

Indonesia

Syiah Kuala University Development Project

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Field Survey: February 2006

1. Project Profile and Japan's ODA Loan



Map of project area



Engineering department building constructed through the project

1.1. Background

Established in 1962, Syiah Kuala University is the oldest national university in Nanggroe Aceh Darusallam Province (Aceh Province) and is the university with the highest level academic standards in Aceh. At the time of the appraisal in 1993, Syiah Kuala University had eight academic departments (agriculture, engineering, education, medicine, veterinary science, economics, law and basic science), over 15,000 students, and 835 faculty members. Teaching staffs of the University, particularly those in the agriculture and engineering departments, have played a central role in the development of the Aceh region. Without this university, reconstruction and development of the region, which was enormously damaged by the earthquake off the coast of Sumatra and the tsunami in its aftermath in 2004, would not have been possible.

Staunchly opposed to Dutch colonial rule to the last moment, the Aceh region became, in 1956, the twenty-seventh province of Indonesia. Both as a Dutch colony and after Indonesia's independence, the region lagged behind in development policies, and also was left behind in establishment of universities.

Human resource development in graduating from the agricultural and engineering departments was strongly needed to facilitate the development of the Aceh region, endowed with rich natural resources. However, improving science-related departments, which needed experimental facilities and equipments,

couldn't be carried out easily compared to the liberal arts departments. Responding to this matter, Syiah Kuala University formulated a university improvement master plan in collaboration with Gajamada University in 1989. This master plan included the construction of school buildings for the agriculture and engineering departments, as well as for the basic science department, which could be positioned as general education courses for the other two departments, and provision of equipment. The plan also established a fellowship program for teaching staffs. The Overseas Economic Cooperation Fund (OECF) the predecessor of the Japan Bank for International Cooperation (JBIC), carried out the Syiah Kuala University Development Project (E/S loans, approved in 1991), this project would include the construction of buildings for the agriculture and engineering departments, provision of equipment, and administration of a fellowship program for teaching staffs.

1.2. Objective

This project's objective was to improve education quantitatively and qualitatively and strengthen research activities in the agriculture and engineering departments of Syiah Kuala University of Aceh Province by constructing buildings for these departments, providing educational and research equipments, and administering a fellowship program for teaching staffs; thus, the project aimed to contribute to the development of the Aceh region and Indonesia as a whole through the nurture of engineers and technicians in science and technology fields, particularly the agriculture and industries, etc. that use natural resources, and also through effective use in society of the knowledge and technology of these fields.

1.3 Borrower/Executing Agency

The Republic of Indonesia/ Directorate General of National Education Ministry

1.4 Outline of Loan Agreement

Loan Amount/ Disbursement Amount	5,467 million yen/5,464 million yen
Exchange of Notes Loan Agreement	October 1993 November 1993
Terms and Conditions	
- Interest Rate	2.6%/year
- Repayment Period	30 years
- (Grace Period)	10 years

- Procurement	General untied (Consultant component: partially untied)
Final Disbursement Date	June 2003
Main Contractors	PT.KOALISI BUMI AGUNG (Indonesia), KEANG NAM ENTERPRISES LTD. (Korea)
Consulting Services	PCI (Japan), NISSOKEN CO., LTD. (Japan), PT.INSAN MANDIRI KONSULTAN (Indonesia)
Feasibility Study (F/S) etc.	1989: SYIAH KUALA UNIVERSITY (Master Plan) 1991: E/S loans

2. Evaluation Results

2.1 Relevance

The objectives of this project are and were consistent with the Indonesian development policies and program both at the time of appraisal and at the time of ex-post evaluation. The plan is considered highly relevant.

2.1.1 Relevance of the plan at the time of appraisal

Repelita V: 1989-93 Indonesian fifth five-year national development plan advocated the development of science and engineering in higher education. Moreover, the second long-term development framework for higher education (KPPT-JP 1986-95) stipulated its objective as improving the capacity, infrastructure, management, productivity, and the quality of higher education institutions.

One issue bearing on higher education in Indonesia was that institutions of higher education were concentrated on the island of Java. Particularly for the Aceh region, where Syiah Kuala University is located, the development of human resources needed for regional development was a high-priority issue, since the establishment of educational facilities lagged behind Java and other regions. The need for human resources development in the agricultural and engineering fields was particularly high. Even though the independence movement by Free Aceh Movement (GAM : Gerakan Aceh Merdeka) has not intensified yet promoting the development of the Aceh region was also crucial for ensuring Indonesia's political stability.

