

## Indonesia

# Bogor Agricultural University (IPB) Development Project

Report Date: November, 2002

Field Survey: September, 2001

## 1. Project Profile and Japan's ODA Loan



Location Map of the Project



IPB Central Administration Office

### 1.1. Background

The agricultural sector was one of the most important industries in Indonesia, with a 23.4% share of GDP in 1987. The government's Five-Year National Development Plan (1988-93), called Repelita V, forecasted that the share would be 21.6% in 1993, and the sector would continue to employ more than 50% of the total labor force in Indonesia.

Bogor Agricultural University (IPB), a national university, had played an important role as a leading institute in educational and research activities. In 1988, IPB had a total of 9,158 students and a teaching staff of 1,025 on five campuses. The number of students and faculty had steadily increased owing to rising demand for educated human resources in the agricultural sector, and the number was predicted to increase in the future.

However, it became difficult for IPB to keep pace with the increasing number of students, owing to its limited capacity. In order to cope with the situation, IPB developed the Second Master Plan of IPB, through which it aimed (i) to improve quality of the curriculum and teaching staff, and (ii) to expand the physical space of the university by relocating educational facilities to the newly developed campus of Darmaga. The plan was implemented starting in 1981. However, only the initial part had been realized, and further promotion of the plan was needed.

Under the plan, the Faculty of Fisheries and the Faculty of Animal Husbandry<sup>1</sup> were given priority in light of the national development goals to acquire foreign currency by export, and to improve the nutritional level of the people. Thus, the demand for researchers and scientists in these fields was more urgent.

### 1.2. Objectives

To upgrade the institutional capabilities of IPB in quality and quantity in order to accommodate the

<sup>1</sup> Currently, the Faculty of Fisheries and the Faculty of Animal Husbandry are respectively called the Faculty of Fishery and Marine Science, and the Faculty of Animal Science.

increasing number of students and academic staff, and thereby contribute to agricultural development in Indonesia.

### 1.3. Project Scope

This project involves the Faculty of Fisheries, the Faculty of Animal Husbandry and the Central Administrative Office. The project consists of the following 4 components and consulting services:

- (1) Construction of buildings for the above stated facilities;
- (2) Supply and installation of equipment and furniture to these buildings;
- (3) Establishment of a fellowship program for IPB staff at the Faculty of Fisheries and the Faculty of Animal Husbandry; and
- (4) Technical assistance for collaborative research and selection/utilization of equipment for the Faculty of Fisheries and the Faculty of Animal Husbandry

### 1.4. Borrower/Executing Agency

The Government of the Republic of Indonesia/ Directorate General of Higher Education (DGHE), Ministry of Education and Culture

### 1.5. Outline of Loan Agreement

Loan Amount	6,946 mil. Yen
Loan Disbursed Amount	6,128 mil. Yen
Date of Exchange of Notes	Dec. 1989
Loan Agreement	Dec. 1989
Terms and Conditions	
Interest Rate	2.5%
Repayment Period (Grace Period)	30 Years (10 Years)
Procurement	General Untied (Partially Untied for Consulting Services)
Final Disbursement Date	Dec. 1995

## 2. Results and Evaluation

### 2.1. Relevance

Indonesia is well known as an agricultural country; by 1999, agricultural land covered 47.0 million hectares, or 72.5% of the total national land area.

At the time of appraisal (1988), the agricultural sector was expected to shift rapidly from traditional to modern methods as the country industrialized. In order for the agricultural sector to collaborate closely with secondary and tertiary industry in the future, for example, it was necessary to improve the quality of agricultural products, to establish a marketing system, and to take measurements against environmental problems. Human resource development for researchers and scientists was viewed as indispensable to support this transformation of agricultural sector, and in 1975 the Ministry of Agriculture projected the number of researchers and scientists needed in the sector as follows.

**Table 1: Prospective Needs for Researchers and Scientists in Agricultural Sector, 1975~2000**

Year	Agricultural Researchers		Agricultural Scientists	
	Available	Needed	Available	Needed
1975	900	2,500	5,700	15,972
1985	-	7,416	-	48,444
2000	-	39,000	-	249,917

Source: Ministry of Agriculture

As Table 1 indicates, only 36% of required researchers and scientists were available in 1975; by the year 2000, this number was expected to increase 15 times. Thus, quantitative and qualitative development of higher educational institutes for the agricultural sector was a priority of the Government of Indonesia at the time. The objective of this project was therefore relevant.

