Ex-Post Project Evaluation 2012: Package III-6 (Madagascar)

October 2013

JAPAN INTERNATIONAL COOPERATION AGENCY

ICONS Inc.

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Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2010, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2009. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

October 2013

Toshitsugu Uesawa
Vice President
Japan International Cooperation Agency (JICA)

Disclaimer

This volume of evaluations, the English translation of the original Japanese version, shows the result of objective ex-post evaluations made by external evaluators. The views and recommendations herein do not necessarily reflect the official views and opinions of JICA. JICA is not responsible for the accuracy of English translation, and the Japanese version shall prevail in the event of any inconsistency with the English version.

Minor amendments may be made when the contents of this volume is posted on JICA's website.

JICA's comments may be added at the end of each report when the views held by the operations departments do not match those of the external evaluator.

Republic of Madagascar

Ex Post Evaluation of Grant Aid Project

The Project of Classroom Construction of Primary Schools in Antsiranana and Toliara Provinces

(Le projet de construction de salles de classe d' écoles primaires dans les provinces d'Antsiranana et de Toliara)

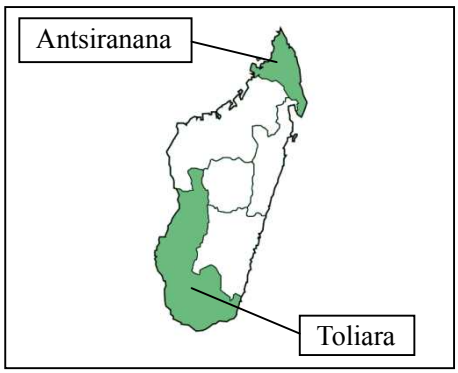
External Evaluator: Haruo Ito, ICONS Inc

0. Summary

The Project for the Construction of Primary School Classrooms in Antsiranana and Toliara Provinces (hereinafter: the Project) was implemented to support classroom construction in the two provinces. Its goal was to improve the education setting by alleviating classroom shortage, which was caused by population growth and aging school facilities. The ex-post evaluation revealed that the Project's purpose corresponded to the development policy and needs of Madagascar, and to the Official Development Assistance (ODA) policy of the Japanese government. Therefore, the relevance of the Project is considered high. The results of the field survey show that the effectiveness and impact of the Project are also high because of the increase in the number of pupils who benefited from it and the reduction in the pupil-classroom ratio. The improvement in the quality of education and achievements of the pupils brought about by the remediation of multiple classes is likewise seen as a positive impact. Efficiency is also high because both the project period and project cost were within the original plan. The sustainability of the Project is considered fair, as minor problems have been observed in the operation and maintenance system, and in financial and structural aspects; moreover, water facilities have not been properly maintained. In regard to the financial aspect, the budget allocation for each school's management board (called FAF [Fiarahana miombona Antoka ho Fampandrosoana ny sekoly]), which plays a role in maintaining school facilities, has been decreased since the political turmoil in 2009.

In light of the above, the Project is evaluated as highly satisfactory.

1. Project Description



Project Location

School Building Supported by the Project (Antsiranana)

1.1 Background

Education is considered one of the most important development issues by the government of Madagascar and the Strategic Plan for Education Sector Reform and Development (hereinafter: Strategic Plan)—the

basis of the foundation policy in education of the Poverty Reduction Strategic Paper (PRSP) in 2003. The Strategic Plan aims for a 100% completion rate in basic education by 2015 through its dissemination and the improvement in the quality of and access to education. Moreover, 'Education for All' (EFA), the medium-term implementation plan of the Strategic Plan, offered free primary education and school kits for all pupils, and school subsidies in accordance with the number of pupils; it constructed 2,000 classrooms and provided 2,000 teachers. As a result, the number of pupils increased from 2.3 million in 2000 to 3.82 million in 2006. The enrolment rate also rose in the same period—from 99.7% to 139.6%, for a net enrolment rate of 97.6%. However, the existing school facilities did not have the capacity to absorb the growing pupil population; it was reported that there was a shortage of 16,186 classrooms nationwide. Moreover, of the 50,760 public school classrooms available in 2006, 10.3% were makeshift structures that had been built by community members. Because the national budget was insufficient, the government had to rely on international donors for the construction or rehabilitation of school facilities. Nevertheless, the classroom shortage remained critical. Thus, after the completion of the Primary School Construction Project (Phase II) in 2004–2005, Madagascar requested to Japan for the school construction project with the Grant Aid for Community Empowerment scheme[1], which would provide the necessary budget for primary school facilities and related equipment.

1.2 Project Outline

The Project aimed to alleviate the classroom shortage caused by population growth and aging school facilities through the provision of classrooms, principals' offices, and toilets in primary schools in Antsiranana and Toliara, using the Grant Aid for Community Empowerment scheme.