2.1.2 Relevance of the plan at the time of evaluation

Law No. 20 of 2003 concerning the national education system stipulates the need to enhance administration system of universities, to attach importance to promote self-supporting systems in such universities, and the importance of facilities and equipment in higher education in order to augment competitive power of the nation. The third long-term development framework for higher education (KPPT-JP 1996-2005) hammers out a policy of “implementing a new paradigm” which aims to accelerate a policy of promoting the independence of universities and to call on universities not only to fulfill their traditional education and research functions but also to strengthen their function of contributing to society, through joint research and other activities. These points are clearly specified in the Syiah Kuala University Act of 2002.

As a result of the full-scale intervention of the international community following the massive tsunami triggered by the earthquake off Sumatra at the end of 2004, the GAM independence movement demised at the end of 2005. In the peace process, basic policies for the development of the Aceh region were formulated. It is of extreme importance, in accordance with these policies, that Syiah Kuala University’s provision of know-how and human resources to industries in the region is upgraded. Syiah Kuala University has an important position for regional development, as it virtually monopolizes the human resources supply to the Aceh government. The regional plans of the Aceh government—whether short, medium or long-term—emphasize the strengthening of agriculture; to this end, reinforcement of research function in Syiah Kuala University’s Agriculture department is essential. Recovery from the damage caused by the earthquake off Sumatra would have been impossible without Syiah Kuala University and its graduates. Syiah Kuala University, especially the engineering department, has played a major role in the provision of materials and know-how for reconstruction.

2.2 Efficiency

Despite delays in implementation of this project, actual outputs and cost were satisfactory in relation to the original plans, and efficiency is thus judged to be broadly high.

Fig. 1 Some of the Output of the Project

2.2.1 Outputs

The E/S loans that were extended



Maintenance equipment (example)



Academic Activities Center

under the university master plan by OECF (the present JBIC) provided for the development of the engineering, agriculture department and the basic science department. This project gave priority to the construction of new buildings for the agriculture and engineering departments, the procurement of educational and research equipment, and the administration of the fellowship program for teaching staffs of both departments. Among those, the construction of buildings and provision of educational and research equipment proceeded virtually as planned. Regarding the fellowship program, although there were exceptional cases where some teaching staffs studied in the United States, the United Kingdom, Australia and Malaysia, the majority studied in Japan, and of the total number of teaching staffs, more than twice the number planned received doctoral degrees and 1.5 times the number planned received master's degrees.

The review of the master plan was implemented in 1996 and the construction of the Academic Activity Center¹ and campus infrastructure such as roads and school gates were additionally included in this project.

2.2.2 Project period

The project period planned at the time of appraisal was 77 months. Looking at only the period required for implementation of the original plan (building construction, procurement of educational and research equipment and the fellowship program), the actual period was 98 months. It was planned that building construction, procurement of educational and research equipment and other equipments would be nearly complete by December 1998. However, the period was extended because of the difficulty of procuring building materials planned to use amid the economic confusion in the aftermath of the currency crisis in 1997. Materials were also late in arriving owing to the diversion of the materials supply route from Medan due to the civil war. To cope with this situation, efforts were made to hold the extension of the procurement period to the minimum by reducing the size of procurement lots.

The total period for this project, including the additional outputs such as the construction of the Academic Activity Center and campus infrastructure, was 156 months. Although these additional outputs were approved under the condition that they be completed within the period planned in the original plan, delays arose due to external factors such as the aforementioned currency crisis, the deterioration of

¹ The Academic Activity Center includes a large hall for holding lectures and symposiums, as well as research rooms for short-term research projects, PC centers and bank ATMs. At the time of the field survey, the offices for various earthquake reconstruction projects were established at the center. For example, Japan's offices for technical assistance and grant aid were also located at the center.

public order due to aggravation of Aceh civil war and others, and a fire broke out in the project office in 1999.

2.2.3 Project cost

Actual total project costs amounted to 5,718 million yen against a planned cost of 6,432 million yen. This reduction in project cost was due to the devaluation of the local currency (Rupiah) in excess of inflation.

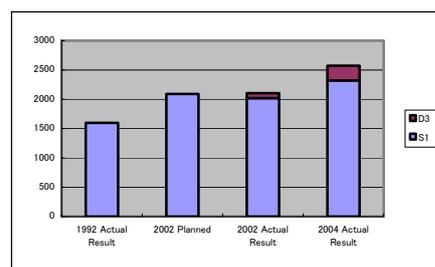
2.3 Effectiveness

The objectives of this project are divided into two: (1) a quantitative and qualitative improvement in education and (2) strengthening research and social service activities. While education did improve quantitatively, a qualitative improvement was not realized. On the other hand, research activities were pursued energetically, and the results of this project were deployed in reconstruction activities from damage due to the earthquake off the coast of Sumatra and the tsunami in its aftermath at the end of 2004. The objectives of the project at the time of the ex-post evaluation were considered to be achieved. It could also be said, however, that the improvement of the education and research environment of the basic science department could have enhanced the effectiveness of this project.