Currently, the agricultural sector's contribution to GDP has declined to approximately 17%, although about 45% of the entire working population still remains in this sector. According to IPB, the number of researchers and scientists in the sector is still insufficient. Accordingly, the current national development plan emphasizes human resource development to meet the increasing demand for researchers and scientists. Therefore, the project objective is still relevant to educational policy in the nation and to the needs in the agricultural sector.

## 2.2. Efficiency

### 2.2.1 Project Scope

During the planning of detailed design, the original scope was modified slightly. The faculty buildings were expanded and construction of an academic events plaza and a gymnasium was added. As a result, the total floor area was expanded from 90,209m<sup>2</sup> to 96,653m<sup>2</sup>. This scope modification was the result of savings accrued during implementation from the depreciation of the Indonesian currency. This additional construction work is considered adequate in order to meet the demands of students and academic staff of IPB.

### 2.2.2 Implementation Schedule

Construction was originally scheduled for completion over a period of 23 months, but this was extended to 44 months because of the additional construction work described above. The start of construction work was lagged for 16 months due to a delay in the tendering process, and in the end the Project completed in 1996, 29 month behind the schedule<sup>2</sup>.

### 2.2.3 Project Cost

The total project cost was originally estimated at 8,172 million Yen, 85% of which (6,946 million Yen) was to be financed by ODA loan from Japan. The actual total project cost was 6,495 million Yen (of which 6,128 million Yen was financed by the ODA loan), representing a reduction of approximately 21% (approximately 12% cost under-run for Japan's ODA loan portion). This cost under-run was attributed to the depreciation of the Rupiah against the Yen<sup>3</sup>. At the time of appraisal, 28% of construction costs was to be covered by foreign currency, but in actuality, the entire amount was covered by local currency<sup>4</sup>. Therefore, the

<sup>2</sup> All the additional construction work was completed in July 1996, though the newly constructed Central Administration Office and buildings in the Faculty of Fisheries and the Faculty of Animal Husbandry were already open in September 1995.

<sup>3</sup> The exchange rate shifted from 1 Rupiah = 0.078 Yen in 1989 to 0.042 Yen in 1995.

<sup>4</sup> At the time of appraisal, certain materials were not available in the local market and had to be imported from Japan. Owing to improvements in local market conditions, however, by the time of implementation, most materials could be procured in the local

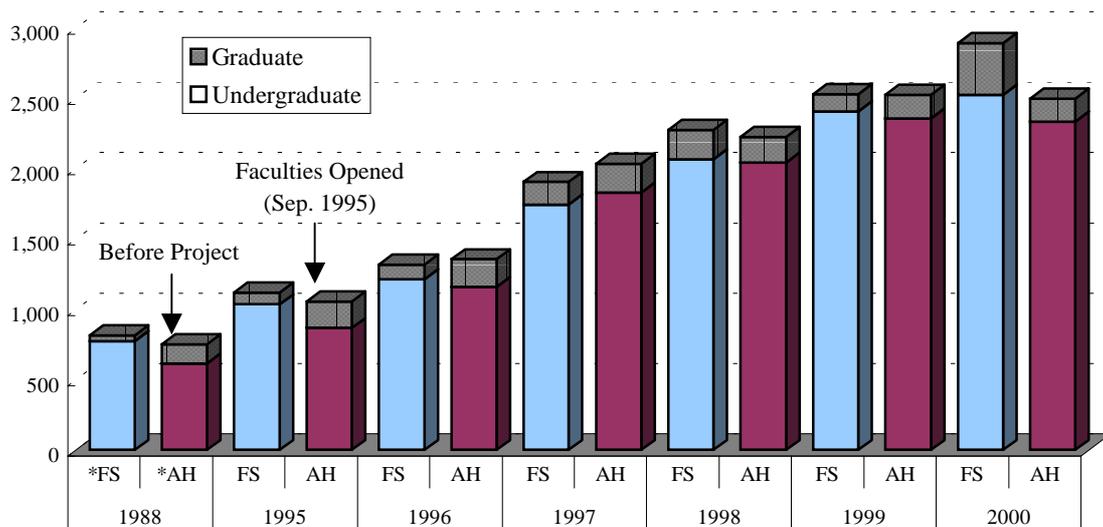
construction cost was significantly reduced in terms of Yen currency, and the savings were used for additional construction. Despite the additional construction, the total project cost remained within the range of the original estimate.