Grant Limit/Actual Grant Amount	1,032 million yen/1,032 million yen
Exchange of Notes Date (Grant Agreement Date)	5 March 2007
Implementing Agency	Ministry of National Education (MEN)
Project Completion Date	Toliara: 13 June 2009 Antsiranana: 15 December 2009
Main Contractors	Construction Toliara: ENGEMAFI (Lots 1, 3, 6, 7, & 8), MANITRA (Lot 2), and HERIMANANA (Lots 4 & 5) Antsiranana: ENGEMAFI (Lots 1, 2, 3, 4, & 8), MANITRA (Lot 9), and HERIMANANA (Lots 5, 6, & 7) School Material Procurement Toliara: MENUISERIER D'ART (Lots 1, 2, & 4) and BCTP (Lot 3) Antsiranana: MENUISERIER D'ART (Lots 1, 2, 3, 4, & 5)
Main Consultant	GROUPEMENT SERT/TSR
Preparatory Survey	August 2006–March 2007
Related Projects (if any)	- Primary School Construction Project (1997–1998) - Primary School Construction Project, Phase II (2004–2005)

[1] The Grant Aid for Community Empowerment, one of the Grant Aid schemes started in 2006, supports the comprehensive capacity building of communities facing poverty, starvation, epidemics, and threats to safety; promotes construction that is based on local specifications and designs; and uses local suppliers and equipment to reduce implementation cost. The Project was implemented right after the Grant Aid for Community Empowerment scheme was completed.

2. Outline of the Evaluation Study

2.1 External Evaluator

Haruo Ito, ICONS Inc. (Senior Consultant)

2.2 Duration of Evaluation Study

Duration of the Study: November, 2012–November, 2013

Duration of the Field Study: 12 January–9 February 2013; 30 March 2013–13 April 2013

2.3 Constraints during the Evaluation Study

Due to budgetary and time constrains, the beneficiary survey[2] was carried out by local consultants only in one of the two targeted provinces—Antsiranana. The Japanese consultant, on the other hand, implemented the field survey[3] in both target provinces, interviewing principals, teachers, pupils, and FAF members (parents) and conducting a visual inspection of school facilities. The current situation of the target schools was analysed using available statistical data from the Regional Branch of National Education (Direction Régional de l'Education Nationale [DREN]) in both provinces.

3. Results of the Evaluation (Overall Rating: A[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Relevance to the Development Plan of Madagascar

At the initiation of the Project in 2006, the Madagascar Action Plan 2007–2012 (MAP) was developed as a replacement for PRSP, which was due for completion in that year. MAP has eight main goals, the third being the improvement of the education system to provide internationally competitive human resources (following the promotion of good governance and development of infrastructure). However, the political turbulence in 2009 has had a negative impact on the education sector; according to a survey by the National Bureau of Statistics, the net enrolment rate has fallen from 83% in 2005 to 73.4% in 2010, thus threatening the achievement of EFA indicators. Under these circumstances, during the ex-post evaluation in April 2013, the Mid-Term Plan for Education 2013–2015 (Plan intérimaire pour l'éducation 2013–2015) has been drafted by the Ministry of National Education (MEN) and donors as a tentative sector development plan during the political stabilisation process. Increasing the number of primary school buildings will be one of the targets of the Mid-Term Plan under the overarching goal of expanding basic education.

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[2] The beneficiary survey covered 49 of the Project's 52 target schools: 28 in Antsiranana and 21 (out of 24) in Toliara (statistical data from DREN only).
Sampling number: school principals 28, pupils 139
Survey contents: educational statistics (umber of pupils, enrol rate and pass rate) and facility conditions.

[3] In addition to beneficiary survey, the Japanese consultant visited 16 schools, eight each in Antsiranana and Toliara for conducting interview to related personages and facility check. School principals, teachers, pupils and FAF members were interviewed during the visit.

[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[5] ③: High, ②: Fair, ①: Low

For the above reasons, the project goal is highly relevant to the country's development plan, both at the project initiation and the ex-post evaluation.

3.1.2 Relevance to the Development Needs of Madagascar

The number of pupils in primary schools has increased because of the sensitisation of community members and heightened parent awareness of the importance of education. The school-age population at the primary level has also been expanding (see Table 1); therefore, the need for additional classrooms is still high.

Table 1: School-Age Population at the Primary Level (between 6 and 10 years old)

2007–2008	2008–2009	2009–2010	2010–2011
2,680,136	2,760,137	2,842,525	2,927,374

Source: Plan intérimaire pour l'éducation 2013–2015

In 2006, 10.3% of the 50,760 classrooms in public primary schools were makeshift structures that had been constructed by community members. Although the old classrooms are becoming run-down, and roofs and building frames are damaged by cyclones that hit Madagascar annually, classroom renovation has not been implemented properly. Since the political turbulence in 2009, school building programs by donors have been suspended. As a result, the proportion of classrooms that were temporarily built by the community increased to 13.5% in 2012. This shows that the implementation of the Project corresponds to the needs of Madagascar, as the classroom shortage is still critical.