2.3.1 Quantitative improvement in education

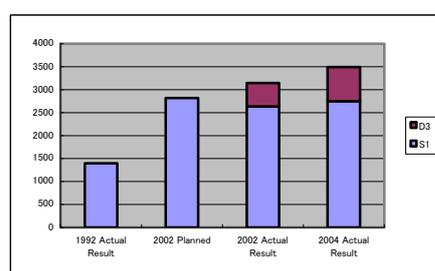
As Figures 2 and 3 show, looking only at students in the S1 program, which corresponds to Japan's four-year colleges, the number of students planned at the time of appraisal was a little short of actual result in 2002. For the agriculture department (actual number in 1992: 1,597), numbers were planned to be increased to 2090 (under the 2002 plan); for the engineering department, (actual number in 1992: 1,397), numbers were to be increased to 2,820 (under the 2002 plan). The actual numbers of students in 2002 were 2,020 for agriculture department

Fig. 2 Number of Students Enrolled in Agriculture Department



Source: created by Syiah Kuala University data

Fig. 3 Number of Students Enrolled in Engineering Department



Source: created by Syiah Kuala University data

and 2,635 for the engineering department respectively. But in 2004 the actual numbers nearly reached the planned numbers (agriculture department: 2,322, engineering department: 2,748). If the number of students enrolled in the D3 program (which corresponds to junior college), which did not exist at the time of the appraisal (agriculture department: 85, engineering department: 510) are included, the planned numbers were already achieved in 2002 (agriculture department: 2,105, engineering department: 3,145).

The numbers of students enrolled in 2004 in the S2 program, which corresponds to a master's program in Japan's graduate schools, although not included in the plan, were 114 for the agriculture department and 136 for the engineering department respectively.

The numbers of new students in 1992 were 195 in the agriculture department and 211 in the engineering department respectively. These numbers have steadily increased and in 2002 reached 454 in the agriculture department and 451 in the engineering department. Meanwhile, the number of graduates in the agriculture department in 1992 was 231, in the engineering department, 185. In 2002, however, the numbers were 181 in the agriculture department and 258 in the engineering department, and in 2004, 212 in the agriculture department and 292 in the engineering department. Thus, although number of graduates in the engineering department increased, the number of graduates in the agriculture department was less than at the time of the appraisal.

The number of teaching staffs has steadily expanded: Compared with the time of the appraisal, in 2004, teaching staffs increased 30% in the agriculture department and approximately 100% in the engineering department. There has been also a steady increase in the number of teaching staffs who acquired doctoral and master's degrees (see Table 1).

Table 1. Number of Teaching staffs in the Agriculture and Engineering Departments of Syiah Kuala University

	Agriculture Department		Engineering Department	
	1992	2004	1992	2004
Number of teaching staffs	150	202	130	268
Number of teaching staffs with master's degrees	32 (21.3%)	106(52.5%)	26 (20.0%)	116 (43.3%)
Number of teaching staffs with doctoral	8 (5.3%)	29(14.4%)	1 (0.8%)	19 (7.1%)

2.3.2 Qualitative improvements in education

Overall, qualitative improvements have not been realized.

(1) Student/professor ratio

The number of students per professor remained unchanged between 1992 and 2004, increasing from 10.64 to 11.50 in the agriculture department and declining from 10.75 to 10.25 in the engineering department. Under the current Syiah Kuala University master plan, a total of 200 teaching staffs will be hired for all academic departments by fiscal year 2006².

(2) Floor area of buildings per student

Thanks to construction of new buildings, including those provided for under this project, the floor area of buildings increased from 2,924 m² to 24,542 m² in the agriculture department, and from 6,891 m² to 27,141 m² in the engineering department. Floor space increased at a higher rate than did the number of students, and thus school floor area per student increased in both departments³.

(3) Proportion of qualified teaching staffs

As mentioned above, the proportion of qualified teaching staffs (i.e., teaching staffs with doctorates or master's degrees) has steadily increased (see Table 1). This increase is attributable to the larger number of teaching staffs earning

² These figures do not include the changes in the number of students and teaching staffs caused by the damage of the tsunami at the end of 2004. In terms of responding to increase number of students relative to the number of teaching staffs, filling the vacancies left by teaching staffs who died in the tsunami is an urgent task.

³ It cannot be straightforwardly judged that building floor area per student has increased, given that agriculture and engineering students study mainly in the science department building in their first year, as will be seen in 2.5 below.

advanced degrees under this project's fellowship program, in which 53 teaching staffs received master's degrees and 23 earned doctorates.

