Indonesia

Ex-Post Evaluation of Japanese Technical Cooperation Project
"The Project for Strengthening of Polytechnic Education in Electric-Related Technology"

Yusuke Hasegawa, International Development Center of Japan

1. Project Description

Project Location

EEPIS Administration Building

1.1 Background

Under the Higher Education Long Term Strategy III (3rd HELTS 1996-2005), the policy of higher education in Indonesia gave priority on the development of polytechnics providing professional tertiary education. Based on this policy, it was decided by the Directorate General of Higher Education (DGHE) to implement teacher education at the three polytechnics which were nominated as national resources polytechnics (NRP) in the fields of electrical engineering, civil engineering, and manufacturing and mechanical engineering respectively, by establishing Diploma 4 (D4) courses. Electronic Engineering Polytechnic Institute in Surabaya (EEPIS) was chosen as NRP of electrical engineering. Against this background, the Indonesian Government requested the Japanese Government to provide the assistance to establish the D4 courses equivalent of bachelor's degree, as well as the Diploma 3 (D3) course for information technology to supply skilled workers in information technology. In response to the request, "The Project for Strengthening of Polytechnic Education in Electric-Related Technology" was conducted by the Japan International Cooperation Agency (JICA) from October 1999 to September 2004.

The Japanese Mid-term Evaluation Team of the project dispatched to Indonesia in November 2001 recommended that additional assistance should be provided for the D4 course for information technology, leading to this part of cooperation added to the project. The Japanese Terminal Evaluation Team of the project which visited Indonesia from May to June 2004 recognized the necessity to carry out the follow-up cooperation for the D4 course for information technology, which was implemented from October 2004 to September 2006.

1.2 Project Outline

Overall Goal	Well-trained electric-related polytechnic teachers are provided to polytechnics nationwide and they provide education needed for skilled technicians in industrial development.
Project Objective	To provide EEPIS with the ability to educate (1) for well qualified electric related polytechnic teachers and (2) for skilled information technology technicians as well.
Outputs	(1) In-service Diploma 4 courses (teachers' training courses/ 1.5 years) for electronic engineering, electrical engineering, telecommunications engineering, and information technology are established and well managed.

	(2) Pre-service Diploma 4 courses (teachers' training courses/ 4 years) for electronic engineering, electrical engineering, telecommunications engineering, and information technology are established and well managed.
	(3) Diploma 3 course for information technology is established and well managed.
	(4) In-service teachers' short-training courses for electric-related field are established and well managed.
	(5) The research and teaching capacity of EEPIS teaching staff members is strengthened.
	(6) Management system of EEPIS is strengthened.

Inputs	Japanese Side:
	  1. Experts
	     8 for Long-Term; 119 for Short-Term
	  2. 31 Trainees received
	  3. Equipment 338 Million Yen
	  4. Local Cost 105 Million Yen
	Indonesian Side:
	  1. 115 Counterparts (at the time of Terminal Evaluation)
	  2. Facilities, Project Office, Utilities
	  3. Local Cost

Total cost	1,011.31 million yen
Period of Cooperation	October 1, 1999 – September 30, 2004; October 1, 2004 – September 30, 2006 (Follow-up Cooperation)
Executing Agency	Directorate General of Higher Education (DGHE), Ministry of National Education; Electric Engineering Polytechnic Institute in Surabaya (EEPIS)
Cooperation Agency in Japan	Institute of National Colleges of Technology, Tokyo Institute of Technology, etc.
Related Projects	"Project for Expansion of Electronic Engineering Polytechnic Institute of Surabaya in the Republic of Indonesia" (Grant Aid: FY2002-2004); "Third Country Training Program on Electronic Engineering Education (FY1993-2002); "Third Country Training Program on ICT Methodology" (FY2002-2006)

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement of Overall Goal

It was prospected in the terminal evaluation that the overall goal of the project would be achieved through the continued activities by EEPIS since enough number of higher education institutions in electric-related field were expected to receive graduates of D4 courses as teachers and that about 70% of D4 students expressed their hope to work as teachers at electric-related polytechnics after graduation.

1.3.2 Achievement of Project Objective

Achievement of the project objective was not recognized with regard to teachers' training at pre-service D4 courses, since the first batch of graduates of the courses had not yet been provided at the time of the terminal evaluation. It was concluded in the terminal evaluation that the project objective was achieved regarding training courses at in-service D4 and D3 for information technology, since the educational institutions which sent their teaching staff to the in-service D4 courses as well as the organizations which employed graduates of the D3 courses were generally satisfied with the quality of the corresponding training courses provided by EEPIS.

1.3.3   Recommendations

It was recommended to JICA that it should make further adjustments with the Japanese supporting institutions which sent their teaching staff as short-term experts and with EEPIS before and after the dispatches, because there were cases where short-term experts stayed for too short a time to interact with the counterpart sufficiently. The follow-up cooperation, which was conducted subsequently for two years, did not find such a difficulty because the cooperation focused on a particular area (i.e. information technology) and that it was carried out primarily by long-term experts.

Recommendations made to EEPIS included program development considering the needs of the industries, providing evening classes in-service D4 courses, and strengthening Job Arrangement System (JAS). EEPIS has since then worked on these issues and evening classes in-service D4 courses are currently provided. However, there is still room to improve JAS as explained later.

The terminal evaluation report recommended that Directorate General of Higher Education (DGHE) should set stricter standards on polytechnic education to keep its quality against the background of a growing number of private polytechnics. In this connection, a government regulation newly set forth in 2005 requires polytechnic teachers to have the minimum qualification of Master's degree. As discussed later, this necessitates a change of the characteristics of the D4 courses initially provided as teacher training courses.

2   Outline of the Evaluation Study

2.1   External Evaluator
Yusuke Hasegawa, International Development Center of Japan

2.2   Duration of Evaluation Study
Duration of the Study: April 19, 2010 – February 14, 2011
Duration of the Field Study: July 25 – August 5, 2010 and September 21 – 25, 2010

2.3   Constraints during the Evaluation Study
Major constraints identified during the Evaluation Study are as follows:

As part of the Evaluation Study, the evaluator conducted a beneficiary survey of graduates and past participants at diploma and short-training courses provided by EEPIS. The contact address on the beneficiaries entirely depended on the information provided EEPIS. Generally, it would be more difficult to identify the current locations of the beneficiaries of the past cooperation for higher educational institutions compared with those of some types of cooperation which could grasp the benefiting coverage relatively clearly such as rural development and infrastructure construction projects, because graduates of higher educational institutions often move out to work or continue studying in other areas. In the case of this beneficiary survey, in addition to the limited number of beneficiaries whose contact information was held by EEPIS, many of them have already changed their addresses from the ones on the EEPIS's record. Thus, the collection rate of the beneficiary survey was generally low. As a result, the survey does not necessarily ensure statistical reliability in terms of sample size and sampling method.