3.1.3 Relevance to Japan's ODA Policy

In regard to Japan's aid policy for Madagascar during project initiation in 1997, the promotion of 1) basic human needs (education, health and medical care, and water supply); 2) infrastructure for regional development; 3) agriculture, fisheries, and the environment; and 4) human resource development was a priority in the policy consultation of the Ministry of Foreign Affairs in 1997. Thus, the Project's goal of improving the educational environment was consistent with Japan's aid policy. In addition, 1) poverty reduction through economic growth, 2) the promotion of human-centred development, and 3) the consolidation of the peace process were also priority development agendas in the third Tokyo International Conference on African Development (TICAD III) held in September–October 2003. The Project's support for education was relevant to 'the promotion of human-centred development' in the agendas of the TICAD III.

Since the Project is compatible with the country's development plan, development needs, and Japan's ODA policy, its relevance is considered high.

3.2 Effectiveness[6] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

(1) Number of Pupils in the Target Schools

The results of the beneficiary survey revealed that the number of pupils increased slightly, from 29,508

[6] Sub-rating for effectiveness is to be set in consideration of impact.

during the preparatory survey in 2006–2007 and 29,860 at the project completion in 2009–2010, to 29,719 during the ex-post evaluation in 2011–2012 (see Table 2).

In some of the target schools, the number of pupils dropped during the project implementation, mainly because of the establishment of private schools in neighbouring areas and the displacement of people resulting from the deterioration of security in rural areas or the closure of local factories.

Table 2: Number of Pupils and Classrooms in Each Target School

	Target Provinces	2006–2007 Baseline	2009–2010 Project Completion	2011–2012 Ex Post Evaluation
Number of Pupils	Toliara	18,814	18,925	19,387
	Antsiranana	10,694	10,935	10,332
	Total	29,508	29,860	29,719
Number of Classrooms	Toliara	225	n.a.	322
	Antsiranana	115	n.a.	162
	Total	340	n.a.	484[7]

Source: Beneficiary Survey

Of the 204 classrooms constructed by the Project, 126 were old classrooms that were rebuilt. The Project set the indicator showing that the learning environment for 12,600 pupils[8] will improve once the old classrooms are rebuilt. The results of the beneficiary survey proved that even though the Project has accomplished its original target, the number of pupils studying in the 126 rebuilt classrooms has reached 16,546, thereby increasing the pupil-classroom ratio. However, as regards the improvement of the learning environment in the target schools, many of the classrooms constructed by the community or Malagasy government before the Project were makeshift structures, with noise and leaking roofs, and an insufficient number of desks and chairs. Thus, for the 16,546 pupils now studying in the classrooms rebuilt under the Project, the learning environment has nevertheless improved.

Classroom with Clay Wall Constructed by the Community

[7] The Project built 78 new classrooms and rebuilt 126, for a total of 204. The current number of classrooms has increased because of the classroom building implemented by the local government and community.

[8] Number of rebuilt classrooms multiplied by the ideal number of pupils per classroom multiplied by two-shift system (in this case, 126 × 50 × 2).

(2) Pupil-Classroom Ratio

The results of the beneficiary survey show that the average pupil-classroom ratio in the target schools has slightly decreased (see Table 3). However, the pupil-classroom ratio of 63 after the project completion in 2008–2009 fell short of the target ratio of 52 that was set in the preparatory survey. The reason was that the number of schools with double-shift classrooms decreased since the time the indicator was set up[9]. However, the significant improvement over the pupil-classroom ratio of 91 before the Project (2003–2004) is a sign that overcrowding in classrooms has been eliminated. Therefore, by relieving teachers of the heavy burden of handle many pupils in a class and promoting contact between the teachers and the pupils, the Project has improved the quality of learning.

Table 3: Pupil-Classroom Ratio in Target Schools

2006–2007 (Baseline)	2009–2010 (Target)	2009–2010 (Completion)	2011–2012 (Ex Post Evaluation)
91	52	63	61

Source: Beneficiary Survey

With regard to the number of teachers in the target schools, the principals in 92.9% of the schools replied that the number of teachers has increased since the project completion. This self-help effort of the Malagasy side—the allocation of the necessary number of teachers—which also helps improve the learning environment, has likewise been implemented according to the original agreement of the Project.