(4) Graduation rate

Viewed only from graduation rates, an improvement in the quality of education through this project has not been achieved. Here, the graduation rate is measured by two values: (a) the ratio of the number of graduates in a given school year to the number of current students enrolled in that year, and (b) the ratio of the number of graduates in a given school year to the number of new students in that year⁴.

Table 2. Graduation Rates

	Agriculture Department		Engineering Department	
	1992	2004	1992	2004
(a) Number of graduates for school year/Number of students enrolled for that school year	14.5%	9.1% (9.2%)	13.2%	10.6% (19.8%)
(b) Number of graduates for school year/Number of new enrollees for that school year	1.19	0.45 (0.31)	0.88	0.68 (0.60)

Source: created by Syiah Kuala University data. Figures for D3 course in parentheses.

Regardless of the definition, the graduation rate has declined. Although increasing the graduation rate was also an objective at the time of the appraisal, this objective has not been achieved.

According to a hearing held at Syiah Kuala University at the time of the field survey, there are broadly two factors that explain why a qualitative improvement was not achieved. First, science education up to high school is inadequate, so new students cannot keep up in their college classes. To cope with this problem, the basic science department of Syiah Kuala University offers a program to junior and high school teaching staffs in methods of teaching science education. However, because the basic science department itself has a shortage of facilities and

⁴ The most useful indicator of graduation rates is the number of graduates in a given school year as a percentage of the number of new students four years prior to that year. Since data under this definition was not available at the time of appraisal; here, in order to compare numbers at the time of the appraisal with numbers at the time of the ex-post evaluation, the graduation rates as defined in (a) and (b) above are examined.

equipment, the contribution of this program to this date has remained small.

Second, because an improvement of the basic science department has not been realized, the education provided to first year students before advancing to specialized courses is insufficient. The basic science department of Syiah Kuala University provides general education courses for the agriculture department and engineering department. Students in these two departments take classes in basic science in the basic science department as prerequisite subjects before advancing to specialized courses. While an increase in the number of students was achieved by expanding the floor areas of buildings of the agriculture department and engineering department through the project, there has been absolutely no improvement to the infrastructure of the basic science department where all students study in their first year, and thus basic education is provided in small classrooms and crowded laboratories⁵. As revealed at a hearing held with a few students (fourth-year agriculture department students), there was much dissatisfaction with education in the first year.

2.3.3 Strengthening research activities and social service activities

The points below clearly illustrate that research has undergone a qualitative and quantitative improvement.

According to the National Education Ministry, the number of research recognized to be high in quality has expanded for all departments from 144 in 1991 to 232 in 2004, with 39 in the agriculture department and 34 in the engineering department.

The researchers at Syiah Kuala University, especially those who had acquired degrees through the fellowship program in the project demonstrated outstanding abilities in reconstruction activities from the earthquake off the coast of Sumatra and the tsunami in its aftermath at the end of 2004⁶.

The number of community service activities (i.e. research conducted under the contracts with external organizations) has increased for all departments from 33 projects in 1991 to 98 in 2004⁷. A number of bases for earthquake-recovery activities have established offices in the Academic Activity Center constructed under this project. In addition, the frequency of use of this center's large hall, which, among all facilities in the Aceh region with a capacity of 1,000 persons, suffered only light damage from the earthquake and tsunami, has been extremely

⁵ Of the classrooms/laboratories used for classes provided at a full pace of five classes per day, six days a week, four are from the five mathematics classrooms and one is from the 12 physics classrooms. The operating rate of other laboratories of these two departments and the laboratories of the chemistry and biology departments is fairly high. The highest operating rate is found in physics laboratories, which throughout the week are used to full capacity or above capacity.

⁶ Refer to Column 2 at the end of this report.

⁷ Many of these activities are cross-departmental and it is difficult to obtain data on activities in which teaching staffs of the agriculture department and engineering department alone are involved.

high. Although small meetings with tens of people are occasionally held in this hall, it is usually the venue for large meetings, centering on the conferences related to reconstruction, and a total of 140 conferences were held in fiscal 2005, with an average number of users of more than 500.

2.3.4 Internal rates of return

Because accurately determining the benefit of developing the university is difficult, EIRR, or the Economic Internal Rate of Return, was not calculated in the ex-post evaluation. The reason for the difficulty is that, under standard labor economics, an analysis of the effect of human resources development requires attention to the difference in lifetime wages. In the case of this project, however, even though it produced highly competent people, it cannot be assumed that these people will eventually secure jobs whose wages are high. According to a hearing with teaching staffs and students held at the time of the field survey, one of the most popular occupations for excellent students is public service employee, but the salary of civil servants is deliberately held down. Despite the low wages, one of the backgrounds of high popularity of this occupation is non-economic factor: the work is rewarding and brings high status. Risk-averse attitudes are cited as another reason: wages, although low, are stable. Given these factors, converting the wage data observed to economic price is virtually impossible.