Also, in the process of implementing the Evaluation Study, the evaluator was not able to obtain a part of the reports made by long-term experts which were considered to be important for him to review the activities and achievement of the project. In addition, since literature information and data on the follow-up cooperation as a whole including planned and actual activities were very limited, examination of the follow-up cooperation counted primarily on the interviews with the persons concerned and JICA's annual project implementation documents.

3. Result of the Evaluation (Overall Rating: B)

3.1 Relevance (Rating: a)

3.1.1 Relevance with the Development Plan of Indonesia

Relevance to the Development Plan of Indonesia was ensured throughout the project implementation period.

The national development plan (PROPENAS: 2000-04), which was mainly formulated by the National Development Planning Agency (BAPPENAS), emphasizes the improvement in quality of higher education as well as the strengthened connections with industry. The improvement in access and quality of higher education, including polytechnics, are targeted in the National Medium-Term Development Plan (RPJM: 2004-09), and it is advanced by the strengthening of cooperation between the higher education institutions and business and industry which will fulfill the commercial needs contributing to the development of science and technology.

On the other hand, the polytechnics development plan created by DGHE, aiming to open 155 new public polytechnics by 2020 was changed while the project was in progress. In the new plan, a total of 195 polytechnics were either planned to be opened or transformed from other organizations. For this reason, the policy to expand the polytechnics was maintained.

3.1.2 Relevance with the Development Needs of Indonesia

The project and the development needs of Indonesia coincided.

For skilled engineers demand, the government's target was to increase the number of engineers by 260 thousand by 2020 through the increase in the number of engineering students by opening new as well as expanding polytechnics. This was maintained by the end of the project even after the change was made in the polytechnic development plan.

It is another benefit for other polytechnics that EEPIS assumes the role of training and upskilling their teachers because EEPIS is the only polytechnic in the electric-related field recognized as National Resource Polytechnic (NRP) by DGHE.

For this reason, demand for EEPIS graduates was thought to be sustained because EEPIS was maintained as the NRP by the end of the project.

3.1.3 Relevance with Japan's ODA Policy

The project coincided with Japan's ODA policy.

In terms of the relation to Japan's priority cooperation issues, strengthening the soft-type cooperation in the educational field was stated in one of the 7 priority issues (i.e. "assistance for poverty reduction and social development"), in former ODA Mid-term Policy formulated in 1999. In addition, "prioritizing support in the educational sector including higher education and vocational training" was stated in the priority "human resource development and intellectual support". This coincides with the project, aiming to support the polytechnics which were the higher education institutions to train engineers.

Regarding the connection to the country assistance implementation strategy, the "human resource development and educational sector" was stated as one of the five priorities for the Indonesian country assistance implementation strategy at the start of the project. The strategy also emphasizes the improvement of the quality of teachers, and the enhancement of education for skilled personnel and engineers, contemplating that "the wide range of human resource development such as improving the educational standard is important in order to strengthen the international competitive power and develop the industrialization with high added-value". In this sense, the project coincided with the policy.

3.1.4 Appropriateness of Assistance Measure

The methodology adopted for the project was appropriate.

The basic policy of the project emphasized the improvement of the existing personnel's

ability by providing training in Japan or additional education within the country, rather than resourcing new teachers from outside. Based on the long-time experience of Japan's cooperation for EEPIS in the past, the policy stressed the self-initiative from the Indonesian side. The assistance policy also intended to dispatch a number of short-term experts for new D4 courses, which consisted of a combination of comprehensive and technical curriculums, while dispatching long-term experts for the D3 course for information technology which was a new field of study for EEPIS. It was evaluated that the appropriate

D3 Buildings provided by Japan's Grant Aid in 1980's

strategy was employed based on the significance of active involvement of the counterpart (C/P) staff and considering C/P's experience of respective activities.

The advantage and the necessity of Japan's assistance to the project were also acknowledged. Japan has been cooperating in establishing and managing EEPIS since the 1980's through grant aid and technical cooperation based on the technical college (Kosen) system in Japan as a model. The education at the polytechnics is similar to the one found in technical college, where practical technical educations are being provided. Moreover, at the start of the project, many teachers at the C/P had already taken training in Japan and were expected to have a high cooperation effect. From this point of view, it was evaluated that there were a substantial necessity and advantage for the cooperation by Japanese experts based on technical education in Japan.

This project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy. Also, the methodology of the project was evaluated to be appropriate. Therefore, its relevance is high.

3.2 Effectiveness (Rating: b)[1]

3.2.1 Project Outputs
3.2.1.1 Output 1
In-service D4 courses (teachers' training courses/ 1.5 years) for electronic engineering, electrical engineering, telecommunications engineering, and information technology were established and well managed. The courses were officially commenced in fiscal 2000. For the students enrolled from fiscal year 2000 to 2005, there were a total of 352 applicants, 268 enrolled students, and 246 graduates, and around 20 students per class graduated consistently (Table 1). Another In-service D4 courses were commenced for the teachers at vocational high schools and a total of 108 students graduated for the same period. A questionnaire survey about the operation and management of the courses was carried out on the EEPIS graduates. Response was received from only four graduates of these courses and everyone answered that the courses were managed and operated appropriately.

3.2.1.2 Output 2
Pre-service D4 courses (teachers' training courses/ 4 years) for electronic engineering, electrical engineering, telecommunications engineering, and information technology were established and well managed. The courses were officially commenced in fiscal 2000. For the students enrolling up to fiscal 2005, there were a total of 2,398 applicants, 575 enrolled students, and 499 graduates (Table 1). The number of applicants increased year by year and

---

[1] Effectiveness is evaluated comprehensively including the impact stated in 3.3.

the average applicant ratio to enrollment was 4.9. A questionnaire survey was carried out on the EEPIS graduates. Response was received from only two graduates of these courses and both of them answered that the courses were managed and operated appropriately.