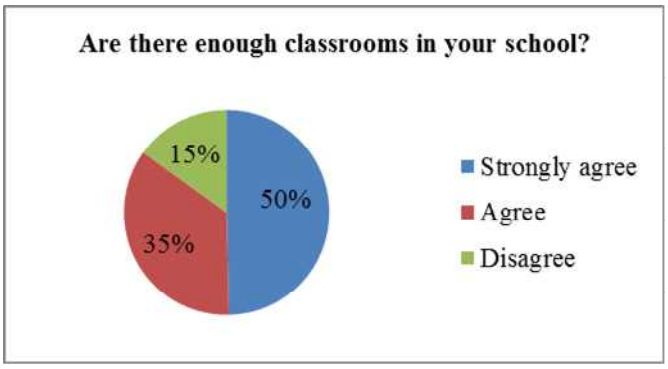
(3) Fewer Double-Shift Classes

By increasing the number of classrooms, the Project has helped reduce the need for double-shift classes. The results of the beneficiary survey show that from 98.0% before the project implementation, the number of schools[10] practicing double shifting decreased 26.6 percentage points to 71.4% after the Project increased the number of classrooms. The reduction in double-shift classes allows the target schools to secure standard class hours and the teachers to spend more hours for the preparation of teaching because of the reduction of their working load. Furthermore, teachers are able to conduct lessons in the morning, when pupils have better concentration, which positively affects the pupils' performance. Additionally, the reduction in double-shift classes has encouraged parents to send their children to school because the latter would no longer have to commute in the late afternoon.

3.2.2 Qualitative Effects

A beneficiary survey was conducted on 139 pupils in the target schools regarding their satisfaction with the Project's construction of classrooms. Around 85% replied that they 'strongly agree' or 'agree' to the question 'Are there enough classrooms in your school?' (see Figure 1). This implies that the Project installed enough classrooms in the target schools.

[9] The implementation rate of double-shift classes decreased from 98.0% (before the Project) to 71.4% (after the Project).
[10] Sample size = 49 schools (out of the Project's 52 target schools): 28 in Antsiranana and 21 in Toliara.



Source: Beneficiary Survey

Figure 1: Pupil Satisfaction with the Number of Classrooms

Of the 56 schools targeted by the beneficiary survey, only five refused to accept pupils: two, because of limited classroom capacity and three, because of the lack of teachers. This shows that the Project has provided most of the target schools with enough classrooms.

3.3 Impact

3.3.1 Intended Impacts

(1) Result of the Elementary Certificate of Primary Education

Although the average passing rate in the final examination of primary education (Certificat d'Etudes Primaires Elémentaires: CEPE) of the target schools in Antsiranana has been slightly lower than the national average for the past three years, the average passing rate of the other target schools has been considerably higher than that of Antsiranana[11]. Furthermore, 89.3% of the target schools responded that the learning motivation of pupils (e.g. increase in the attendance rate and attitude towards their studies) has improved since the Project built new classrooms. Various other factors contribute to a better passing rate in the final exam, and the improved learning environment resulting from the Project's classroom construction is considered one of them.

Table 4: Passing Rate of CEPE in Target Schools[12]

	2008–2009	2009–2010	2010–2011
Nation	78.5%	76.9%	74.4%
Antsiranana	67.5%	75.5%	48.9%
Target schools	72.6%	76.6%	67.3%

Sources: MEN, DREN, and Beneficiary Survey

(2) Enhancement of the FAF[13] Function by the Soft Component

Seminars on school operation and maintenance analysis, budget planning and accounting, facilities check

[11] The reason for the low passing rate in Antsiranana in 2011 was not confirmed in the field survey.
[12] Sample size: only 28 target schools in Antsiranana.
[13] FAF (Fiarahana miombona Antoka ho Fampandrosoana ny sekoly) means 'school development partnership' (Partenariat Pour le Développement des Etablissements Scolaires [PPDES]). FAF is sort of a school management committee that each school is required to form under ministerial ordinance No. 2002/1007, issued in 11 September 2002. The committee has seven or eight members, composed of residents, principals, teachers, pupils, etc.

and maintenance, and operation of the pupils' congress were implemented as the Soft Component of the Project. The positive impacts of the Soft Component on the enhancement of the FAF function have been confirmed, such as holding a General Assembly regularly to discuss school maintenance problems, strengthening participation in school activities, and ensuring the transparency of the FAF fund by reporting to community members how it was used. However, the activities of FAF members and monitoring of FAF activities by DREN and the Circonscription Scolaire (CISCO) have been constrained by the low budgetary allocation, decrease in the subsidies for FAF, and transfer of FAF members who had attended the seminars. As a result, the continuity of the said positive impacts has been impeded. Moreover, the fact that only 54.2% of FAF (in 13 out of 24 schools) is currently involved in the maintenance of school facilities further dampens the positive impacts.

(3) Reduction of the Burden of School Maintenance on the Community

Across the country, 13.5% of primary school classrooms are makeshift structures that were built in 2012 with the support of the community. Low-standard materials were used, such as wood or mortared adobe bricks, and galvanised iron for the roofs. Therefore, regular building maintenance and the repair of roofs, doors, and windows damaged by cyclones were a burden on the school staff and community members. The results of the interviews show that the construction of classrooms by the Project—using high-quality materials, mortar, etc.—did away with roof leaks and ensured proper ventilation, thereby reducing the schools' maintenance expenses.