2.3.5 Use of and satisfaction with facilities (Beneficiary survey)

At the time of the field survey, a questionnaire survey of 33 Syiah Kuala University teaching staffs was conducted to determine their use of and satisfaction with university facilities. Specifically, the survey examined the differences in satisfaction before and after the project relating to common facilities throughout the university, that is, the quantity and quality of buildings, classrooms, laboratories and laboratory equipment. The survey revealed a tendency for respondents to evaluate their satisfaction as higher after the project. However, about half of the respondents expressed strong dissatisfaction with the state of equipment, indicating that it was obsolete and that maintenance was inadequate, and pointing out equipment failures, etc. caused by the earthquake at the end of 2004. The problem of insufficient supply of water and electricity was not only mentioned at the hearing but also came under physical inspection at the time of the field survey⁸ (see 2.5 “Sustainability” concerning the current state of facilities and

⁸ In this survey, the unavailability of running water in an agriculture department laboratory was actually observed. Several blackouts occurred during the field survey.

equipment).

2.4 Impact

The highest objective of this project was to contribute to the development of the Aceh region through human resources development, technical development and the expanded use of technology. Apart from the contribution of reconstruction activities, the extent of how far this objective had been achieved could not be confirmed at the time of the ex-post evaluation. Because all construction was performed on existing sites, the project did not result in site acquisition and relocation of residents either.

2.4.1 Developing the human resources that will play the leading roles in the agriculture and engineering fields

As illustrated in Column 2 at the end of this report, the contribution made by teaching staffs to efforts to recover from the earthquake was enormous. However, the contribution of Syiah Kuala University graduates to the Aceh region was not confirmed, apart from the fact that more than 90% of the officials of the Aceh government are graduates of the university⁹.

2.4.2 Other impacts

This project directly employed 772 persons. In addition, the convenience of residents in the surrounding area was improved through the completion of university ring road and drainage.

2.5 Sustainability

Although no particular problems were found concerning the facilities' operation and maintenance system at the time of the evaluation, given the enormity of the damage from the earthquake and tsunami off Sumatra, it cannot be said that the state of operation and maintenance was good. Furthermore, because human resources had to be channeled into reconstruction activities, full attention could not be devoted to education and research. These problems, coupled with the basic science department's lack of facilities and resources, left some doubt as to whether

⁹ Since the university is unable to ascertain the career paths of graduates, it cannot be determined accurately what sort of contribution that Syiah Kuala University graduates makes to regional development. With recovery from the earthquake and tsunami having just begun at the end of 2004 and the civil war having just ended at the close of 2005, development of the Aceh region will just be getting underway in earnest from now. Consequently, it was inevitable that the survey conducted in FY2005 could not determine the contribution of Syiah Kuala University graduates to the development of the Aceh region.

the effects of the project are sustainable¹⁰.

2.5.1 Technical capacity

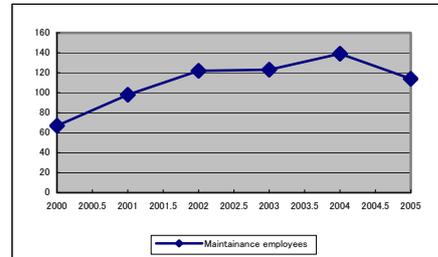
Operation and maintenance of the facilities provided through this project is performed by the university administration office for common facilities and by each academic department for the facilities of individual departments. Maintenance of the equipment provided is

in principle left to the autonomous management of each research

laboratory. Most of the teaching staffs who have returned from fellowship program had acquired operation techniques for advanced laboratory equipment¹¹. On the other hand, even though routine maintenance system is in place, the capacity to respond to special cases is not developed, which left some equipment unusable. In particular, many pieces of precision equipment could not be used because their accuracy has been diminished because of the earthquake.

The number of full-time maintenance personnel had been on the rise, but some died in the tsunami, and at the time of the ex-post evaluation, there were only 114 persons. In their places, members of research laboratory sometimes involved in maintenance work.

Fig. 4 No. of Maintenance Personnel
(total for university)



Source: created by Syiah Kuala University data

¹⁰ The most important points when considering sustainability of the projects to develop and upgrade Syiah Kuala University are not only whether excellent human resources have been developed through the project, but whether those people would be able to nurture successors. Even if short-term research results are achieved, if successors are not nurtured (in other words, if education is negligent), research results cannot be sustainably produced over the long term.