3.2.1.3 Output 3

D3 course for information technology was established and well managed. For the students enrolling from fiscal 2000 to 2005, there were a total of 2,641 applicants, 332 enrolled students, and 301 graduates (Table 1). Earlier, more than 700 students applied for the class capacity of 35, resulting in a high applicant ratio. Although capacity of the class was increased later, the applicant ratio was still high enough at 3.3 in fiscal 2005. A questionnaire survey was carried out on the EEPIS graduates and had response from 13 graduates of the course. Five students said the course was managed and operated in very appropriate manner and 8 graduates said it was appropriate.

Table 1   Number of In-service D4 (1.5 year), Pre-service D4 (4 years), D3 IT course applicants, enrolled students, and graduates

(unit: persons)

Year		In-service D4 program (1.5 years course)				Pre-service D4 program (4 years course)				D3 program
		Electronic	Telecom	Electrical	IT	Electronic	Telecom	Electrical	IT	IT
2000	Applicants	15			25					792
	Enrollments	13			21					35
	Graduates	11			18					33
2001	Applicants	22			27					749
	Enrollments	18			22					35
	Graduates	18			20					28
2002	Applicants	19			24	139				410
	Enrollments	17			21	35				72
	Graduates	15			21	29				69
2003	Applicants	26			29	114	125	25	100	322
	Enrollments	23			25	30	30	30	30	70
	Graduates	21			23	21	29	29	22	53
2004	Applicants	30			30	288	154	76	348	170
	Enrollments	26			24	60	60	30	60	60
	Graduates	26			24	57	56	26	55	71
2005	Applicants	35		30	40	343	217	84	385	198
	Enrollments	20		19	19	60	60	30	60	60
	Graduates	17		15	17	51	51	20	53	47
2006	Applicants	15	15	13	25	324	278	112	444	210
	Enrollments	8	10	13	18	60	60	30	90	90
	Graduates	7	10	13	16					69
2007	Applicants	20	20	19	40	400	326	112	728	392
	Enrollments	10	15	19	27	60	60	30	60	60
	Graduates	8	13	18	28					47
2008	Applicants	23	23	20	39	408	355	131	675	379
	Enrollments	23	23	20	30	60	60	30	60	60
	Graduates	11	14		18					
2009	Applicants	23	43	32	75	333	329	200	1066	379
	Enrollments	23	30	30	30	60	60	60	60	60
	Graduates									

Source: EEPIS

Note: Number of graduates is listed in the year of their enrollments (i.e. graduates under the line of 2005 are those among the students who were enrolled in 2005).

3.2.1.4 Output 4

In-service teachers' short-training courses for electric-related field were established and well managed. By fiscal 2005, 6 maintenance and repair training courses for technicians working at the state polytechnics and 17 training courses for polytechnic teachers were held, and a total of 154 trainees took the courses between fiscal 1999 and 2005. A questionnaire survey was carried out on the EEPIS graduates. Only four participants from the short-term

courses responded and two thought the courses were managed and operated very appropriately and one thought appropriately.

3.2.1.5 Output 5

The research and teaching capacity of EEPIS teaching staff members was largely improved. By the year 2005, the number of the teachers who earned the master or doctor degrees had reached 55, 45% of all the teachers, indicating an increase from the figures found at the terminal evaluation implemented in 2004 (37 persons and 32%) (Table 2). A total of 288 academic papers were presented between 1999 and 2005 at domestic and international conferences, and in 2005, an average of 0.5 papers was written per person. The ratio was largely maintained through the project although the figure slightly dropped from 0.6 in 2003 found at the terminal evaluation. A questionnaire survey was carried out on the EEPIS graduates. Based on the questionnaire answered by 30 D3 or D4 course graduates, a total of 27 graduates (90%) think the EEPIS teachers' teaching ability was very satisfactory (10 persons) and satisfactory (17 persons).

Tale 2   Number of EEPIS teaching staff by degree

(unit: persons)

| Year | Department | | | | | | | | (A) S2+S3 Total | (B) Total Teaching Staff | (A)/(B) |
| | Electronic | | Telecom | | Electric | | IT | | | | |
	S2	S3	S2	S3	S2	S3	S2	S3			
1999	2	0	2	1	4	0	0	0	9	69	13.0%
2000	2	0	4	1	4	0	0	0	11	80	13.8%
2001	2	0	5	1	4	0	1	0	13	117	11.1%
2002	3	0	8	1	4	0	2	0	18	105	17.1%
2003	7	1	10	1	6	0	6	1	32	109	29.4%
2004	13	1	13	1	8	0	6	1	43	108	39.8%
2005	16	2	14	1	11	0	10	1	55	122	45.1%
2006	19	3	16	1	12	0	13	1	65	120	54.2%
2007	23	3	19	1	13	0	16	1	76	133	57.1%
2008	26	3	22	1	13	1	16	1	83	133	62.4%
2009	29	3	24	1	18	2	19	1	97	138	70.3%

Source: EEPIS
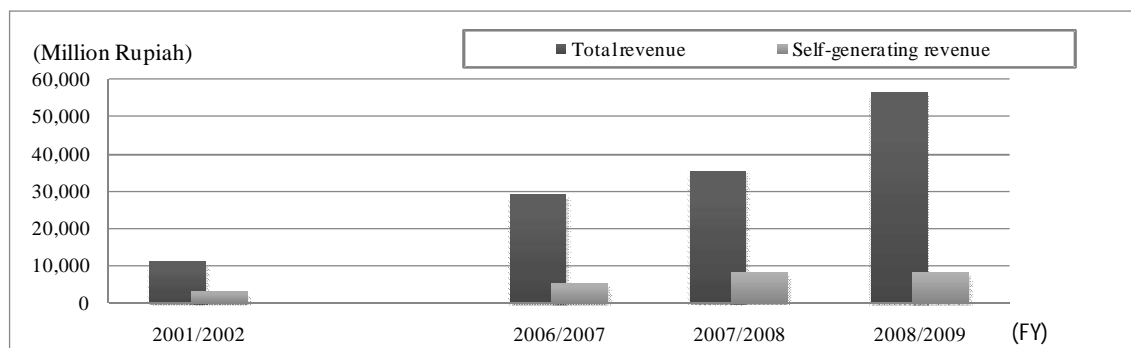
Figure 1   Revenue of EEPIS