(4) Sanitary Improvement through the Installation of Toilets

Before the Project, few pupils used toilets because schools either had too few of them or none at all. The results of the beneficiary survey show that the sanitary environment has been improved in all target schools with the installation of toilets by the Project. Moreover, the improvement in health conditions brought about by the pupils' behavioural change (e.g. lower incidence of diarrhoea) is identified as the synergistic effect of health education; specifically, the instruction on the proper use of the toilet by other donors.

(5) Function as a Cyclone Shelter

The target area of the Project is frequently damaged by cyclones. The survey confirmed that since anti-cyclone specifications were applied in the project construction, the classrooms can be used as shelters when cyclones hit.

3.3.2 Other Impacts

(1) Impacts on the Natural Environment

No negative impacts, such as the noise from school construction sites, soil disposal, and sewer water from toilets, were identified in the field survey.

(2) Land Acquisition and Resettlement

To be listed as a prioritised school construction site, documents proving site ownership (Certificat d'Immatriculation et de Situation juridique) have to be presented, and the target area should have no squatters. Since the classrooms, toilets, and water supply facilities of the Project were constructed on existing school sites, the Project has had no problem in the resettlement of residents.

The Project has largely achieved its objectives; therefore, its effectiveness and impact are high.

3.4 Efficiency (Rating: ③)

3.4.1 Outputs

(1) Outputs of the Japanese Side

The project provided classrooms, principal's offices and warehouses, toilets, and water supply facilities to 52 schools in the two target provinces. As shown in Table 5, the 64 target schools in the original plan were reduced to 52. Rising material, labour, and transportation costs, and foreign exchange losses are reported as the factors that led to the reduction of target schools in Toliara during the first term of the Project. The two schools in Antsiranana that were eliminated in the second term had private property issues and lacked access roads. Because the target schools were decreased, the number of toilets, and principal's offices and warehouses were reduced accordingly. Nevertheless, despite fewer target schools, the number of constructed classrooms increased from 200 (planned) to 204 (accomplished) because the competitive tender for the second term of the Project in Antsiranana produced surplus funds.

Table 5: Planned and Accomplished School Facilities

	Planned			Accomplished		
	Total	Toliara	Antsiranana	Total	Toliara	Antsiranana
Target school	64	34	30	52	24	28
Classroom	200	91	109	204	65	139
Principal's offices/warehouses	32	14	18	10	17	27
Toilets	64	34	30	52	24	28
Water supply	24	5	19	24	5	19

Sources: Preliminary Survey Report (2007) and Completion Report (2010)

Furniture and equipment were procured for the 52 target schools (see Table 6).

Table 6: Procured Furniture and Equipment

- Classroom: desks and chairs of pupils and teachers, cupboards
- Principal's office: desks and chairs of the principal, meeting chairs, cupboards, bulletin board
- Warehouse: books, storage shelf

Source: Completion Report (2010)

(2) Soft Component

The Soft Component seminars of the Project have been implemented in the 52 target schools as planned. The attendees were representatives from CISCO and the Zone Administrative Pédagogique (ZAP),

principals, teachers, and parents. The total number of participants was 2,571 (565 in Toliara and 2,006 in Antsiranana). Table 7 presents the seminars and manuals of the Soft Component.

Table 7: Training and Training Manuals of the Soft Component

Content of the Seminars	Developed Manuals
- Understanding the present condition and future needs of the school - Diagnostic facilities and developing a maintenance plan for the school - Formulating management financial plans of the school and school accounting for accountants - Introducing maintenance and hygiene education for toilets and water supply facilities	- Manual for the Management Planning Committee - Manual for the Facilities Maintenance Committee - Manual for the Budget and Accounting Committee - Manual of Health Education for Pupils and Teachers - Cartoon and Video for School Management

Source: Soft Component Completion Report (2010)

(3) Outputs of the Malagasy Side

The Malagasy side carried out its obligations according to plan; for instance, it obtained the necessary land and expedited construction and equipment procurement. However, the installation of school gates and perimeter fences where needed has not been carried out in some target schools. Thus, neighbourhood residents can freely use the toilets and water supply facilities of the schools, which makes it difficult to keep them in a good condition.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The original project cost was placed at 1,032 million yen, and the actual disbursement also amounted to 1,032 million yen (100% of the planned amount). Therefore, the project cost stayed within the budget.

3.4.2.2 Period of Cooperation

The planned project period was 35 months (see Table 8), but the Project was completed in 25.3 months—well within the planned period. At the start of construction, some contractors had difficulty securing human resources, equipment, and machinery due to the tight credit situation. This was precipitated by the economic crisis wrought by political instability. However, the Project was able to avoid major disruptions because the tender for local contractors was implemented under strict conditions, including the verification of the contractors' financial status. Even though local contractors were hired under the Grant Aid for Community Empowerment scheme, the transfer of technology to them and the appropriate process control by the Japanese construction supervisor contributed to the shortening of the project period.