¹¹ Although during the period of the project there was some equipment that could not be used due to a lack of technical skill, after the return of students from foreign study programs provided through this project, guidance and management were handed over to students with improved technical skills, enabling all equipment to be used.

2.5.2 Operation and maintenance system

The Project Implementation Unit (PIU), which was in charge of the university development project, worked in close collaboration with the university's administration office to carry out university developments based on the master plan. However, PIU has already disbanded. From Syiah Kuala University data and hearings at the time of the field survey, it appears that staff to monitor and organize information relating to university facilities and this project's effects was properly dispatched from each department.

When considering the sustainability of a project to develop and upgrade a university, it is not sufficient to merely examine the state of development or the maintenance system

of the departments concerned. In 2.3.2 above, it was pointed out that upgrading the basic science department is essential for the agriculture and

Fig. 5 Library



Fig. 6 Science Dept. Building



engineering departments to achieve a significant educational effect. Although the construction of buildings and administration of the fellowship program have achieved substantial research results in the short term, ensuring their sustainability depends on the extent to which the goals of education are achieved. This means that the project's achievements will have a sustainable effect through nurturing successors to continue the work. However, the basic science department, whose principal responsibility is teaching first-year students of the agriculture and engineering departments, is not adequately developed.

Another concern that merits attention is the deteriorated library environment. Libraries occupy a core position in the university in its role of research and educational institution. The Syiah Kuala University library is poorly lit and has a small collection of books which are still waiting to be organized.

Unless the basic science department and library are upgraded, this project's objectives cannot be judged as having sustainability.

Column 1 Efforts by individuals to complement inadequacies of the university's systems and financial status

This column examines the current status of reconstruction activities, using as an example the agriculture department's livestock science program. The agriculture department has a practice facility on campus which teaches students the know-how for raising domestic animals. At this facility, research and development was performed concerning the production of high-quality chicken meat, and students received practical training. Because it was located in the part of the campus nearest the sea, it was directly hit by the tsunami in the aftermath of the earthquake off Sumatra in December 2004, and all equipment and livestock were wiped out. Although recovery from the tsunami has been proceeding gradually, a budget and system for restoring this facility have not been established, and at the present time it is mostly unused. Although this project has contributed to human resources development, the university cannot provide a system through which these people can be used effectively. The effectiveness of this project has been forced to be compromised, as has its sustainability, since training of successors at this practice facility has been interrupted.

Agriculture Dept. Practice Facility



Practice at Mr. Yunus's Farm



Mr. Yunus, who acquired a doctoral degree in Japan through this project's fellowship program, trains graduate students at his farm. Graduate students came from the various places in the Aceh region are learning the know-how for producing high-quality and safe chicken meat and eggs, and it is said that they earn high profits after they return to their home districts. This is an example of where the individual effort of teaching staffs is complementing the university's financial and system inadequacies and is helping to keep education results high.

This example suggests that knowledge of farming technology can secure individual profit and contribute to the development of the Aceh region. At present, the market for chicken meat and eggs in the Aceh region continues to be a seller's market and is meeting the strong demand from the influx of farm products from other areas (especially Medan). If the production of chicken meat and eggs is sufficiently competitive with products brought in from other areas, farmers could

earn many times the income of university teaching staffs. With know-how and accurate information, there are business opportunities to seize.

2.5.3 Financial status

At the time of the ex-post evaluation, a centralized educational system remained in place, whereby a budget for an approved portion of expenditures could be secured by applying every year to the National Education Ministry. As universities have advanced their efforts to become self-supporting toward 2010, they are shifting to systems in which they manage their universities by themselves with the support of regional governments. As provided for by the Syiah Kuala University Act of 2002, universities can now independently conduct profit-making projects at their own discretion. However, although joint research with industry and government sharply increased in 2004, such research met with a setback due to the earthquake and tsunami damage at the end of 2004. At the time of the ex-post evaluation, it was gradually resuming.

Budget allocations within the university are not decided by the National Education Ministry, but are structured to be decided by the university independently. The university has determined the allocation ratio for maintenance of facilities and equipment. In 2005, 2.4% of the budget was allocated to maintenance. Since 2002, virtually the full amount deemed necessary by university authorities has been disbursed.

Equipment maintenance plans are determined by directors of research laboratory. In a number of hearings held in research laboratory, many claimed that the budget approved by university authorities was insufficient to meet maintenance costs. The reasons why equipment maintenance is inadequate include, in addition to lack of funds, reliance on foreign countries to procure materials and technology for maintenance, as is the case with chemicals and precision machinery, and the lack of know-how for procuring these items.