Source: Mid-term Evaluation Report; EEPIS

3.2.1.6 Output 6

Management system of EEPIS was largely strengthened. The number of EEPIS teaching staff (C/P) has increased from 69 at the project starting point to 115 at the terminal evaluation in 2004, and by 2005, the number had reached to 122 (Table 2).   According to the mid-term evaluation, the number of companies utilizing JAS was 109 in 2000 and 131 in 2001. Furthermore, 165 companies are listed on the catalogue created by JAS in 2006. This result

indicates the reinforcement of relations with the companies. On the other hand, the number of new recruits out of the graduates JAS figures out was 53 in 1999, 43 in 2004, and 36 in 2005. This indicates there was still room to improve the rate of the report from the graduates. At the operation and maintenance center (calibration unit), four personnel remained from the terminal evaluation to the end of the project. In addition, the number of technicians and assistants who maintained and managed the equipment for laboratories at each department was 43 in 2005. According to the mid-term evaluation report published in December 2001, the revenue from EEPIS's self-generating activities was 884 million rupiah in 1999 and 3.1 billion rupiah in 2001, which constitute about 25 to 30% of the entire budget of EEPIS. In the ex-post evaluation, the revenue made by self-generating activities was 5.2 billion rupiah in 2006 which is 18 % of entire budget (Figure 1), although the continuity of the data from the mid-term evaluation has not been confirmed since there were no records found in the ex-post evaluation study regarding self-generated revenues before 2005. Considering the trend of EEPIS's budget expansion, although the proportion was dropped, revenue from self-generating activities was thought to play the role to support EEPIS's financial base.

3.2.2 Achievement of Project Objectives
3.2.2.1 Indicator 1
   The project objective was "to provide EEPIS with the ability to educate (1) for well qualified electric related polytechnic teachers and (2) for skilled information technology technicians as well".
   As the indicators related to (1) in the above objective, the number of graduates of D4 courses who were employed by polytechnics, and the level of satisfaction among the polytechnics which employed teachers trained at D4 or short-term courses were examined. As a result, training and capacity building for polytechnic teachers in electric-related field were implemented. However, it does not necessarily mean that the objective was fully achieved from the number and qualification point of view.
   The first batch of the students who took a Pre-service D4 course graduated in 2005, one year after the five-year-long project was over. However, since then, no comprehensive figure has been recognized for the number of the graduates who were employed by other polytechnics as teachers. Although it was not confirmed in the ex-post evaluation study whether the project had the target number of graduates of Pre-service D4 courses who would be employed as polytechnic teachers, there is only particular information confirmed on some graduates working at Malang Polytechnic in East Java, Caltex Polytechnic in Riau, Aceh Polytechnic in Aceh. From the EEPIS teacher's view, less than 10% of graduates become teachers after the completion of Pre-service D4 courses. In consideration of the above situation, it is not considered that the project produced enough number of polytechnic teachers as a whole.
   On the other hand, out of 246 graduates who completed In-service D4 courses between fiscal 2000 and 2005, 133 graduates proceeded to the teaching profession. Most of them were presumed to be existing teachers returning to their original place. The other In-service D4 courses were offered to the teachers working at vocational high schools or equivalent level and 108 students graduated by 2005. Based on the above facts, although In-service D4 courses have contributed to the capacity building for the teachers, it is confirmed that there was a limitation for the role of Pre-service D4 courses.
   As mentioned above in section 3.2.1.2, it is evaluated that the output of the project regarding Pre-service D4 courses was achieved, i.e. the courses were established and well managed. However, only small percentage of the graduates became teachers. The reason why the project did not achieve from this aspect was that the minimum qualification to become polytechnic teachers were raised to the master's degree level (Sarajana 2, hereinafter S2) by Government Regulation set forth in 2005. This affected the teacher's qualification which used to be obtainable at the graduation of a D4 course (equivalent of bachelor degree) which is no

longer possible[2].

With the change of the regulation, EEPIS's Pre-service D4 courses have become the courses with the purpose to train engineers with the equivalent of university graduation. The change in the regulations was not expected at the start of the project; however, it is believed that external conditions such as the "position of D4 as a training course for polytechnic teachers will not be changed" should have been clearly specified for achieving the project objective in the Project Design Matrix (PDM). It is presumed that the change of the position of D4 was not recognized at the time of the terminal evaluation. It is recommended to review the PDM if such a change that largely affects the indicators of the project is confirmed; however, revision was not made in this project because the change appeared after the project period.

3.2.2.2 Indicator 2

As the indicators related to (2) in the above project objective, the number of graduates who graduated D3 course for Information Technology and were employed by companies, as well as the level of satisfaction among the employers were examined. As a result, the evaluation is that the training for skilled information technology technicians has been successful.

The share of D3 IT course graduates employed by the companies was 37.5% in 2003, in the terminal evaluation. However, the corresponding figures for 2004 and 2005 were not identified by JAS. Based on the interviews with the teaching staff of the course, graduates are much in demand among companies, and almost all graduates find employment or start their own business in the early stage apart from some graduates who go on to bachelor courses (D4 or Sarajana 1 courses). Indeed, in the questionnaire survey carried out on EEPIS graduates, all of the 13 respondents were employed within 6 months after graduation of the course including ten of them within 3 months of graduation (including before graduation). Based on the survey conducted at the terminal evaluation about the satisfaction rate of the graduates in 2003 among 36 companies, around 89% answered that the graduates showed above average dedication to the companies. Although a later situation on the company's satisfaction was not directly understood because no answer for the questionnaire survey implemented as part of the ex-post evaluation was received, it was evaluated that the human resource development in the course matched the company's demand, as graduates found employment at the earliest stage as mentioned above.

Laboratory work at Electrical Engineering Department

This project has somewhat achieved its objectives, therefore its effectiveness is fair.

3.3 Impact

3.3.1 Achievement of Overall Goal

Regarding that "well-trained electric-related polytechnic teachers are provided to polytechnics nationwide" stated in the Overall Goal, it is evaluated that currently, qualified polytechnic teachers have not yet been provided sufficiently nationwide. One of the major challenges for DGHE is to upgrade the qualification of many existing polytechnic teachers who have not met the minimum requirement of S2. As of 2009, 38% of teachers in all public

---

[2] Current teachers without the minimum qualification require master's degree or above by 2014. Therefore, currently, limited numbers of D4 course graduates are employed as polytechnic teachers.

polytechnics still have the degree of S1 or D4, or lower diploma[3]. In addition, since there is no increase in the polytechnic teachers trained at EEPIS Pre-service D4 courses, it could not be concluded that well-qualified teachers have been supplied sufficiently to polytechnics at national level through the project.

