Faculty of Fisheries Indonesia

EDUCATION PPROGRAM AT FACULTY OF FISHERIES INSTITUT PERTANIAN BOGOR, INDONESIA1)

by
Ismudi Muchsin 2)
Rokhmin Dahuri 3)
and
Kadarwan Suwardi 4)

I. HISTORICAL BACKGROUND

Bogor Agricultural University (in Indonesia it is called Institut Pertanian Bogor, IPB) constitutes the continuation of higher education in agriculture and veterinary medicine which was initiated long before World War II. In 1940 these two schools merged to form the College of Agriculture (Landbouw Hogeschool) that was temporarily closed during the Japanese occupation. In 1946/1947 this college was reopened under the name of Faculty of Agriculture (Faculteit voor Landbouwwestenshappen)

After the Independence of Indonesia in 1945, the above two schools became Faculty of Agriculture in 1950 and Faculty of Veterinary Medicine in 1954 under University of Indonesia (UI). Meanwhile, a continuous endeavour to establish Faculty of Fisheries under UI had been launched since 1953/1954. In 1960/1961 a study program of Marine Fisheries was then formed under Faculty of Veterinary Medicine, Animal Husbandry and

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2) Dr. Ir. Ismudi Muchsin is currently the Dean of Faculty of Fisheries, Bogor Agricultural University (BAU), Bogor, Indonesia.

3) Dr. Ir. Rokhmin Dahuri is Faculty Member of Faculty of Fisheries, BAU.

4) Dr. Ir. Kadarwan Suwardi is Vice Dean of Academic Affairs, Faculty of Fisheries, BAU.

Marine Fisheries of UI. One year later, a study program of Inland Fisheries was also established under Faculty of Agriculture of UI.

On 1 September 1963, Bogor Agricultural University (IPB) with its five faculties (Agriculture, Veterinary Medicine, Fisheries, Animal Husbandry, and Forestry) was split from UI through the Decree of the Minister for Higher Education, Government of Indonesia No. 91/1963. It also means that it is the first Faculty of Fisehries founded in Indonesia. On 30 October 1964 the Faculty for Agricultural Mechanisation and Product Technology was formed to become the sixth faculty of IPB.

Up to the present Faculty of Fisheries is one of eight faculties of Bogor Agricultural University. Other seven faculties include the faculties of Agriculture, Veterinary Medicine, Animal Husbandry, Forestry, Agricultural Technology, Mathematics and Science, and Graduate Studies.

In the early stages of its development, lecturers of Faculty of Fisheries were derived from Inland Fisheries Research Institute, Marine Fisheries Research Institute, National Agency for Biology (LBN-LIPI), National Institute for Oceanology (LON-LIPI), and the Directorate General of Fisheries. Then, in 1964 Faculty of Fisheries graduated its first graduates. Many of the alumni were recruited to become faculty member (lecturer) and were sent to study abroad, particularly to United States and Japan to obtain Master or Ph.D degree in various Fisheries sciences and technology. Faculty of Fisheries also recruited

lecturers from Faculty of Science of Gajah Mada University (UGM) and of Bandung Institute of Technology (ITB). Until the beginning of 1970's, Faculty of Fisheries had very limited laboratory facilities. Students at that time made their laboratory works and experiments in laboratories of Inland Fisheries Research Institute and Marine Fisheries Research Institute which were located in Bogor and Jakarta respectively.

II. ACADEMIC PROGRAM

2.1. Undergraduate Program (Sarjana or BSc.)

2.1.1. Basic Philosophy and Goal

Faculty of Fisheries (FOF), IPB has a strong commitment to establish a center for Indonesian community development through fisheries development in an holistic term which is implemented through the triple function of the Indonesian higher eduction, namely: education, research and community services. FOF aims to implement such a triple function toward an efficient development and conservation of fisheries resources including their ecosystems on a sustainable basis in the interest of humanity and society both at the present and in the future.

In terms of education, FOF aims to provide education to its students to be a fisheries graduate who possesses ability, skill and expertise to work with and develop fisheries sciences and technology in accordance with Indonesian development needs for human welfare.