Table 8: Planned and Actual Project Implementation Period

Planned	Actual	Actual/Planned
35 months	25.3 months (from 7 November 2007 to 15 December 2009)	72%

Sources: Preliminary Survey Report 2007 and Completion Report (2010)

The contract amount of the Soft Component was 252,500,000 MGA[14] (100% of the planned amount). The planned implementation period of the Soft Component was 34 months, but it was completed within 25 months (from December 2007 to December 2009) or 74% of the allotted time.

Both the project cost and project period were within the plan; therefore, the efficiency of the Project is high.

Box: Comparison of the Grant Aid for Community Empowerment and Grant Aid for General Projects

1. Features of the Grant Aid Projects

The ex-post evaluation compared the Grant Aid for Community Empowerment and Grant Aid for General Projects carried out in Madagascar. The Grant Aid for Community Empowerment tried to strike a balance between quality and cost reduction in school facility construction. The quality of the facilities constructed under the Grant Aid for Community Empowerment is somewhere between the quality of those constructed by other donors (e.g. the World Bank) using local standards and that of the Japanese Grant Aid for General Projects. The advantages and disadvantages of each Grant Aid Project are as follows:

	Grant Aid for General Projects Primary School Construction Project Phase II	Grant Aid for Community Empowerment Project for the Construction of Primary School Classrooms in Antsiranana and Toliara Provinces
		
Advantages	- High durability - High-quality finish - Reliable term of works	- A large number of classrooms due to the low unit cost
Disadvantages	- Fewer classrooms due to higher cost	- Finishing quality is lower than that of the Grant Aid for General Projects - Risks in low quality, delay of the project period

2. Costs of the Grant Aid Projects

The unit construction cost of classrooms divided by the total cost under the Grant Aide for General

[14] 1 MGA (Malagasy ariary) = 0.042 yen (as of February 2012)

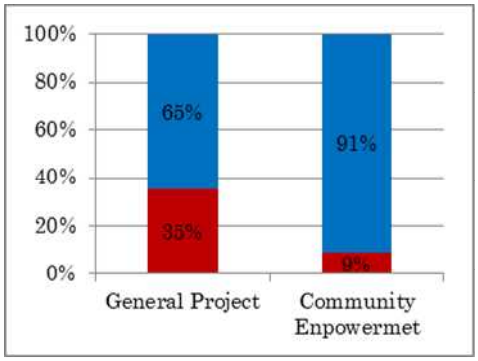
Projects was 5,995 thousand yen and under the Grant Aid for Community Empowerment, 4,939 thousand yen. Therefore, the objective to reduce construction cost of the Grant Aide for Community Empowerment was attained. For comparison, the two-story school building of the Grant Aide for General Projects designed by Japanese consultants had glass windows and flushing toilets; the Grant Aide for Community Empowerment used local standard designs, specifications, and contractors. There are the factors of this reduction. In the Grant Aide for Community Empowerment, 26% of the total project cost was allocated to the indirect expenses (procurement agency and supervision expense) for the tender preparation, contractor selection and project management conducted by Japanese engineers. The proportion of the indirect expenses in the total cost was high, however it can say that this high proportion was necessary in order to secure the quality construction, even if using local contractors.

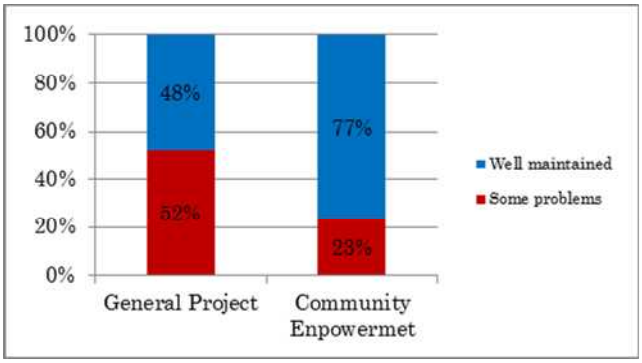
3. Important Factors of the Grant Aid for Community Empowerment

The Grant Aid for Community Empowerment project, even if it hired local contractors, was of appropriate quality and finished the work ahead of schedule. Its biggest asset was the Japanese technical manager under contract with the Japan International Cooperation System (JICS), the procurement agency of this project. He has 28 years of working experience in Madagascar and an interpersonal relationship with the senior management of each contractor. He handled the technology transfer to contractors and local consultants. At the start of the construction period, some construction companies had difficulty providing materials, human resources, and equipment because it was hard to secure loans from banks. This was due to the economic crisis caused by the establishment of the new regime. However, the project operated without any major disruptions, as it implemented the tender under strict conditions, including the verification of the contractors' financial status. In the selection of local consultants and contractors, it is important to confirm the financial status of bidders and reflect their status in the selection of the tender.

4. Outcomes of the Grant Aid Projects

The results of the facility check in the beneficiary survey (see Figures 1 and 2) show that the Grant Aid for Community Empowerment had fewer maintenance problems because local procured materials and spare parts were applied for the design of classrooms and toilets, and because local standard specification were improved in consideration of the durability of those facilities.