By the data identified by JAS, related to the recent graduates, 8% (2 out of 25 graduates) of graduates of Pre-service D4 courses in 2007 have become teachers at polytechnics, and the figure remains 20% if those who have become vocational high school teachers are included. On the other hand, for In-service D4 courses, 31 graduates in 2007 and 23 graduates in 2008 become teachers. Students on In-service D4 courses include both current polytechnic teachers and general public and by the figure, most of current polytechnic teachers are understood to have returned to their work place after the courses (Table 3). In-service D4 courses for the vocational high school teachers have been offered continuously and in 2009, 43 students graduated.

Table 3 Number of graduates of In-service D4 courses and number of those proceeding to teaching positions

(unit: persons)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Number of graduates	29	38	36	44	50	49	36	67	43
(graduates who got teaching job)	19	25	20	28	22	19	24	31	23

Source: EEPIS

Note: The above figures do not include the graduates of In-service D4 classes for vocational high school teachers.

Therefore, although EEPIS has been continuously supplying teachers for polytechnics and vocational high schools, it is not necessarily appropriate to suggest that there is a sufficient supply of new teachers at a national level. The number of polytechnic teachers at public and private polytechnics specializing in electric field is currently around 4,800 nationwide, and the government is planning to increase this by 400 teachers by 2014.

One of the elements that impede supplying good teachers to electrical polytechnics is the change in teacher's qualification for polytechnics approved by the government to master's degree (S2), as mentioned in 3.2.2.1, which means the qualification is no longer provided by completing the D4 course. Thus Pre-service D4 courses at EEPIS has been changing their purpose to that of developing engineers at bachelor's level, and EEPIS has been placing more emphases on the activities to attract companies. It is mentioned in an expert's report, that while the project was in progress, a discussion was made about signing and submitting the confirmation letter acknowledging becoming a teacher after the graduation to Pre-service D4 course students. However, based on the interviews with the C/P, it has not been implemented because this makes no practical sense since EEPIS cannot guarantee the job placement for the graduates to other polytechnics.

On the other hand, regarding that "skilled technicians needed in industrial development are provided" stated in the Overall Goal, it is evaluated that the development of skilled technicians by polytechnics in electric-related field has generally been making progress. This was examined by the increasing number of the polytechnic graduates specializing in electric field after the completion of the project as a criterion, but no number of polytechnic graduates nationwide specializing in electric was obtained. However, the number of public and private polytechnics has increased from 47 in 2001/02 to 141 in 2006/07, and the target number of new polytechnics set by the government has also increased to 400 by 2025[4]. The total number

---

[3] Apart from the group of 38%, some teachers were taking Master's courses. If the two groups were combined, 57% of all teachers in public polytechnics had not met the minimum qualification at that point.

[4] ADB, "Polytechnic Development Project - Project Preparatory Technical Assistance Concept Paper"

of polytechnic students was around 100 thousand in 2006/07 and based on this figure, the number of students studying electric-related field is estimated around 60 thousand and the number of graduates are thought to be steadily increasing. One contributing factor to the general progress would be that Indonesia has sustained around 5% of annual economic growth since 2002, maintaining the condition that "the need for skilled technicians does not change drastically" which was set in the PDM.

3.3.2 Other Impacts

EEPIS has become a role model for other polytechnics and educational institutions by utilizing the accumulated experience from the project activities, and various impacts have been made, including for outside the country, through the activities listed below.

> Capacity development assistance to newly established polytechnics (such as designing the curriculums, organizational management).
> Providing the advisory service to the Community Colleges in East Java for the transition to polytechnics (currently agreement is concluded with 25 colleges).
> Offering advice and assistance to the development of polytechnics in other provinces or at the national level (such as polytechnic development project by ADB).
> Assistance for the capacity development for higher educational institutions for engineering at East Timor and Rwanda (dispatching experts from EEPIS for JICA project and receiving trainees), as well as implementing Third Country Training program by JICA.

The activities listed above are considered to be providing the impacts for the development of polytechnics as well as the improvement of their quality in a broad sense. The knowledge, method and experience gained through the project activities as well as the working experience with Japanese experts are understood to have been drawn on in no small measure. For instance, based on the interview with a teacher dispatched from EEPIS as JICA's third country expert in 2008, as a part of JICA's technical cooperation project assisting the capacity building of vocational school in Rwanda, while implementing the training at on-site in Rwanda, experience gained from this project as a C/P was used as reference, and he was conscious about replicating training methods used by the Japanese experts at EEPIS.

In addition, EEPIS has been continuously and actively participating in both international and domestic robot contest (Robocon) since 1991[5]. As a result, teachers and graduates are proud of EEPIS by raising the profile of EEPIS. This is also contributing to raising the awareness and understanding of the engineering field in the society.

Based on the above facts, the overall goal through implementing the project is not sufficiently achieved so far. However, it is evaluated that the experience and knowledge gained thorough the project have been making impacts in various forms both inside and outside of Indonesia.

Graduation ceremony for trainees from Rwanda (JICA Project for Strengthening the Capacity of Tumba College of Technology)

(December 2009)

[5] Robot contest was first participated by EEPIS with a cooperation of Japanese experts as part of a technical cooperation project "Electronic Engineering Polytechnic Institute of Surabaya Project (1987-1994)" prior to this Project. EPPIS won the first prize at the international contest organized in Japan in 2001. The contest was not included in the official cooperation activities, however, indirect cooperation such as advising, supervision, and attending to the contest were implemented by experts.