2.1.2. Study Programs

To achieve the above goals, since 1985 FOF has offered 5 study programs, namely Aquatic Resource Management (ARM), Aquaculture (AQ), Fisheries Resource Utilization (FRU), Fisheries Product Processing (FPP), and Fisheries Social-Economics (FSE). Then, in 1988 a study program of Marine Science and Technology (MST) has been formed to be the sixth study program under the FOF.

The role of each study program in a fisheries development system, particularly for the Indonesian context, as well as their linkages is presented in Figure 1. The ARM study program plays the role in providing education and training to its students in the assessment and evaluation of aquatic ecosystems including their embodied fisheries (living) resources for fisheries development purposes in the form of aquaculture, capture fisheries (fishing), or conservation (protected areas). The information concerning the potential of fisheries resources within a certain area (aquatic ecosystem) and their possible uses (whether for aquaculture, capture fisheries, or conservation purposes) based upon such assessment and evaluation is the basis for fisheries development.

The science and technology to carry out research and development in aquaculture and capture fisheries are offered by AQ and FRU study programs respectively. In the meantime, MST study program focuses its curriculum for the assessment, evaluation and exploration of only marine ecosystems including

their fisheries resources for three fisheries development purposes: aquaculture, capture fisheries, and conservation. The science and technology in establishing the conservation of fisheries resources and their ecosystems (e.g. marine protected areas) are provided by ARM study program.

Furthermore, the science and technology for the handling and processesing of fisheries products produced through aquaculture and capture fisheries are offered by the FPP study program. Marketing and business aspects of fisheries products as well as social, economic and cultural analyses of fishermen and consumer communities are provided by the FSE study program.

Environmental impacts of other development activities as well as fisheries development activities on the aquatic ecosystems could be learnt within ARM or FSE study programs.

2.1.3. Curriculum and Courses

In line with the academic program of IPB, FOF offers B.Sc. (S-1) program in four years or eight semester. The first two semesters are conducted by IPB (Directorate of Undergraduate Program). All students are obliged to take 14 courses during these two semesters. Courses offered in semester-1 and semester-2 by IPB are described as follows.

Semester-1 and Semester-2:
Mathematics I (3)[1]

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[1] The number in brackets indicates the number of credits for the respective courses.

Mathematics II (3)
Basic Chemistry I (3)
Basic Chemistry II (3)
Introductory Economics (3)
Basic Physics (3)
Introduction to Agricultural Sciences (1)
Religion (2)
Biology (3)
Pancasila (2)
Basic Military Defence (2)
Indonesian Language (2)
English (3)
Rural Sociology (3)

From semester-3 to semester-8, all courses and related academic activities (e.g. laboratory works and field research) are carried out and organized by FOF. In the third semester all students again are provided with the same courses as follows.

Semester-3:

IKN 201 Introduction to Fisheries Science (3)
MSP 211 Aquatic Invertebrate (3)
MSP 231 Aquatic Resource Ecology I (4)
MSP 232 Ichthyology (4)
SEP 211 Introduction to Fisheries Development (3)
STK 211 Statistical Methods I (3).

Starting in semester-4, students have already been allocated to six study programs with FOF according to the student's choice and the capacity of each study program. Courses offered by each study program are described in Appendices 1 to 6.

2.2. Graduate Program

Apart from undergraduate program, FOF also offers a graduate program (M.Sc. and Ph.D. levels) in aquatic sciences which is jointly organized by FOF and the Faculty of Graduate Studies, IPB.

The graduate program at IPB was established in 1976. The program, at that time, emphasized in the Master of Science (S2) program. Doctoral (Ph.D) program was then opened in 1978, and the Aquatic Sciences study program has been offered since 1981.

This study program provides the foundation for basic and apllied sciences oriented toward aquatic productivity as well as the application of ecological principles in the management of living aquatic resources. It offers three areas of interests in understanding, developing and applying aquatic sciences, namely:

(1) Aquatic Resource Management: ecological principles in aquatic productivity, stability, and interactions of biotic-abiotic components of aquatic ecosystems.

(2) Aquaculture: principles of adaptations and growth of aquatic organisms, and the application of sicences and technology in aquaculture production systems.

(3) Fisheries resource management: principles of population dynamics, equilibrium, and stability of aquatic communities in the management of fisheries resources.