## 2.3. Effectiveness

### 2.3.1 The number of students

The number of students in the faculties has steadily increased, reflecting the rise in the demand for the researchers and scientists in Agriculture and Fisheries sectors. In 1988, there was a total of 816 students in the Faculty of Fisheries and 752 students in the Faculty of Animal Husbandry. At the time of appraisal, these figures were expected to increase to 2,137 and 1,825, respectively, by the year 2000. Figure 1 illustrates the jump in student numbers after the opening of the new faculty building (September 1995). By 2000, the Faculty of Fisheries had 2,895 students and the Faculty of Animal Husbandry had 2,500 students, surpassing the target numbers set for each faculty by about 35%.

**Figure 1: The No. of Students in the Faculty of Fisheries and the Faculty of Animal Husbandry 1988~2000**



\* FS = Faculty of Fisheries, AH = Faculty of Animal Husbandry

Source: IPB

### 2.3.2 Quality of teaching staff

#### (1) Effects of technical assistance and fellowship program of the Project

During project implementation, a total of 26 Japanese experts were invited to the Faculty of Fisheries and the Faculty of Animal Husbandry to provide technical assistance. They gave the academic staff members instruction on how to use equipment introduced under the Project and demonstrated ways in which the

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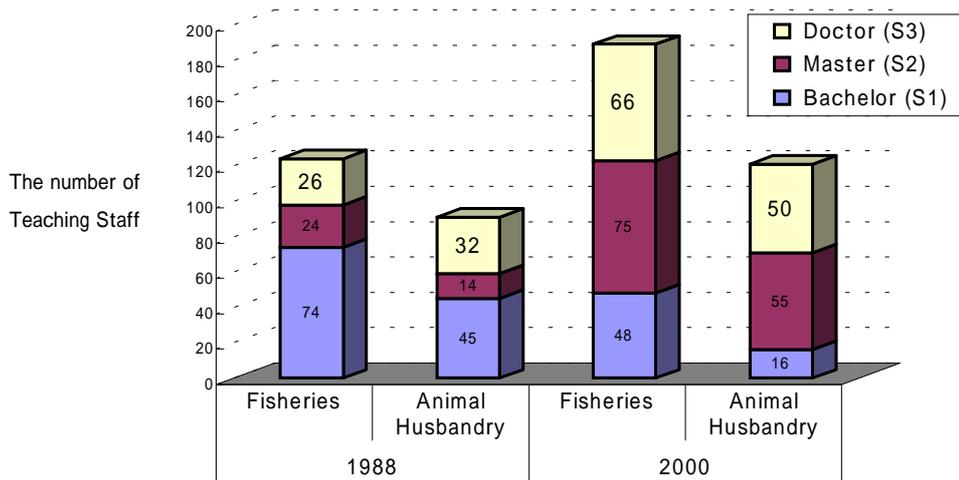
market.

equipment could be used in research collaboration. According to the Faculty of Fisheries and the Faculty of Animal Husbandry, this technical assistance, particularly regarding collaborative research, expanded the research capability of each faculty and contributed to educational improvement. In addition, 6 academic staff members from each faculty participated in fellowship programs, traveling abroad to study in master's or doctoral degree programs in related fields of study for a period of one to two years. Those who received fellowships are now instructing on the use of advanced equipment and are taking initiative in developing new fields of research, thereby improving the overall quality of the teaching staff.

(2) Academic qualification of teaching staff

Figure 2 shows the academic qualifications of the teaching staff in 1988 and in 2000. The proportion of teaching staff with post-graduate degrees in the two faculties increased significantly after the project completion -- from 43% to 75% in the Faculty of Fisheries and from 51% to 87% in the Faculty of Animal Husbandry. Therefore, it can be said that IPB successfully improved the quality of its teaching staff.