3.4 Efficiency (rating: a)

3.4.1 Inputs

Inputs	Plan	Actual Performance
(1) Experts	Main cooperation For Long-Term: Chief Advisor, Project Coordinator, Information Technology For Short-Term: about 100 persons	FY1999-2004 [6] 8 for Long-Term 106 for Short-Term FY2005-2006 0 for Long-Term (1 continuing from the previous year) 13 for Short-Term
(2) Trainees received	Main cooperation Fields of training: About 40 persons for Electrical Engineering, Electronic Engineering, Telecommunication Engineering, Information Technology	FY1999-2004 Fields of training: About 30 persons for Electrical Engineering, Electronic Engineering, Telecommunication Engineering, Information Technology FY2005-2006 1 person (2 continuing from the previous year)
(3) Third-Country Training Programs	None	None
(4) Equipment	Main cooperation Computer, equipment for experiment, calibrators/measuring instruments for research (approx. 200 million yen)	Computer, equipment for experiment, calibrators/measuring instruments for research (338 million yen)
Total Project Cost	Main cooperation 710 million yen	FY1999-2004 970 million yen FY2005-2006 40 million yen
Total Local Cost	Unknown	Unknown

Source: Evaluation Team

3.4.1.1 Elements of Inputs

Comparing with the planned inputs of the project (originally a five-year-long cooperation) and the actual inputs between fiscal 1999 and 2004, each element was input mostly according to the plan, and judging from the achievement, apart from a small portion, the inputs are overall thought to have been appropriate. Detailed analysis is as follows.

As for the long-term experts, Chief Advisor, Project Coordinator, and IT experts were dispatched. Short-term experts were dispatched in four areas including electrical engineering, electronic engineering, telecommunication engineering. The number of the short-term experts mostly matched the plan and based on the interviews with the C/P, it is acknowledged that the

---

[6] As mentioned in 1.2, this Project was initially implemented for 5 years until September 2004 (main cooperation), followed by the 2-year cooperation (follow-up cooperation). The Follow-up cooperation was not planned when the main cooperation started. Plan of inputs for the follow-up cooperation was not identified by the evaluation team. In addition, since the amount of actual inputs for each part of cooperation (main cooperation and follow-up cooperation) was not obtained separately, the actual performance was shown in the table by distinguishing the result of FY1999-2004 and that of FY2005-2006) for the convenience of analysis.

experts were dispatched according to the plan. Dispatching long-term experts was recognized as important in order to achieve the project goal, especially in IT which was a new area for the C/P. On the other hand, for the short-term experts, while the number and the areas were evaluated to be appropriate, the length and timing were not necessarily appropriate to the C/P. For instance, short-term experts tended to be dispatched between the school terms of their mother institutions, however, based on the comment from the C/P, some felt the burden to receive them because the timing was not appropriate as it often coincided with the busy times in the term, and that the length of the experts' visits, 7 to 10 days for each time, were not necessary long enough for the C/P to receive the training. For this reason, the effort of adjustment made by the C/P was thought to be contributing to some extent to generating the outputs of the project.

The number of the trainees was slightly lower than that originally planned (40 trainees), however, they were accepted in all 4 areas as planned. According to the C/P, there was not a big change from the plan regarding the dispatching the trainees.

For the provision of equipment, the actual amount (about 340 million yen) was greater than the plan (about 200 million yen). This was partly caused by additional provision of equipment for Pre-service D4 course for information technology whose cooperation was incorporated into the project after it started. In addition, it was presumed from an expert's report that unintended purchases had to be done for some equipment accommodated in the D4 building of EEPIS which was provided by a Japanese grant aid[7], since the grant aid project was facing a certain budget constraint. The grant aid project was formally decided after the project started and completed in 2004. Apart from this factor, the type, quantity, and timing of the equipment were mostly according to the plan. Based on the interviews with the C/P, provision of equipment was generally implemented according to the plan and it is understood that no excessive or undervalued equipment was provided.

For this project, the in-county study program was offered at the neighboring Institute of Technology Sepuluh Nopember, Surabaya (ITS), to obtain the master's degree for the C/P. The input amount and other planned figures were not able to be confirmed, however, as is mentioned in 3.2.1.5, the number of master's degree holders increased steadily throughout the project, and between 1999 and 2005, the percentage of the master's degree holders or above increased from 19% (13 persons out of 69) to 45% (55 out of 122). According to several C/P teaching staff who obtained the master's degree by the program, it is understood that the program has given them an excellent effect on their own teaching activities at EEPIS from the aspect of improving their expertise and treatment by obtaining the degree.

3.4.1.2 Project Cost

Although the total project cost was planned at 710 million yen in the ex-ante evaluation, the actual figure of inputs between fiscal 1999 and 2003 was about 890 million yen in total, and by fiscal 2004, the total sum was about 970 million yen. Based on this figure, the project cost during the cooperation period exceeded by around 30%. However, the input for the cooperation for the Pre-service IT D4 course, which was added to the output 2 and the additional purchases of equipment for the new D4 building after the start of the project, were not included in the original plan. Considering these circumstances, the cost difference between the original plan and its corresponding part is understood to be smaller, implying that the actual cost would have been slightly higher than planned. No information was obtained from the documentation or related parties for the planned input for each elements.

The planned input amount costing for the follow-up cooperation is unknown; however, actual amount for the implementation of the follow-up cooperation between fiscal 2005 and 2006 was around 40 million yen in total.

---

[7] Project for Expansion of Electronic Engineering Polytechnic Institute of Surabaya

3.4.1.3 Period of Cooperation

On the Record of Discussion (R/D) agreed with the Indonesian side, the cooperation period was 5 years from October 1999, and the actual cooperation ended in September 2004 as planned. The follow up cooperation was planned from October, 2004 to September, 2006 at the completion of the main cooperation project and has been implemented according to the plan. Based on this fact, the planned cooperation period (total of 7 years) coincided with the result (7 years), this means the project was implemented as planned.

The inputs are appropriate for producing outputs and achieving the project objective, therefore efficiency of the project is high.

3.5 Sustainability (rating: b)

3.5.1 Related Policy towards the Project

Higher education has been maintained as the Indonesian government's development issue to this day.

Education is positioned as one of the 11 priority areas at Indonesia's ongoing National Mid-Term Development Plan (RPJM 2010-14) succeeding the previous plan, and the improvement of access to higher education and the quality of teachers are included in this plan. Additionally, DGHE's ongoing strategy plan for higher education (Renstra 2010-14) targets to increase the proportion of the number of polytechnic students against S1 (bachelor) from 17% to 30%. For these reasons, the need for skilled technicians is considered to be maintained. Furthermore, the need for EEPIS graduates also remains high in terms of the capacity-building of industry and vocational high school teachers; however, the role of the Pre-service D4 courses to train new polytechnic teachers has receded due to the change of teacher's qualifications.