Source: Beneficiary Survey

Figure 1: Maintenance Status of Classrooms

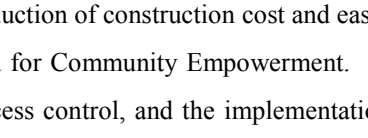


Figure 2: Maintenance Status of Toilets

The reduction of construction cost and easy maintenance were identified as the major advantages of the Grant Aid for Community Empowerment. On the other hand, technology transfer to local contractors, strict process control, and the implementation of the tender, including criteria, on the bidders' financial status were identified as important factors for the effective management of the project. The comparative advantages of the Grant Aid for Community Empowerment will be strengthened by further reductions in the total costs through the efficient implementation with reflecting experiences of the former Grant Aids for Community Empowerment to other projects..

3.5 Sustainability (Rating: ②)

3.5.1 Institutional and Operational Aspects of the Implementing Agency

Table 9 shows the maintenance management system in each administrative level.

Table 9: Organisations and their Roles in School Maintenance

Related Organisations		Roles in School Maintenance
National	MEN	Developing school construction and rehabilitation plans nationwide, school monitoring, and budget management. Seven technicians are assigned to school facilities.
Province	DREN	The Planning Division of DREN contacts CISCO and MEN in regard to the development of the plan for school rehabilitation and monitoring, and budget management. DREN scarcely has technicians for school facilities.
District	CISCO	Developing school rehabilitation plans at the district level, school monitoring, and budget management. CISCO has no technicians for school facilities.
Zone	ZAP	School monitoring and reporting to CISCO. ZAP has no technicians for school facilities.
School Level	FAF	Maintenance of school facility by FAF members using the FAF fund.

Source: Ex post evaluation

At the national level, the Department of Land Assets and Infrastructures in MEN has seven technicians; it is in charge of the school infrastructure rehabilitation plan and monitoring school facilities. Moreover, one or two persons in the Planning Division in DREN (regional level) and CISCO (district level) are responsible for budget management and monitoring school facilities. The maintenance of facilities at the school level is the duty of FAF members, but their activities are limited by insufficient FAF funds. The results of the beneficiary survey show that FAF has been established in all target schools[15]. However, enhancing the school maintenance system by activating functions of FAF remains an issue, as only 13 out of 24 (54.2%) of the FAF in target schools are involved in school maintenance activities. In addition, although indispensable, the periodical monitoring of FAF activities in target schools by CISCO and ZAP is

[15] FAF has managed and maintained school buildings since 2002, after the establishment of FAF in each school was legislated by ministerial ordinance.

hampered by an insufficient budget.

3.5.2 Technical Aspects of the Implementing Agency

The evaluation team confirmed that the engineers of the Land and Facilities Management Office, the department in charge of school infrastructures in MEN, have sufficient skills for monitoring and developing the facility repair plan. At the regional level, DREN and CISCO also have the skills for the periodical monitoring and budget management of school facilities. However, DREN and CISCO allocate a limited number of technicians for the maintenance of school facilities. The Soft Component was aimed at detecting school facility conditions; however, the maintenance being carried out at present does not require any special techniques. In fact, after the completion of the Project, actual school maintenance has not required special skills, as current repairs are limited to door locks and revarnishing—something that even residents or school staff are capable of doing. In addition, since members of FAF school maintenance committees in some schools are composed of electricians, plumbers, carpenters, and plasterers, they are considered to have enough skills for the task. On the other hand, only 43% of target schools have utilised the maintenance manuals developed by the Soft Component, as school maintenance activities reportedly involve only daily cleaning or simple repairs.

3.5.3 Financial Aspects of the Implementing Agency

The national budget for the construction and maintenance of school buildings is secure in the Directorship of Land Assets and Infrastructures of MEN, and is distributed according to the prioritised applications from DREN or each school. However, since the budget is insufficient, MEN is unable to construct new school buildings. Therefore, only the emergency repair of school facilities that were damaged by cyclones or other natural calamities is prioritised. Table 10 presents the national budget of MEN for school facilities.

Table 10: National Budget of MEN for School Facilities

(Unit: 1,000 MGA)

	2010	2011	2012
Rent, water, electricity, and communication	0	45,000	15,000
Furniture	0	41,462	35,000
Transportation	15,000	161,862	75,000
Maintenance	0	25,000	25,000
School buildings	127,500	38,826,000	1,358,044
Total	142,500	39,099,324	1,508,044

Source: MEN

In addition to the national budget, governmental subvention to FAF (FAF fund) is distributed to each school according to the number of pupils. The fund is intended for buying pupils' textbooks and stationery, but part of it has actually gone to the maintenance of school facilities. The FAF fund used to be increased yearly (see Table 11), but political turbulence has caused its suspension. The purpose of the FAF fund is to reduce the financial burden of parents, so that schools do not generally require contributions

from them. However, the teachers hired by FRAM[16] are paid by parent contributions; the bulk goes to the part-time FRAM teachers.