**Figure 2: Academic Qualification of Teaching Staff in the Two Faculties in 1988 and 2000**



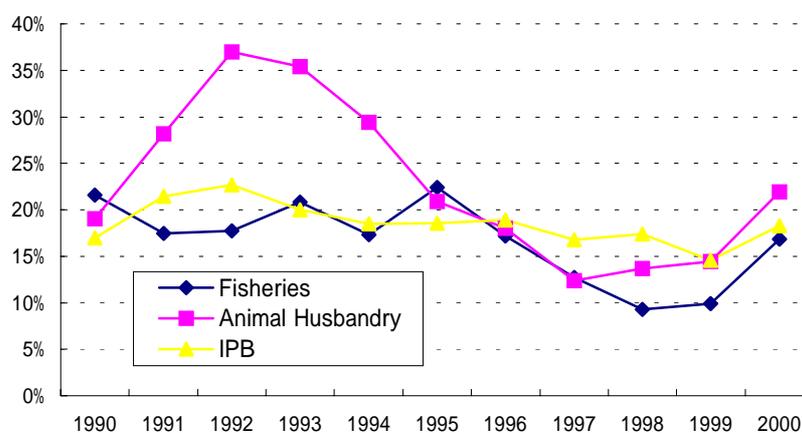
Source: IPB

**2.3.3 Internal Efficiency**

Figure 3 illustrates internal efficiency<sup>5</sup> in the Faculty of Fisheries and the Faculty of Animal Husbandry, compared to the IPB average, between 1992 and 2000. The internal efficiency in both faculties significantly decreased after 1996 owing to the increase in the number of students enrolled owing to opening of new faculty buildings (September 1995) as shown in Figure 1. However, the rate recovered to IPB's average in 2000, first graduation year after the massive increase in enrollment.

<sup>5</sup> Internal Efficiency (%) = The number of graduates / the number of the total students registered at that time (excluding graduate students)

**Figure 3: Internal Efficiency in the Two Faculties 1992- 2000**



Source: IPB

## 2.4. Impact

### 2.4.1 Impact on Agricultural Sector

This section examines the extent to which the project achieved its ultimate goal: enhancing IPB's contributions to the agricultural sector.

#### (1) Employment of IPB graduates

IPB has provided human resources to both the public and private sectors. At the time of appraisal, almost half of IPB graduates were employed in government agencies. However, IPB predicted by 1988 that the major field of employment would shift from the public to the private sector, reflecting the increase in demand for educated human resources in the private sector at the time. In 2000, IPB conducted a survey on the field of employment selected by 1,000 new graduates. The results are shown in the table below.

**Table 2: Prospective and Actual Field of Employment of IPB Graduates (%)**

Field of Employment	Actual Figure in 1988	Prospects for 2000	Actual Figure in 2000
Government Agencies	44	30	20
Higher Education	20	20	5
Research Institutes	10	5	10
Private Sector	26	45	53
Others	---	---	12

Source: IPB

As predicted by IPB, the major field of employment shifted from government agencies to the private sector over a period of 12 years. During that time, in order to respond to new labor market demands, IPB started a polytechnic program in both the Faculty of Fisheries (1996) and the Faculty of Animal Husbandry (1994). Also the Faculty of Fisheries created its Marine Sciences and Technology program in 1999, in an effort to adjust its curriculum to student requests and to the actual demands of the labor market. IPB has effectively provided human resources to the agricultural sector in response to demand. It is worth mentioning that the expansion of laboratory facilities and equipment under the Project helped both faculties develop a more effective curriculum.

## (2) Contribution to the sector

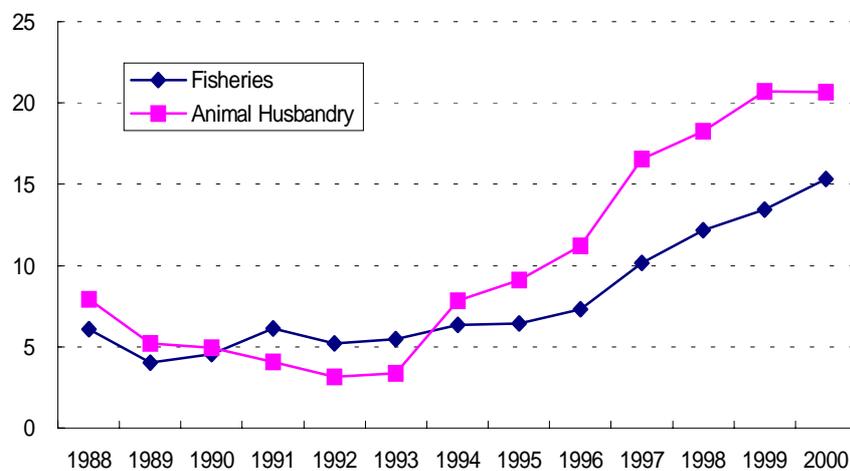
Experts from IPB have participated actively in research activities, making contributions to the various agricultural fields. For instance, IPB played an important role in assisting the agricultural sector during the Economic Crisis of 1997 by introducing new kinds of rice and fertilizer, which boosted the production of various food crops. Among other examples of IPB's direct contributions to the sector are a mass production project developed by IPB students, which has now become a national project supported by the Government, and collaborative research under the Project on the potential uses of native Indonesian grass that contributed greatly to the development of feed resources for cattle and swamp buffalo in Indonesia.