3.5.2 Institutional and Operational Aspects of the Executing Agency

It is evaluated that the organizational capacity of the C/P needed to maintain the project effect after the completion of the project has been ensured. For example, the number of the teaching staff at EEPIS has been increased from 115 at the terminal evaluation to 140 currently. The increased number includes newly employed teachers. However, there are still a large number of teachers who have been working since the project period or even before the start of the project. Current President and Vice Presidents, as well as the majority of heads of departments were directly involved to the project.

At EEPIS, high motivations have been sustained by the expansion of proactive actions and the operations listed below after the completion of the project, and through these activities, the operational capacity of the C/P is thought to be strengthened.

> Continuous entry into the robot contest to the present day.
> Distance education through the web for the In-service D4 course offered for vocational high school teachers has been started. EEPIS is planning to expand the distance education to other programs.
> Three new study programs listed as follows were started after the completion of the project. They are Mechatronics (started in 2006), Computer Engineering (started in 2007) and Multimedia Broadcasting (started in 2008). Another new study program for the area of power generation is planned to be opened in 2011.
> Extension and installation to the current school buildings has been in progress in response to increased student numbers and expansion of the courses.
> Network activities such as cooperation to other polytechnics have continuously been implemented. Since 2005, 10 different undertakings have been implemented including continuous cooperation relationship.

On the other hand, the operational capacity of JAS is not necessary strengthened. Although JAS has been asking the graduates to report their employment situation, the reporting rate is low and there is great variability depending on the year. The graduate capture rates are 37% in 2008, and 23% in 2009. Additionally, the lack of maintenance for the annual data and their inconsistency are recognized. These would partly be caused by lack of instructions from the predecessors and discontinuity of operation by the staff reassignment.

3.5.3 Technical Aspects of the Executing Agency

Educational research capability among the EEPIS teaching staff has been maintained and strengthened after the completion of the project. The number of master's and doctor's degree holders has increased from 55 (45% of all teachers) in 2005 to 97 (70%) in 2009 (Table 2). The number of the average research papers produced for domestic and international academic conferences has also increased from a total of 288 between 1999 and 2005 (an average of 41 papers per year, 0.5 report per person in 2005) to 251 between 2006 and 2009 (an average of 63 papers per year, 0.6 report per person in 2009), although the number varied depending upon the year (Figure 2).

The operation and maintenance of the materials and equipment are evaluated to be appropriately implemented. There are four personnel assigned to the operation and maintenance center as before, and a total of 34 technicians and assistants belong to the laboratories for each department. Based upon a part of the inspection for the equipment and materials provided by the project, they have been utilized and appropriately maintained to this day.
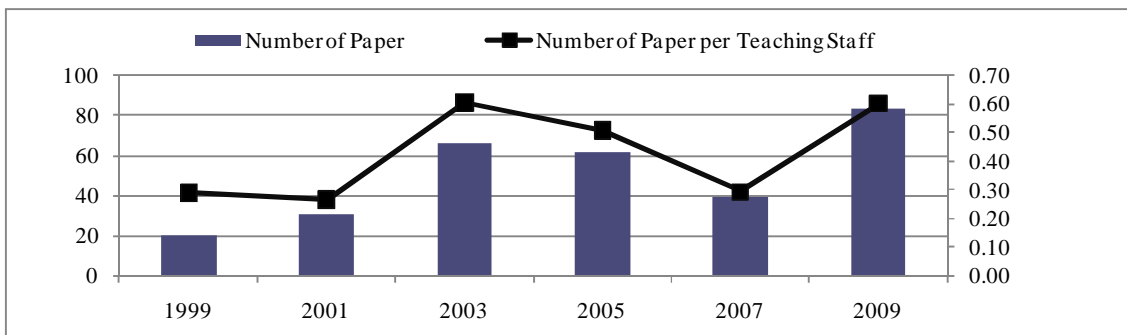

Figure 2   Number of research papers and average papers per person published by EEPIS teaching staff

Source: EEPIS

3.5.4 Financial Aspect of the Executing Agency

Regarding the financial status of the C/P, as a whole, the financial ground is stable because the self-generating income has been secured and its level is higher than when the project was completed. EEPIS's self-generating income went from 5.2 billion rupiah in fiscal 2006 (18% of the entire budget) to 8.2 billion rupiah in 2007 (23%), and 8.1 billion rupiah in 2008 (14%). Although there is variability, it has become a stable source of the income (Figure 1). EEPIS is also entrusted by private companies to provide training courses or develop the IT system every year.

Also, the government budget allocated to EEPIS has increased from between 9 to 12 billion rupiah during the project to between 20 and 30 billion rupiah in recent years. This is thought be caused mainly by the expansion of the ordinary budget due to the establishment of new courses. Additionally, income from the tuition fees has increased steadily by the establishment of new courses. Compared with other polytechnics, EEPIS's capacity to increase the budget through project proposals to the government is recognized to be high by the C/P itself. Therefore, the financial base is understood to be stable as a whole.

3.5.5 Continuity of Effectiveness/Impact

The sustainability of the effect regarding training for new polytechnic teachers is evaluated to be low. Based on the data recognized by JAS, the number of the Pre-service D4 course graduates that have become teachers is one each in 2008 and 2009. As mentioned above, the minimum qualification to become a teacher at polytechnic is now a master's degree (S2), therefore, most of D4 course graduates have found employment in private or public companies. On the other hand, effort to raise the capability of the current polytechnic teachers has continued by implementing the In-service D4 courses, and 31 teachers in 2007 and 23 teachers in 2008 were reinstated as teachers. However, the current teachers who obtained D4 qualification by attending the courses are obligated to obtain S2 by 2014.

In order to produce the continuous effect in future, it is necessary for EEPIS to provide the S2 teacher training courses. However, under the current law, polytechnics have no permission to offer S2 courses. EEPIS is currently envisaging the implementation of S2 course in order to offer teacher-training as a joint program with ITS[8], and it is also hoping to have an opportunity to provide S2 courses single-handedly under legal changes in future. Even if the provision of S2 program by polytechnics is to be permitted by the legal change, the minimum qualification of the teachers engaging to the course is expected to be the doctoral degree (S3). However, the number of the teachers holding S3 at EEPIS is as low as 5% in 2009.

