisheries teaching began in 1962 with establishment of the Fisheries Biology Unit (FBU) which provided diploma/certificate courses until 1973. The Southeast Asian Fisheries Development Center (SEAFDEC) began training courses in 1970 and the Zoology Department - (now) National University of Singapore - offered fisheries subjects but not fisheries degrees. In Malaysia, fisheries training did not begin until 1959, in the form of short courses for fisheries officers; fisheries schools for fishermen began the next year. By 1974, diploma-level courses were available and by 1979, B.S. courses. Sri Lanka is the most recent addition: a department of fisheries biology began in 1987, but fisheries degrees are not offered.

**Courses.** At present, Ph.D. degrees in fisheries are offered in China (1 institution), India (10), Indonesia (1), Japan (9), Malaysia (1), and Taiwan (2). Other countries have institutions with M.S. level degrees: 14 in Japan, and 2 each in the Philippines and Thailand. Institutions in other countries offering B.S. as their highest level include 3 in India, 15 in Indonesia, 7 in Thailand, and 32 in the Philippines. Australia offers only diploma and bachelor's programs. Many diploma/certificate courses are available in India and the Philippines; 1 in Australia; several in Indonesia; and 8 in Malaysia. Courses for extension workers are available at six training centers in Malaysia, one in India, and one in Taiwan. The Philippines offers extension courses at government centers but these seem to be for farmers rather than extension workers themselves. In-service training is widespread in nearly all countries. The institutions offering these courses range from universities to vocational high schools.

**Facilities.** One indication of the state of commitment by a country to fisheries education

## **B.S. Fisheries**

*Minimum requirements for a 4-yr program in the Philippines*

I. **General Education:** Botany and Zoology (6 units), Mathematics (9), Statistics (3), Physics (6), Chemistry (10), Pilipino (6), English and Speech (12), Spanish (12), Humanities/Philippine Institution (6), and Social Science (6).

### II. Major:

A. Inland Fisheries. Freshwater Aquaculture (5), Brackishwater Aquaculture (5), Fishpond Construction (5), Fish Diseases (5), Fish Feeds and Feeding (5), Pond Management and Fertilization (4), Fish Physiology (4), General Fisheries (3), Ecology of Fishes (3), Inland Fisheries Management (3), Ichthyology (5), Aquatic Invertebrates (3), Fisheries Economics (3), Fisheries Extension (3), Fisheries Marketing (3), and Electives (10).

B. Marine Fisheries. Fisheries Gear Design and Construction (5), Biological Oceanography (3), Fisheries Economics (3), Marine Ecology (3), Navigation and Seamanship (10), Marine Fisheries Management (3), Marine Machineries (3), Offshore and Coastal Fisheries (5), Fishing Boat Management (5), Marine Instrumentation (5), Fisheries Extension (3), Fishing Boat Construction and Design (4), Electives (10).

C. Fish Processing. Fish Processing (10), Fish Handling and Refrigeration (5), Fish Microbiology (5), Fish Chemistry (5), Fisheries Economics (3), Food Processing Plant Management (5), Fisheries Extension (3), Fisheries Marketing (3), Quality Control (5), Fish Processing Machinery and Appliances (5), Electives (10).

III. **Practicum:** 120 hours.

*'Tis education forms the common mind,  
Just as the twig is bent, the tree's inclined.*

*- Alexander Pope*

is the number of training vessels, since these are major capital items to acquire and maintain. Australia and the Philippines each have one, Indonesia has three, Malaysia 10, and Japan 12, while India has 20. Thailand educational institutions support one and also use space on naval and SEAFDEC vessels.

In general, the state of the various training facilities is said to be adequate in Australia, Malaysia, and Thailand; good in India (except for the lack of field equipment in "traditional" universities) and in Japan; and poor in Indonesia (literature rather than practical degrees), the Philippines (including insufficient faculty and poor laboratory and fisheries equipment), and Taiwan.

**Manpower.** There is little information at the national level on the number of teachers or

faculty. The annual numbers of fisheries students range from 30 in Sri Lanka to 5,000 in China. Indonesia has some 4,000 students and 340 teachers in the 11 public universities. In Malaysia, 64 faculty members are involved in teaching fisheries-related subjects at three universities. Only one university offers fisheries degrees, with some 68 diploma and B.S. graduates and one or two M.S. and Ph.D. awardees each year. Staff-student ratios appear good in Indonesia (1 in 12) and Malaysia (1 in 6).

India provided figures from an extensive manpower requirements study, which showed that some 180,000 persons would be required for the sector as a whole over the next ten years.

Indonesia needs some 9,600 fisheries technicians and 10,750 extension workers.

Graduates from the universities can probably be absorbed as technicians, but there is no indication of where all the extension workers will come from.

**Employment.** The rate of subsequent employment is a good guide to the usefulness of a course. Few data on this subject are available. In Thailand, the information on university graduates is interesting: about 50% of aquaculture graduates find employment, 20% of fisheries technologists, and 8% of fisheries biologists. Some 110 (22/year) fisheries graduates are needed in Malaysia between 1986 and 1990, suggesting that there is an oversupply (68/year) at present. If Kitasato University is a good guide to the Japanese situation, university graduates are highly employable in a wide variety of industries.