### 2.4.2 Impact on Student-Faculty Ratio

The student-faculty ratios in the Faculty of Fisheries and the Faculty of Animal Husbandry are illustrated in Figure 4. The ratios increased from 6 and 8, respectively, to 15 and 21, between 1988 and 2000. The actual number in 2000 for each school exceeded the target level of 9 students set at the time of appraisal.

The number of students per faculty member in both schools increased significantly after 1995, due to the significant increase in student numbers, as illustrated in Figure 1. While increases in the teaching staff at the Faculty of Fisheries and the Faculty of Animal Husbandry are 41% and 27%, respectively, over the previous 12 years, the student number at both schools rose 255% and 232%, respectively. This was because growth of the teaching staff was limited by the government's "Zero Growth Policy"<sup>6</sup> which restrained the IPB from hiring more faculties. Therefore, IPB focused on improving teaching quality, rather than increasing numbers.

**Figure4: Student-Faculty Ratio in the Two Faculties, 1988~2000**



Source: IPB

## 2.5. Sustainability

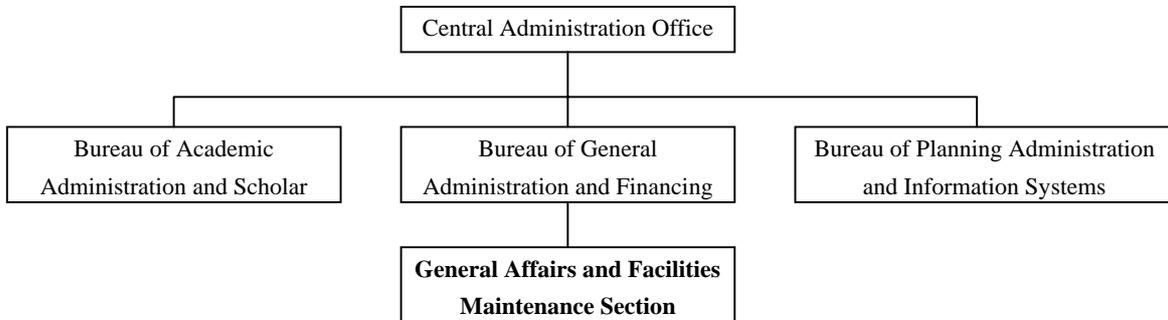
### 2.5.1 Organizational Structure and Technical Capability

IPB has a Central Administration Office and 7 faculties under a rector. The Central Administration Office has three bureaus. Maintenance of general equipment and facilities (including building maintenance) of the

<sup>6</sup> The purpose of the policy is to enhance the efficiency of personnel in the public sector, including national universities, by restricting to increasing the number of government employees.

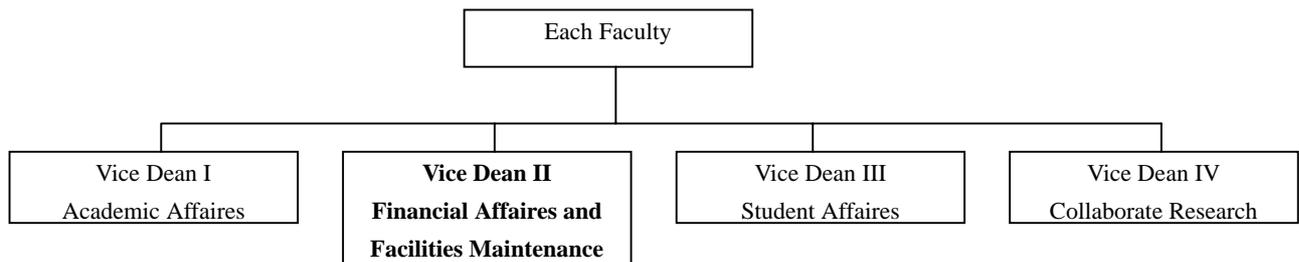
Central Administration Office is handled by the General Affairs and Facilities Maintenance Section under the Bureau of General Administration and Financing (refer to Figure 5).

**Figure 5: Organizational Chart of the Central Administration Office**



For the maintenance of general equipment and facilities (including building maintenance) in each faculty, the Financial Affairs and Facilities Maintenance Section supervised by Vice Dean II has responsibility for maintaining general equipment and facilities (refer to Figure 6).