2.5.4 Operation and maintenance status

The current state¹² of the principal damage resulting from the earthquake off Sumatra at the end of 2004 is listed below.

(Facilities) Many sections of walls and ceilings were destroyed from earthquakes occurring from 2004 into 2005. In particular, the third floor of the engineering

¹² At the time of the field survey.

department suffered devastating damage and is unusable.

(Equipment) Many pieces of equipment were damaged by collapse, etc due to the earthquake.

(Livestock house of the agriculture department) The entire building collapsed due to the tsunami.

(Ring road) One sector sustained damage from the tsunami, and much damage occurred afterward due to frequent passage by trucks brought in for reconstruction work.

Fig. 5 Damages by Dec. 2004 Earthquake off Sumatra (examples)



3rd Floor Ceiling of Engineering Dept. Building



Equipment with Diminished Accuracy

As for the equipment, there were cases where function was lost due to instability of electric power supply, such as agriculture department refrigerators, thus there is other reasons than earthquake for unserviceable equipment.

The problems with electric power supply indicated at the start of this project have been eased somewhat. A system for utilizing the emergency generators provided by this project was established, and although power outages occur frequently even now, power can be restored within a reasonable period of time¹³.

There is no section in Syiah Kuala University dedicated to the maintenance of common facilities. Maintenance is the responsibility of general affairs divisions at both the university and department level, and most of the work is outsourced. Facilities including buildings for which cleaning were inadequate were noted, but most of these facilities were functioning.

3. Feedback

¹³ It was also pointed out at interviews held in research laboratory at the time of the field survey that it was not possible to get adequate results from experiments due to power outages, and in some particularly severe instances, laboratory equipment was damaged.

3.1 Lessons learned

Attention should be focused on the need to upgrade other departments in order to enhance the educational and research effect of the departments targeted. In addition, the scope of the project should be decided only after investigating the current study programs and the existence of interdepartmental programs.

3.2 Recommendations

JBIC: The development of university cannot be accomplished by upgrading only certain departments. Especially in the case of university like Syiah Kuala University where the basic science department provides general education courses for the engineering and agriculture departments, it is necessary to implement projects with a view to improve related departments together for effective development of university. Syiah Kuala University's basic science department has a strong potential to produce human resources to undertake maintenance of the university's facilities and equipment. However, with its aging buildings, the university cannot provide adequate education, and thus human resources cannot be used effectively. Measures should be taken aimed at upgrading the basic science department, (e.g. improving its infrastructure).

Comparison of Original and Actual Scope

Item	Plan	Actual
(1) Outputs 1) Building Construction	Agriculture Department (16,053m ²) Engineering Department (23,739 m ²)	Agriculture Department (16,127 m ²) Engineering Department (25,141 m ²) Academic Activity Center (29,260 m ²)
2) Equipment Procurement	Procurement of educational and research materials and equipment for agriculture and engineering departments.	As planned
3) Fellowship program	Total 43	Total 77 teaching staffs
4) Consulting Services		
a) Engineering Services	1,699MM	3,623.14MM
b) Technical Services Assistance	364MM	1,001.75MM
c) Fellowship program Support Service	89MM	115.00MM
(2) Project Period	November 1993-March 2000	November 1993-September 2003 (original scope was completed in November 2001)
(3) Project Cost		
Foreign Currency	2,858 million yen	3,046 million yen
Local Currency	3,574 million yen (60,580 million Rp)	2,672 million yen (190,5841 million Rp)
Total	6,432 million yen	5,718 million yen
ODA Loan Portion	6,432 million yen	5,465 million yen
Exchange Rate	1 Rp = 0.059 yen (as of April 1993)	1 Rp = 0.014 yen (as of October 2003)

Column 2 Contribution to Reconstruction Activities

The agriculture and engineering departments of Syiah Kuala University both made a major contribution to activities to recover from the earthquake and tsunami off Sumatra.

(1) Engineering Department

Of engineering department staff that make contributions in various ways to the reconstruction activities, civil engineering specialists made the most outstanding contribution.

(a) Concrete blocks (Bataform)

It goes without saying that when considering the reconstruction of houses damaged by earthquake and tsunami, it is necessary to begin from the early stages of construction of houses. Mr. Taufiq Saidi, who received a doctoral degree from Hokkaido University, is an expert in improving building materials. Applying the techniques he learned in Japan, he developed cement materials suited to the climate of the Aceh region. Mr. Saidi performed repeated experiments combining various materials and pinned down the fact that cement produced in West Sumatra was optimal.