Regarding the provision of the skilled technicians in the IT area, the effect is evaluated to be continuing. The D3 IT course has been continuously producing the graduates to the present and between 2005 and 2007, 210 students entered the course and 163 students graduated. Although the employment rates in 2008 and 2009 are as low as 14% and 3%, based on JAS's data, the reporting rate from the graduates to JAS remains very low and the teachers know that most graduates find employment in a relatively-short period or start their own business right after the graduation. Additionally, based on the survey carried out on the graduates, 7 out of 8 graduates after 2008 found the employment within 3 months of graduation and 1 within 6 months. Based on this fact, the course is evaluated to produce the engineers desired by the companies.

Some problems have been observed in the policy background and structural aspect of the executing agency, therefore, sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

Although the project was highly relevant and its efficiency was high, some parts of effectiveness and sustainability have not been recognized fully due to the rise in the polytechnic teacher's minimum qualification from D4 because of the change of Indonesian government regulation. However, activities and outputs regarding the provision of IT engineers have made a great contribution to the realization of effectiveness and sustainability. In addition, it is evaluated that the project has produced various impacts.

In light of the above, this project is evaluated to be (B) satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency
Recommendations for EEPIS are as follows:
EEPIS has been examining the possibility for the implementation of an S2 (master) program as a joint program with ITS in order to train polytechnic teachers under the

---

[8] EEPIS is placed under the organization of ITS and also located on an ITS campus. In a joint program, EEPIS's basic idea is that while ITS is the issuing organization for the master degree, EEPIS's resource will be used for the provision of the program including laboratory work and research.

new government regulation, and the discussion with ITS and DGHE has already started. EEPIS's approach, which aims to re-acquire the teacher training capability to provide the practical education, which is necessary for the polytechnic education, agrees with the central purpose of the project. Considering the ongoing movement and prospects of the policy and regulations, the necessary improvement of the qualification (to be specific, the improvement for the ratio of the teachers with doctoral degree) among the EEPIS teaching staff should be promoted.

JAS should improve its capture rate of the employment situation of the graduates, as well as keep and update the data with a unified format for each financial year. This data will be utilized not only for the EEPIS's analysis but also as useful and beneficial tool for the applicants, job-hunting students, and potential employers.

Recommendation for DGHE is as follows:

The positioning of the D4 course, aiming to train polytechnic teachers became unclear after the change of the government regulation regarding teacher's qualification. Under the current regulation which establishes S2 as the minimum qualification for university and polytechnic teachers, DGHE should sufficiently consider the polytechnics' characteristics whose aim is not only teaching academic theory and knowledge, but offering a practical and technical education. For instance, it would be possible to review the policy such as requiring the internship at a polytechnic for the students who want to be polytechnic teachers as a part of master's course work, or establishing a new certificate of technical education equivalent to S2 so that polytechnics provide this course. Based on the interview with DGHE, for the training of polytechnic teachers, DGHE recognizes the importance of knowledge and technical education in practical and applied fields which have a closer connection with the industry, rather than S2 which emphasizes on the traditional academic knowledge. DGHE explains that it is in a facilitatory role regarding the movement for establishing the master course in applied science at the university, or a joint program provided by polytechnic and university which excels in the practical education as proposed by EEPIS.

4.2.2 Recommendations to JICA

After more than 20 years of cooperation from Japan, EEPIS has developed to become an influential cooperation partner with JICA. Considering EEPIS's high motivation and influence in Indonesia, it is recommended to sustain the relation as an organization that supplies experts for JICA projects or offers third country trainings as an important cooperation resource. As part of this, after a deliberation on the feasibility for the joint program which EEPIS is considering, it would be possible to examine the soft-type of cooperation such as curriculum design.

The achievement of the project objective was highly influenced by the amendment of the regulation. For this reason, it is recommended that JICA should continue monitoring the policy environment and its changes regarding polytechnic development, as well as EEPIS's position in the policy, in order to ensure the sustainability of the project effect.

4.3 Lessons Learned

If the cooperation involves the establishment of a new course, or improvement of the management, it normally takes long period of time to produce the output from the input (e.g. the graduation of the students from enrollment, besides preparation period), and as observed in this project, it is possible to be able to confirm the output after the project ends. There is a possibility that fundamental external conditions for the project logic might change by or after the end of the project, so it is essential to recognize the risk of this change from the planning and implementing stage of the project. To do this, it is possible to create the concrete structures within the project which can identify the achievement of the

project by the C/P itself even after the project. For instance, a debrief meeting could be held to report the output or outcome when it is delivered.

A part of the logic from the outputs to the objective of this project did not work as planned, due to the regulation amendment. However, the C/P responded to the environmental change utilizing the high capacity and ownership accumulated through the project, and as a whole, it managed to give a certain amount of impact. Therefore, when the same kind of cooperation for the educational institutions is being planned, it is important to ascertain whether the C/P has sufficient capacity including financial and management capability and strong commitment to the project activities.

COMMENTS ON REPORT ON EX-POST EVALUATION
"THE PROJECT FOR STRENGTHENING OF POLYTECHNIC EDUCATION
IN ELECTRIC-RELATED TECHNOLOGY (SPEET)
IN THE REPUBLIC OF INDONESIA"

Assessor: Edy Priyono
(Executive Director, AKADEMIKA-Center for Public Policy Analysis)

The report looks well written.   The flow of the report is good and makes readers of the report understand about the substances easily.   However, we should be careful with some figures/facts regarding the employability of the graduates, because (in Indonesia, at least) usually it is not easy to trace and get information from graduates, and as an implication, that kind of data is usually underreported.

More generally speaking, the employability of graduates of vocational school and university is still a big issue in Indonesia. For illustration, in 2007 and 2008 unemployment rate among senior high vocational schools (SMK) graduates is the highest compared to any other education level (21% and 17% respectively).   In that circumstance, accurate and complete information from both supply side (schools/universities) and demand side (industries) is needed to get a clearer picture about the problem.   It is not directly related to the project, but if we can say or do something to help the government to solve the problem, or at least to understand better, that will be very useful.

Sustainability is one of key issues for any project.   I highly recommend such project to include improving capacity of local institution (i.e. ministry of education, university, business/professional association) to continue and/or to replicate the efforts (after the project is completed) to the project components.   In the 'normal' condition, the government of Indonesia is the institution responsible for supporting the education institutions including the EEPIS. External supports from some projects are very useful, but those will stop someday, and when it happens, ideally, the government is able to continue the support using their own resources. However, the problem is not only resources, but also the capacity of the local institutions.