**Figure 6: Organizational Chart of Each Faculty**



Maintenance of laboratory instruments and other special equipment and facilities is the responsibility of each faculty. For instance, the Faculty of Animal Husbandry has its own workshop to maintain its special instruments. The Faculty of Fisheries does not have a workshop, but equipment is maintained by the laboratories that use it. Each faculty has highly skilled experts, in particular the academic staff members who received fellowships can operate and maintain advanced laboratory instruments. When equipment cannot be repaired by the staff of IPB, it is usually sent to local suppliers.

### 2.5.2 Current Condition of Facilities

IPB conducted an inventory on the physical status of equipment and furniture in 2000, including that procured under the Project<sup>7</sup>. In the inventory, 1,912 pieces of equipment and 3,754 pieces of furniture installed in the Central Administration Office were inspected and approximately 97% of those were rated good. There was no available inventory data regarding the Faculty of Fisheries and the Faculty of Animal Husbandry, but, according to both faculties, equipment and furniture procured under the Project are currently in good condition and are well maintained so far. However, there is a problem in the buildings of each faculty, particularly a leak in the roof. According to IPB, the roof cracked during the earthquake in 1996 and since then, a leak in the roof has been recognized in the 4th and 5th floors of each faculty building. At the time of the earthquake, leakage was not a serious problem, but has since become serious because budgetary constraints have prevented IPB

<sup>7</sup> There was no distinction between equipment/furniture procured under the Project and those procured by its own fund of IPB.

from repairing the roof. IPB has recognized the problem and is determined to repair the roof as soon as funding can be secured.

### 2.5.3 Financial Status

IPB has three different revenue sources: DIP (National Development Budget), DIK (National Routine Budget) and DIKS (IPB's own fund). DIP and DIK come from the Government, while DIKS consists of tuition, donations from the community and project management fees<sup>8</sup>. DIP is used for construction of new facilities and rehabilitation of facilities that require more than routine maintenance, and it includes foreign aid and loans. DIK is used for operation and routine maintenance of the university. The annual budget and expenditures of IPB between 1995 and 2000 are shown in Table 3.

Approximately 70% of the IPB's budget between 1995 and 2000 came from the Government. Since the Asian currency crisis of 1997, most national universities, including IPB, have received smaller national budget allocations (particularly DIK) in terms of real value because of the financial difficulties of the Government (refer to Figure 7). This is partly due to a shift in government priorities from higher to basic education; in 2001, there was a 56% increase in budget allocations to primary education and a reduction of 26% in higher education funding. For higher education, the Government expects the private sector to help provide educational opportunities, and is planning to encourage better management to public universities instead of increasing budget allocation to them.

**Table 3: Annual Budget and Expenditures of IPB, 1995~2000**

Unit: Million Rupiah

	1995		1996		1997		1998		1999*		2000	
<b>Budget</b>												
1. DIP	323	46%	332	42%	653	52%	873	56%	2,353	63%	824	49%
2. DIK	162	22%	171	22%	227	18%	249	16%	324	9%	303	18%
3. DIKS	224	32%	282	36%	379	30%	436	28%	1,059	28%	560	33%
Total	709	100%	785	100%	1,259	100%	1,558	100%	3,736	100%	1,687	100%
<b>Expenditures</b>												
Operation**	650	95%	702	95%	1,196	98%	1,488	98%	3,627	99%	1,531	99%
Maintenance	36	5%	36	5%	30	2%	26	2%	21	1%	18	1%
Total	686	100%	738	100%	1,226	100%	1,514	100%	3,648	100%	1,549	100%

\*An increase in 1999's DIP is due to that the follow-on project, "Bogor Agricultural University Development Project II" has been implemented since 1995, and the ODA loan for the Project II was distributed to IPB as DIP. This budget was used for the project implementation (expansion and construction of buildings and facilities).