The Bataform he invented is lighter than standard concrete and has excellent resistance to water. The lightness of the concrete simplifies transport of building materials. Because of its excellent resistance to water, it is possible to make houses



with it that can withstand the torrential rains that occur during the rainy season. It is also easily processed, allowing buildings to be built without highly sophisticated technology. The only potential problem involving Bataform was economic efficiency, but because prices of traditional brick soared due to the earthquake and tsunami, Bataform has been seen as an inexpensive alternative.

(b) Building standards

The damage sustained by the Aceh region is clear testimony to the enormous scale of the earthquake and tsunami. However, the cause of collapse of buildings was not only intensity of the earthquake and tsunami, but that many buildings had been constructed without proper observation of building standards

Syiah Kuala University's engineering department is educating the people of Aceh about the importance of observing building standards in relation to the earthquake and tsunami damage.

One mosque in the center of the city miraculously sustained only slight damage and has become famous around the world. For the people of Aceh, as they push ahead with reconstruction activities, the mosque serves as a major spiritual support.

Although the main building of the mosque suffered little damage, the outer walls of an adjacent tower were fallen off. Syiah Kuala University's engineering department participated in a project to restore the outer walls, they taught the people how to construct buildings resistant to earthquakes by observing building standards.

(c) Memorial Hall

The desire to communicate to later generations the extraordinary damage caused by the earthquake and tsunami is being fulfilled through a creative approach. One effort in which Syiah Kuala University has been directly involved is the plan to leave the beached ship shown in the



photograph as a memorial hall. This ship is sitting on land about 4km from the coastline. It was carried to its current location by the tsunami.

The people of Aceh answer unanimously that one of the reasons why the earthquake and tsunami damage was so enormous was that they had no advance knowledge of the tsunami. If they had known that there was a possibility that a tsunami would follow the earthquake, many lives could have been saved. By leaving a memory of the tsunami damage through building this memorial hall, it is natural that future generations should plan to ensure that such a mistake is not repeated.

(2) Agriculture Department

The contribution of agriculture department to the reconstruction effort through involvement in farm work on crop land that damaged by seawater of the tsunami is

now looked at. This problem was approached from two directions:

- (a) Improvement of crop breeds with resistance to salt damage.
- (b) Replacement of soil.

Research conducted by Syiah Kuala University teaching staffs concerning these two approaches is summed up below. The two teaching staffs who performed this research used the knowledge they acquired through study in Japan under this project.

(a) Improvement of crop breeds: Mr. Efendi

Mr. Efendi's research at Tohoku University involved the development of crops that can be cultivated on dry farm land. In Aceh, the year can be broadly divided into a dry season and a rainy season. During the rainy season, many kinds of crops, mainly rice, are harvested but during the dry season not very much can be grown.



Therefore, the development of crops that are resistant to the dry weather can be a significant step for the development of Aceh through agriculture promotion.

Mr. Efendi developed crops with resistance to the dry season through research into genetic technology. Crops that are resistant to the dry season can generally be cultivated on land that has been damaged by sea water. If the research in which Mr. Efendi is currently involved advances, it will be possible to produce rice on land damaged by the tsunami.

(b) Replacement of soil: Mr. Hairul Basri

Mr. Basri, who earned a degree in agricultural engineering at Kyushu University, has been involved in reconstruction through work in soil



improvement. At the time of the ex-post evaluation, a soil improvement project in Lhoong seated to the west of Banda Aceh was planned. This project aimed for replacement of soil that suffered salt damage from the tsunami, and the installation of new irrigation facilities.

Even if technical requirements are met, such as developing plants that grow well on uncultivated land or replacing soil, what ultimately is needed for farm work is

human labor. To revive farm work and realize a reconstruction of the Aceh region, it is also imperative that people involved in farm work must be organized and that schemes be created so that their enthusiasm is clearly reflected in harvests. Syiah Kuala University's agriculture department has been actively involved in educational projects aimed at farmers before the earthquake off Sumatra, and has contributed to creating systems in which farmers hold initiatives of work to restore farm land.

(3) Healing emotional wounds

Mr. Zulfian has accumulated researches into acoustically superior buildings using a non-acoustic room constructed under this project. This research comes to have relevance to reconstruction activities in an unexpected way.



People who are visited by major natural disasters suffer major psychological damage. Such people not only suffer physical damage, but are also emotionally devastated through having to see many dead and injured and by losing their families. Healing such emotional wounds requires various efforts. In particular, providing better living environments is important. At the beginning stages of recovery from a tsunami, emphasis is naturally placed on keeping off the rain, but afterward it is important to construct houses which provide peace of mind to the people to live in. Through his research into acoustics, Mr. Zulfian works to propose home designs with consideration given to emotional wounds.