Courses offered by the aquatic science study program is listed in Appendix 7.

2.3. Admission and Tuition Fees

2.3.1. Undergraduate program

Candidates of FOF students are graduates from Senior High School in natural sciences and mathematics study programs. The candidate should pass a selection test or have high academic

performance during their study at Senior High School (15 % top rank of their cohort/batch).

Success in completing undergraduate program at FOF is predicted on the basis of the student's transcript of grades obtaining during semester-1 and semester-2 under IPB. Applicants are to submit a written request for application forms. This request should be directed to the Academic Program of FOF.

2.3.2. Master program

Candidates are BSc. holders in natural (biological) sciences, aquatic sciences, fisheries, and related field of studies. They should have 2.75 grade point average (on 0 - 4 scale).

2.3.3. Ph.D. program

Candidates are M.Sc. holders in biological sciences, aquatic sciences, fisheries, and related fields of study. They should have 3.5 grade point average (on 0 - 4 scale). M.Sc. holders with grade point average of less than 3.5 may be accepted if supported by recommendations from qualified professors or they have published adequate scientific papers.

2.3.4. Foreign students

Foreign students may be admitted to the FOF provided that

they master the Indonesian language and after they have fulfilled all admission requirements and submitted special permits from the Minister of Education and Culture, Republic of Indonesia. Up to the present, foreign students who have enroled in and graduated from FOF are coming from Malaysia.

Tuition fees for foreign students in undergarduate program is about US $ 1,000 per year and about US $ 2,500 is for graduate program. Costs of living in Bogor is about US $ 3,000 for undergraduate students and about US $ 3,000 - 5,000 is for graduate students. Research costs, depending on the topics and the nature of research works, for the completion of the thesis usually ranges from Us $ 500 to 2,500.

The total student enrolment at FOF is currently about 950 students. The capacity of FOF to admit students is of some 230 students per year.

III. RESEARCH AND COOPERATION PROGRAMS

To support the other two functions of Higher Education (education and community services), FOF continuously carries out research activities in various aspects of fisheries sciences and technology. Research activities of FOF frequently supported by both national and international agencies.

Cooperation programs of FOF with national agencies, among others, involve Directorate General of Fisheries, Marine Fisheries Research Institute, State Ministry for Population and the Environment, Department of Public Works, Department of

Transmigration, and National Agency for Planning and Development (Bappenas). International cooperation programs have also been conducted since the early development of FOF, among others, involving: USAID, IDRC, JICA and JSPS, CIDA, ADB, and the World Bank. Cooperation programs with both national and international agencies can be in the form of research, education, training, laboratory and infrastructure development, or community services.

IV. ACADEMIC AND RESEARCH FACILITIES

In order to house all academic and research activities, FOF is equipped with administration building and classrooms, laboratory, and experimental ponds. The main administration building of FOF is currently located at IPB campus of Darmaga, about 10 km to the west of Bogor City, West Java. This main building is three storey building and each level has an area of 1,000 m^2. It is used mainly for administrative offices, offices of the Dean and its vices, offices of faculty members, and seminar rooms. Another three storey building with a total area of about 2,800 m^2, which is located 1 km from the main building, is provided for classrooms.

FOF has a two storey building located about 200 m from the main building which is used for a variety of laboratory works, such as limnology, ichthiology, aquatic invertebrate, fish nutrition, fish parasitology, water quality, and fish handling and processing. The total area of this building is about 1,770 m^2. In addition, an aquaculture complex consisting of a 1,400 m^2

for laboratory and 10,000 m^2 experimental ponds is also belong to the FOF. The location of such facilities is about 2 km from the main building.

Besides the above facilities, FOF has a laboratory for marine sciences (about 800 m^2) which is located on the coast of Jakarta Bay, Jakarta, about 60 km from Bogor city. A field station, which is situated in Pelabuhan Ratu beach about 75 km form Bogor, has been under construction and will be completed by the end of next year. The total area of this field station is about 30,000 m_2.

In accordance with IPB's development master plan, starting next year FOF will build an integrated building consisting of four levels with a total area about 35,000 m^2. This building will be used for administrative offices, classrooms, seminar rooms, laboratories, offices for faculty members, etc. Adjacent to the building, a complex of experimental ponds (7,000 m) will also be developed for FOF research activities. The fund for the development of this building will be derived from the loan agreement through the OECF.