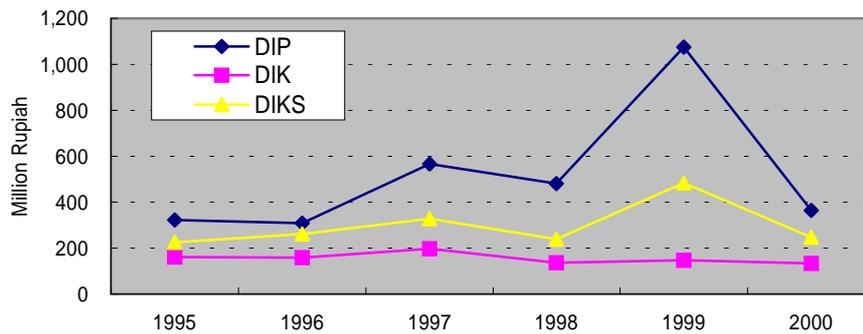
\*\*OPERATION includes investment activities, such as construction and expansion of facilities.

Source: IPB

IPB's operation and maintenance budget (DIK) decreased steadily since 1997 in terms of 1995 prices.

<sup>8</sup> Project management fees consist of revenue from collaborate research projects with private institutes.

**Figure 7: Annual Budget of IPB, 1995~2000 in 1995 Constant Price**



Source: IPB

Since its budget is limited, approximately 97% of the IPB's total expenditures have been allocated to operations and expansion of facilities, and approximately 3% of the total budget goes for maintenance. This proportion is the same for each faculty. According to IPB, a minimum of 10,000 Rp./m<sup>2</sup> is required annually for adequate building maintenance, but each faculty can only provide 100 Rp./m<sup>2</sup>. This situation has prevented IPB from conducting proper maintenance of buildings and facilities.

#### 2.5.4 Sustainability of the Project

IPB is one of the top-level agricultural universities in Indonesia and has contributed to both the public and the private sector by providing high-quality human resources and technical assistance. For the purpose of quality improvement of education, IPB has adopted a management system to provide incentives to the faculties for better performance. In that system, every member of the teaching staff is evaluated by the head of each faculty, and each faculty gives rewards and penalties according to the staff's achievements, in order to enhance the quality of the teaching staff. As a result, both the Government and the agricultural sector have confidence in IPB as a leading institute in the agricultural field.

However, as described above, IPB is having difficulty in maintaining its buildings and facilities due to finances. Since IPB, as a government service unit, had limited autonomy and had to comply with prevailing regulations, it was difficult to increase DIKS and build its own operation and maintenance budget. For example, the regulations limited IPB to raising tuition and collaborating with the private sector. However, in December 2000, the Government enacted the Autonomy Law<sup>9</sup>, PP154 (Badan Hukum Milik Negara), in order to promote management efficiency at national universities. This law gave IPB the opportunity to open its facilities to the private sector and conduct collaborative research with private institutes, and thereby generate its own revenue. IPB is now trying to increase the DIKS proportion of its total budget to 70~75% by utilizing its physical and human resources and cooperating with the private sector. IPB is focusing particularly on developing research programs in cooperation with private institutes and acquiring patents for new agricultural products and technologies. In fact, IPB has already acquired 34 patents for various agricultural products and technologies over the past two years.

IPB is now shifting from being a government-aided university to an autonomous university. It will be a challenge for IPB to improve management efficiency, including both financial and human resource management. The sustainability of the project objective, to provide quality education to a large number of students, depends very much on IPB's ability to mobilize funds.

<sup>9</sup> The Autonomy Law is to devolve management control authority from the central authority to the individual institution.

### **3. Recommendations**

It is recommendable for IPB to repair damages of the buildings as soon as possible, so as to minimize the damage and to save the maintenance costs in a long run.