**Weaknesses.** The state of education in Australia seems to be adequate while in India it is said to be quite satisfactory, apart from some lack of management skills of graduates and a declining quality of students. Indonesian universities all suffer from lack of practical training. The main problems in Malaysia are the lack of tertiary specialization into fisheries or aquaculture or management, the poor quality of students, and lack of subprofessional training for, e.g., fish farm workers. In the Philippines, there are too many substandard schools, with poor student quality in secondary and postsecondary schools; there are also poor curricula and text books, as well as a lack of practical training in aquaculture. Taiwan colleges suffer from too many narrow courses and insufficiently trained teaching staff. Fisheries students in Thailand need more practical knowledge; lack of access to international literature is also a problem.

It should be mentioned that the available literature on fisheries education is also very poor. Few studies of relevance have been made. UNESCO is the major producer in the field but most of its efforts are directed towards marine science rather than fisheries *per se*.

Neither is there evidence of any ongoing commitment by any agency to improve fisheries education in the region, although interest in the broad subject area may be increasing.

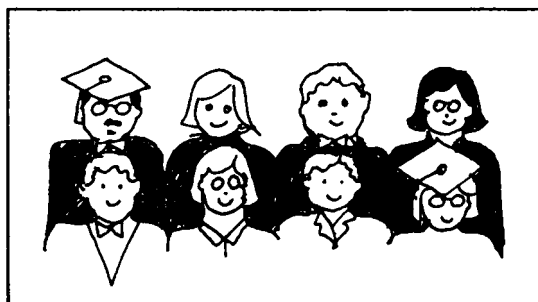
**The Future.** Lack of demand inhibits further development of fisheries education in

Australia, Malaysia, and Singapore. In India, the basic need is for modernization and diversification to keep up with modern technology. Malaysia needs a manpower requirements survey, textbooks in Bahasa Malaysia, screening of students, and a review of tertiary programs. The Philippines has already made a plan to streamline the whole fisheries education sector, pruning the number of institutions and revising curricula. Taiwan sees the need to provide more practical training and to improve both curricula and textbooks; another laudable goal is to encourage professional pride! Malaysia echoes the sentiment. In Thailand, there may be a need for more vocational training as well as providing more access to the international fisheries "scene" through visiting scientists, overseas travel and international literature.

Those countries not presently following the American system will probably all move towards that system at the postgraduate level, requiring students to undertake specific courses in addition to the research component which is the only requirement, e.g., the British system for the doctorate degree. The American system also allows much more flexibility in career path.

In India, manpower needs will depend on whether a fisheries degree is made mandatory for various posts in government positions. This could also be the situation in future in other countries. Upgrading the necessary qualifications for key positions would stabilize the demand for graduates.

Sources: (1) Maclean, J.L. 1988. An overview of fisheries education and training in Asia, p. 12-16; and (2) Juliano, R.O. and E.E.C. Flores. 1988. *Fisheries education and training in the Philippines*, p. 86-113. In *Fisheries Education and Training in Asia: Workshop Proceedings*. Asian Fish. Soc. Spec. Publ. 2, 162 p. Asian Fisheries Society, Manila, Philippines.



## Courses of Action

The root problem of establishing or strengthening fisheries education systems must be addressed. There must also be political will to improve the industry; improvement of fisheries education systems should be seen as part of overall national efforts to promote the industry.

The following are recommended:

### 1) Development of a policy which incorporates fisheries education and training into fisheries manpower development strategies.

This can be achieved by:

- determining the quantity, type, and level of manpower required for fisheries development over a fixed period in accordance with national economic development plans;
- incorporating the different levels of fisheries education into the mainstream of education in order to provide a broader and more balanced education.

### 2) A comprehensive and regular review of fisheries education programs in line with development trends of the fisheries industries.

This could be achieved by:

- strengthening vocational level training at the postprimary/elementary level to provide appropriate training with hands-on experience for skilled labor needed in the industries;
- strengthening technical education at the postsecondary level to provide appropriate training for professional skilled fishermen, fish farmers, and fish processors, and instructors for vocational institutions. This should include a balanced instruction of theory and practice;
- strengthening fisheries education and training programs at university level to provide appropriate education and training for extension workers, research scientists, technicians, instructors, and administrators. This should include a review and restructuring of:
  - undergraduate fisheries programs with specialization in fisheries manage-

ment, aquaculture, fish processing, fisheries economics, and fisheries extension;

- fisheries science programs at the post-graduate level to improve the capability of fisheries science graduates in helping the industries to resolve technical problems;
- organizing subregional workshops to discuss complementarity in curriculum development and educational materials.

### 3) Upgrading existing fisheries training capability in Asia.

- sufficient financial support is essential to improve national training capability in terms of facilities, operation and staff salary scales;
- education and training institutions should have adequate training facilities and staff and should endeavor to attract better quality students; for example, by offering more scholarships;
- the region needs relevant fisheries textbooks and references appropriate for Asia; the writing and translation of fisheries textbooks and other training materials is urged.

### 4) Promotion or strengthening of a network of fisheries educational institutions with areas of excellence in fisheries science.

This could be attained by establishing a consortium of fisheries institutions to provide opportunities for exchange of professional staff, graduate program complementarity, and collaboration on research and training activities.

### 5) Stronger linkage and cooperation among fisheries professionals in government, universities, and private institutions involved in training, research, and development.

### 6) Taking steps to improve the image of the fisheries profession and the professional status of fisheries personnel.

Source: Asian Fisheries Society. 1988. Workshop statement of fisheries education and training in Asia. p. 1-6. *In Fisheries Education and Training in Asia: Workshop Proceedings*. Asian Fish. Soc. Spec. Publ. 2, 162 p. Asian Fisheries Society, Manila, Philippines.