V. LINKAGES

In conducting the education program, FOF has both national and international linkages, among others, are with the following agencies.

(1) Directorate General of Fisheries (DGF), Department of Agriculture and its components, such as Brackishwater

Development Center at Jepara, Central Java; Mariculture Development Center in Lampung; and The Agency of Vocational Capture Fisheries at Tegal, Central Java.

(2) The Agency of Agricultural Research and Development (AARD), Department of Agriculture and its components, like Research Institute of Freshwater Fisheries, Bogor, West Java; Research Institute of Coastal Aquaculture, Maros, South Sulawesi; and Research Institute of Marine Fisheries, Jakarta.

(3) National Institute of Oceanology, Indonesian Institute of Science (LIPI), Jakarta.

(4) Tropical Biology Rersearch Center (Biotrop) of SEAMEO, Bogor.

(5) Private Fisheries Companies, such as PT. Usaha Mina Ltd., Jakarta; and Brackishwater Shrimp Culture Project at Karawang, West Java.

(6) Tokyo University of Fisheries, Japan.

(7) Kagoshima University, Japan.

(8) University of Michigan, USA.

(9) Institut National Polytechnique, Toulouse , France.

Appendix 1. Courses of Aquatic Resource Management Study Program

Semester-4:
IKN 202 Basic Processing and Analysis of Fisheries Data (3)
MSP 212 Basic Limnology (3)
MSP 221 Introduction to Oceanography (3)
MSP 233 Marine Biology (3)
MSP 234 Physiology of Aquatic Animals (3)
MSP 241 Fisheries Biology (3)
STK 212 Statistical Methods II (3)

Semester-5:
BDP 311 Introduction to Aquaculture (2)
MSP 311 Planktonology (3)
MSP 324 Marine Meteorology (3)
MSP 332 Tropical Marine Ecology (3)
MSP 341 Statistical Sampling Methods (3)
MSP 342 Fisheries Resource I (3)
MSP 346 Population Dynamics (3)

Semester-6:
MSP 312 Aquatic Productivity (3)
MSP 322 Dynamical Oceanography (3)
MSP 331 Aquatic Resource Ecology II (3)
MSP 343 Fisheries Resource II (3)
MSP 344 Stock Assessment (3)
MSP 345 Fundamentals of Fisheries Management (2)
PSP 212 Fishing Methods (3)

Semester-7:
MSP 411 Freshwater Resource Management (3)
MSP 421 Applied Oceanography (3)
MSP 422 Marine Resource Management (3)
MSP 431 Conservation of Aquatic Living Resources (3)
MSP 432 Quantitative Ecology (3)
MSP 441 Marine Fisheries Resource Management (3)
MSP 442 Inland Fisheries Resource Management (3)

Semester-8:
MSP 401 Community Services (4)
MSP 402 Field Works (4)
MSP 403 Seminar (1)
MSP 404 Thesis (6)

Appendix 2. Courses of Marine Science and Technology Study Program

Semester-4:
GFM 222 Advanced Physics (3)
IKN 202 Basic Processing and Analysis of Fisheries Data (3)
MAT 323 Differential Equations (3)
MSP 221 Introduction to Oceanography (3)
MSP 233 Marine Biology (3)
MSP 241 Fisheries Biology (3)
STK 212 Statistical Methods II (3)

Semester-5:
GFM 326 Electronics (3)
IKN 301 Introduction to Marine Science and Technology (2)
MSP 321 Hydrodynamics (2)
MSP 324 Marine Meteorology (3)
MSP 332 Tropical Marine Ecology (3)
MSP 346 Population Dynamics (3)
PSP 314 Fisheries Resource Utilization Technology (4)

Semester-6:
IKN 302 Scuba Diving (2)
IKN 303 Interpretation of Remote Sensing Data (3)
MSP 323 Physical Oceanography (3)
PSP 311 Fish Behaviour (3)
PSP 325 Marine Instrumentation (3)
PSP 326 Introductory Acuostics (3)
SEP 345 Law of the Sea (3)