### Comparison of Original and Actual Scope

Items/Activities	Original Scope (At time of Appraisal)	Revision/Modification
<b>I. Project Scope</b>		
1. Construction of buildings:		
- Faculty of Fisheries	Total floor area: 37,575 m <sup>2</sup> - School building: 36,995 m <sup>2</sup> - Field laboratories, etc.: 580 m <sup>2</sup>	38,971 m <sup>2</sup> - 38,277 m <sup>2</sup> - 694 m <sup>2</sup>
- Faculty of Animal Husbandry	Total floor area: 39,434 m <sup>2</sup> - School building: 28,814 m <sup>2</sup> - Field laboratories, etc.: 10,620 m <sup>2</sup>	41,846 m <sup>2</sup> - 35,530 m <sup>2</sup> - 6,316 m <sup>2</sup>
- Central administration office	Total floor area: 13,200 m <sup>2</sup>	15,836 m <sup>2</sup>
2. Supply of equipment and furniture:		
- Faculty of Fisheries	Equipment: 588 items Furniture: 51 items	- 314 items + 7 items of spare parts - 43 items
- Faculty of Animal Husbandry	Equipment: 320 items Furniture: 64 items	- 228 items + 12 items of spare parts - 47 items
- Central administration office	Equipment: 11 items Furniture: 11 items	- 6 items + 1 item of spare parts - 64 items
3. Fellowship program for IPB:		
- Faculty of Fisheries	M.A.: 2 Doctor: 2 Short term training: 1	- 4 - 2 - 0
- Faculty of Animal Husbandry	M.A.: 0 Doctor: 3 Short term training: 5	- 3 - 3 - 0
4. Technical assistance programs:		
- Effective selection of equipment	- 6 persons/3M/M	- 8 persons/4M/M
- Advice on equipment utilization	- 6 persons/9M/M	- 8 persons/8M/M
- Assistance in collaborative researches	- 10 persons/30M/M - Total: 22 persons/42M/M	- 10 persons/30M/M - Total: 26 persons/42M/M
5. Consulting Services	- 398M/M	- 520M/M
<b>II. Implementation Period</b>		
1. Procurement of equipment:		
- Tendering	Sep. 1991 to June 1992	Dec. 1992 to Oct. 1993
- Implementation	July 1992 to Dec. 1993	Nov. 1993 to Aug. 1995
2. Construction of buildings:		
- Tendering	Sep. 1990 to June 1991	Dec. 1991 to Dec. 1992
- Implementation	July 1991 to June 1993	Nov. 1992 to July 1996
3. Procurement of furniture:		
- Tendering	Nov. 1992 to Apr. 1993	Dec. 1992 to Oct. 1993
- Implementation	May 1993 to Aug. 1993	Nov. 1993 to Mar. 1995
4. Fellowship program:		
- Preparation and Implementation	July 1989 to Aug. 1994	Oct. 1989 to Mar. 1996
5. Technical assistance programs		
	Apr. 1990 to May 1990 Mar. 1994 to Aug. 1994	May 7, 1991 to May 22, 1991 Dec. 12, 1994 to Jan. 10, 1995 Nov. 21, 1994 to Dec. 12, 1995
6. Consulting Services:	July 1989 to Aug. 1993	May 1990 to Apr. 1996
<b>III. Project Cost</b>		
Foreign currency	2,688 mil. Yen	965 mil. Yen
Local currency	75,123mil. Rp. (5,484 mil. Yen)	106,346mil. Rp. (5,530mil. Yen)
Total	8,172mil. Yen	6,495mil. Yen
ODA loan portion	6,946mil. Yen	6,128mil. Yen
Exchange Rate	1 Rp. = ¥ 0.073 (Apr. 1989)	1 Rp. = ¥ 0.052 (weighted average during project implementation)

**Independent Evaluator's Opinion on  
Borgor Agricultural University (IPB) Development Project**

Mohamad Ikhsan  
Researcher, Institute for Economic and Social Research Faculty of  
Economics University of Indonesia

Considering a relatively high agriculture share in both production and demand in the Indonesian economy, this project is considered very relevant. More specifically, economic transformation in one economy will also be taking place not only across sectors (for example, from agricultural sector to manufacture or service sector) but also within the sector (for example, from traditional agriculture including staple food production to value-added agriculture including poultry).

Considering both the demand and supply sides, Indonesian agricultural sector, particularly poultry has potential to grow at least to match income growth, but inadequate productivity has made this sector grow under its potential. Building research capacity is one way to solve that problem including this project, taking into account its benefits not only directly to that sector but also its externalities. As many other long-term projects, this project would not be financially feasible and given very low tuition fees may not be sustainable without government's subsidy. Thus, in short this project is still relevant as argued by the evaluator.

As one of the nation's leading universities, which particularly specializes in agricultural upgrading, the research and teaching capacity in IPB will be benefited for the whole country. However, some important notes should be raised for the future consideration:

- (1) The cost of providing education in IPB as other exact science is relatively high. Given current tuition fee scheme, subsidy for students would be higher than other fields.
- (2) Providing relatively high subsidy is meant to give incentive for students to stay in this field. But in reality, many of IPB graduates work for non-agricultural sector, which in turn reduce the effectiveness of the program - in this case the project. Therefore, it is important to consider a comprehensive program in order to increase the number of graduates who would stay and focus in their field. Building independent research unit is one of the solutions.
- (3) The sustainability of the project is another crucial element. The research activities have been scaled down – in many cases stopped – when the project ceased. Thus, sustainability of the project should be focused at the time of project appraisal.