Semester-7:
IKN 401 Marine Telemetry (3)
MSP 423 Fisheries Oceanography (3)
MSP 443 Marine Ecosystem Simulation and Modelling (3)
PSP 412 Practical Works (2)
PSP 422 Marine Acoustics (3)
PSP 434 Marine Living Resource Exploration (4)

Semester-8:
IKN 402 Community Services (4)
IKN 403 Field Works (4)
IKN 404 Seminar (1)
IKN 405 Thesis (6)

Appendix 3. Courses of Aquaculture Study Program

Semester-4:
BDP 211 Practical Aquaculture (3)
BDP 251 Aquatic Chemistry (3)
BIK 210 Introductory Biochemistry (3)
MEP 431A Hydrology for Aquaculture (3)
MSP 212 Basic Limnology (3)
MSP 221 Introduction to Oceanography
MSP 234 Physiology of Aquatic Animals

Semester-5:
BDP 312 Basic Aquaculture (4)
BDP 313 Aquacultural Engineering (4)
BDP 331 Aquaculture of Natural Foods (3)
BDP 351 Biology and Control of Aquatic Pollution (3)
BIO 231 Basic Microbiology (3)
MSP 311 Planktonology

Semester-6:
BDP 321 Fish Breeding (3)
BDP 332 Fish Nutrition (4)
BDP 341 Fish Parasitology (3)
BDP 352 Water Quality Management (3)
MSP 312 Aquatic Productivity (3)
SEP 212 Fisheries Economics (3)
STK 331 Experimental Designs (3)

Semester-7:
BDP 411 Freshwater Aquaculture (4)
BDP 412 Marine Aquaculture (4)
BDP 413 Aquaculture Development (4)
BDP 421 Hatchery Management (2)
BDP 442 Fish Diseases (3)

Semester-8:
BDP 401 Community Services (4)
BDP 402 Field Works (4)
BDP 403 Seminar (1)
BDP 404 Thesis (6)

Appendix 4. Courses of Fisheries Resource Utilization Study Program

Semester-4:

IKN 202 Basic Processing and Analysis of Fisheries Data (3)
MSP 221 Introduction to Oceanography (3)
MSP 241 Fisheries Biology (3)
STK 212 Statistical Methods II (3)
PSP 211 Fishing Gear Materials (3)
PSP 212 Fishing Methods (3)

Semester-5:

PSP 311 Fish Behaviour (3)
PSP 312 Fishing Technology (3)
PSP 321 Fishing Boats (4)
PSP 322 Navigation I (3)
PSP 331 Fisheries Harbors (3)
PSP 332 Introductory System Analysis in Fisheries Resource Utilization (2)

Semester-6:

MSP 233 Marine Biology (3)
MSP 322 Dynamical Oceanography (3)
SEP 331 Introduction to Fisheries Business (3)
PSP 313 Design and Engineering of Fishing Gears (3)
PSP 323 Navigation II (3)
PSP 324 Maritime (4)
PHP 231 Fisheries Product Handling (3)

Semester-7:

PSP 405 Seminar on Fisheries Resource Utilization (3)
PSP 411 Practical Work on Fisheries Resource Utilization (3)
PSP 421 Fishing Instrumentation (3)
PSP 431 Fishing Grounds (4)
PSP 432 Fishing Operations (3)
PSP 433 Computer Applications in Fisheries Resource Utilization (3)

Semester-8:

PSP 401 Community Services (4)
PSP 402 Field Works (4)
PSP 403 Seminar (1)
PSP 404 Thesis (6)

Appendix 5. Courses of Fisheries Product Processing

Semester-4:
BIK 210 Basic Biochemistry (3)
IKN 202 Basic Processing and Analysis of Fisheries Data (3)
MSP 234 Physiology of Aquatic Animals (3)
PHP 231 Fisheries Product Handling (3)
PHP 233 Basic Fisheries Product Technology (3)
PHP 241 Raw Materials of Fisheries Product Industries (2)
PSP 212 Fishing Methods (3)

Semester-5:
PHP 311 Biochemistry of Fisheries Products (3)
PHP 312 Nutrition from Fisheries Products (3)
PHP 341 Fisheries Product Refrigeration (3)
PHP 342 Processing Technology of Fisheries Products (3)
BIO 231 Basic Microbiology (3)
PHP 344 Industrial Chemistry of Fisheries Products (3)
BDP 311 Introduction to Aquaculture (2)

Semester-6:
PHP 313 Quality Control of Fisheries Products I (3)
PHP 321 Microbiology of Seafood (3)
PHP 322 Thermal Processes of Fisheries Products (3)
PHP 331 Traditional Fisheries Product Processing (3)
PHP 332 Processing of By Products and Product Improvements (3)
PHP 343 Management of Laboratory for Fisheries Product Industries (3)
STK 331 Experimental Designs (3)

Semester-7:
PHP 413 Quality Control of Fisheries Products II (3)
PHP 421 Toxicology, Sanitation and Hygine (3)
PHP 431 Seminar on the Development of Fisheries Product Technology (2)
PHP 441 Layout and Handling of Raw Materials of Fisheries Products (3)
PHP 442 Planning of Fisheries Product Industries (3)
PHP 443 Computer Applications in Fisheries Product Industries (3)

Semester-8:
PHP 401 Community Services (4)
PHP 402 Field Works (4)
PHP 403 Seminar (1)
PHP 404 Thesis (6)

Appendix 6. Courses of Fisheries Social-Economics Study Program

Semester-4:

IKN 202 Basic Processing and Analysis of Fisheries Data (3)
MSP 241 Fisheries Biology (3)
PHP 232 Introduction to Fisheries Product Technology (2)
PSP 211 Fishing Gear Materials (3)
PSP 212 Fishing Methods (3)
SEP 212 Fisheries Economics (3)
STK 212 Statistical Methods II (3)

Semester-5:

BDP 311 Introduction to Aquaculture (2)
SEP 311 Basic Accounting (3)
SEP 322 Fisheries Extension (3)
SEP 324 Credits and Banking Systems (2)
SEP 341 Fisheries Law and Regulations (3)
SEP 242* Microeconomic Theory (3)
SEP 344 Fisheries Data Systems (3)

Semester-6:

SEP 308* Demography (3)
SEP 321 Fisheries Co-operation (3)
SEP 323 Fisheries Sociology (3)
SEP 332 Fisheries Product Business (4)
SEP 342 Fisheries Resource Economics (3)
SEP 343 Basic Econometrics (3)
SEP 243* Macroeconomic Theory (3)

Semester-7:

SEP 411 Management of Fisheries Business (4)
SEP 412 Policy of Fisheries Enterprises (3)
SEP 421 Methods of Social Research (3)
SEP 431 Marketing Management and Strategy (3)
SEP 441 Project Evaluation Techniques (3)
SEP 442 Fisheries Development Policy (3)

Semester-8:

SEP 401 Community Services (4)
SEP 402 Field Works (4)
SEP 403 Seminar (1)
SEP 404 Thesis (6)

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* Courses offered by Agricultural Social-Economics of Faculty of Agriculture, IPB

Appendix 7. Courses of M.Sc. Program in Aquatic Sciences

Semester-1:
STK 511 Statistical Analysis (3)
AIR 511 Aquatic Ecosystem (3)
AIR 512 Ecosystem Dynamics (3)
AIR 513 Biology of Fish Population (3)

Semester-2:
AGR 590 Research Methodology (3)
Elective
Elective
Elective

Semester-3:
AIR 601 Colloquium (1)
AIR 698 Research (0)
Elective
Elective

Semester-4:
PPS 690 Seminar (1)
AIR 699 Reserach and Thesis (6)

Electives

1. Aquatic Resource Management
AIR 521 Aquatic Productivity (3)
AIR 522 Aquatic Pollution (3)
AIR 523 Aquatic Resource Management (3)
AIR 613 Eutrophication (3)
AIR 632 Biology of Wastewater (3)
AIR 633 Hydrodynamics of Aquatic Ecosystems (3)

2. Aquaculture
AIR 541 Aquaculture Systems (3)
AIR 542 Fish Nutrition (3)
AIR 543 Reproductive Biology of Aquatic Animals (3)
AIR 651 Water Quality Management (3)
AIR 652 Fish Health Management (3)
AIR 653 Fish Genetics (3)

3. Fishery Resource Management
AIR 561 Fish Stock Assessment (3)
AIR 562 Fisheries Resource Management (3)
AIR 563 Conservation and Habitat Rehabilitation (3)
AIR 671 Fisheries Models and Simulation (3)
AIR 672 Numerical Classification (3)
AIR 673 Fish Ecophysiology (3)

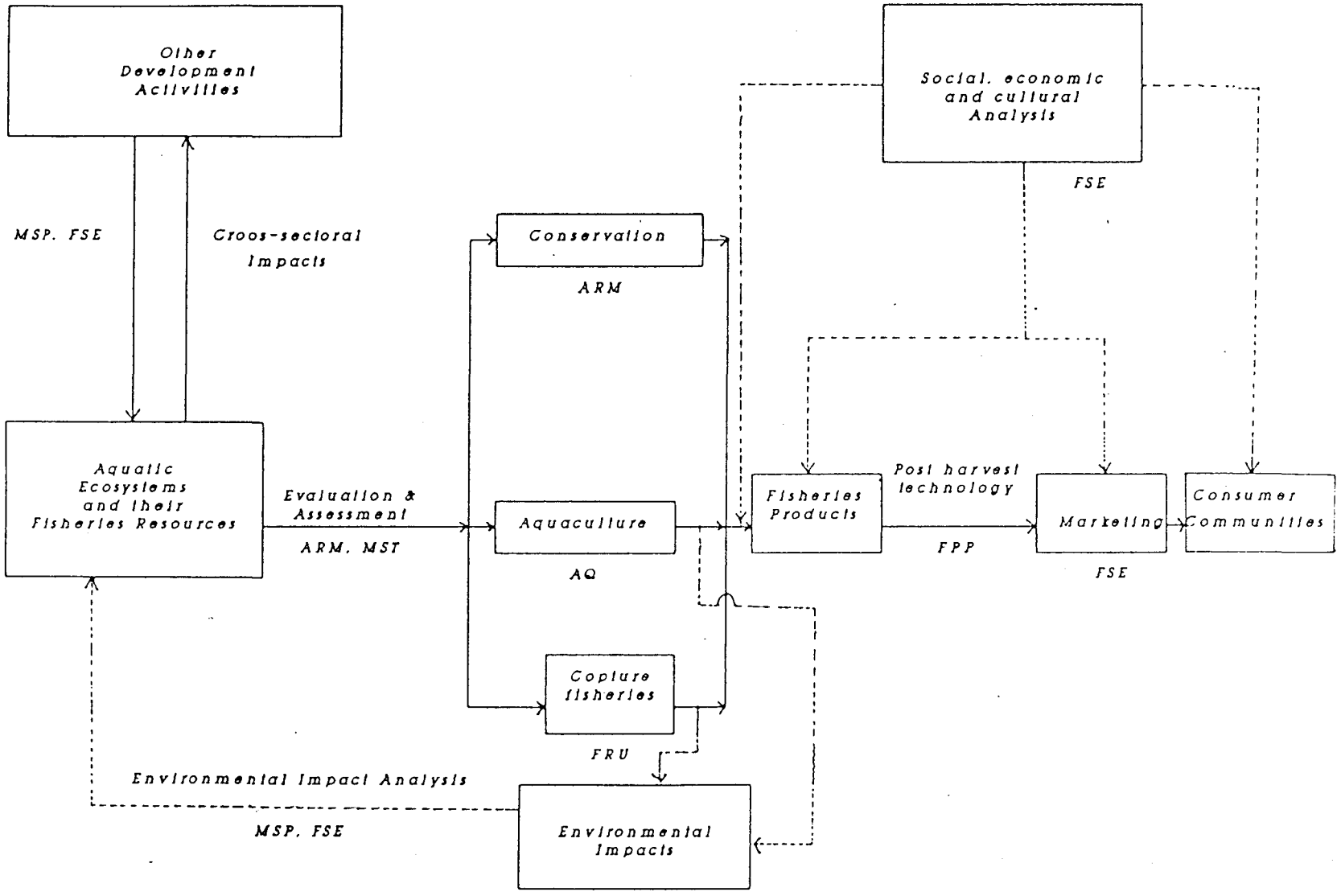

Figure 1. The Role of Study Programs in Fisheries Development Systems and Their Linkages.