Table11: Governmental Subvention to FAF

(in MGA)

	2010	2011	2012
Total	4,743,810,340	6,298,995,563	7,803,999,990
Total per pupil	961	924	2,000[17]

Source: MEN

Compared to the cost of maintaining other school facilities, that of the Project's target schools is low, as the work involves only daily cleaning and simple repairs (repainting, replacement of door locks, etc.) because of the high construction quality. Therefore, the average operation and maintenance cost of each target school is only 158,313MGA (about 6,649 yen) per year (see Table 12). Since the priority of the FAF subsidy is textbooks and stationery, it is not enough to cover the repair of damaged toilets and windows, however the minimum maintenance activities of each target school are conducted within the budget.

Table 12: Average Operation and Maintenance Cost of the Target Schools

(in MGA)

	2010	2011	2012
Classroom	41,852	51,481	31,596
Furniture	29,217	14,291	13,333
Equipment, spares	201,199	215,830	113,384
Total	272,267	281,602	158,313

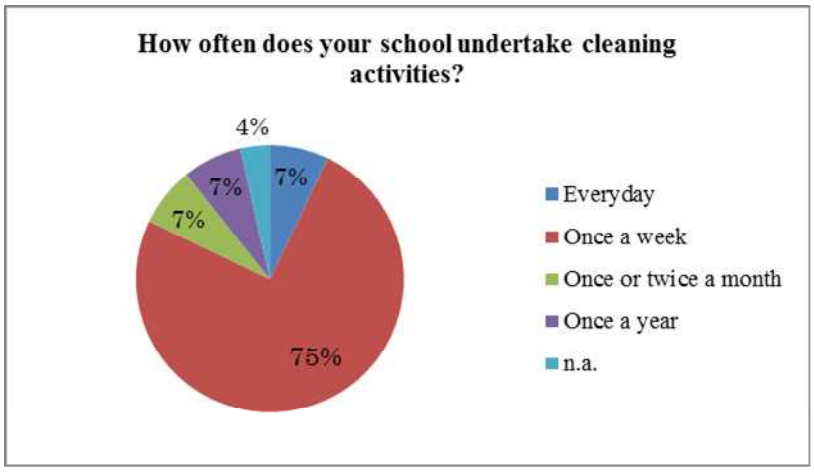
Source: Beneficiary Survey

Meanwhile, UNICEF distributes the Fonds Catalytique Local (FCL)[18] to the schools to compensate for the insufficiency of the FAF fund. Though the FCL also prioritises the textbooks and stationery of the pupils, part of it can be used to improve the learning environment by maintaining the school facilities.

3.5.4 Current Status of Operation and Maintenance

In its school visits, the ex-post evaluation team confirmed that the school facilities established by the Project were sufficiently maintained. Further, the results of the beneficiary survey show that 82% of the target schools rotate pupils and teachers in cleaning the school building at least once a week (see Figure 2).

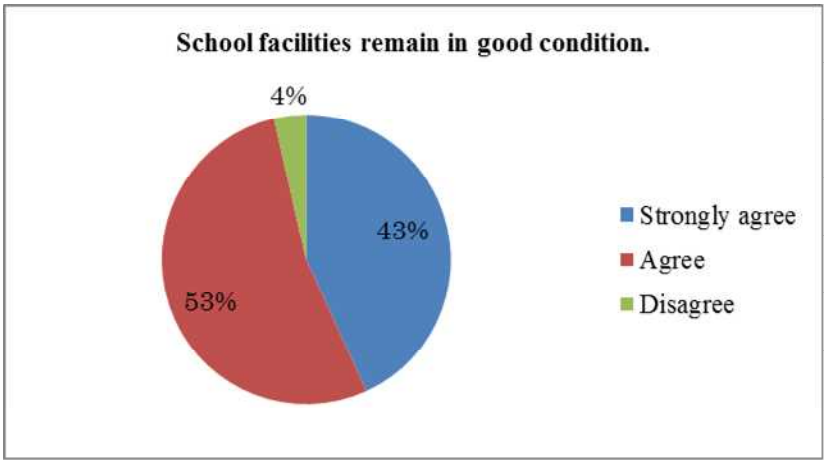
[16] The salaries of the full-time teachers and subsidies of the part-time teachers hired by FRAM are paid by the government.
[17] The amount of subsidies to FAF per pupil in public schools was increased because the allocation to private schools has been suspended since 2012.
[18] The total FCL fund in 2012 was 9,449,940,000 MGA. Unlike the FAF subsidy, which is based on the number of pupils, the FCL fund is distributed at a flat rate in accordance with the schools' criteria.



Source: Beneficiary Survey

Figure 2: Cleaning of Facilities in Target Schools

In the beneficiary survey, 96% of the pupils ticked either 'strongly agree' or 'agree' to the statement 'School facilities remain in good condition' (see Figure 3). This implies that the facilities of the target schools have been maintained at an acceptable level.

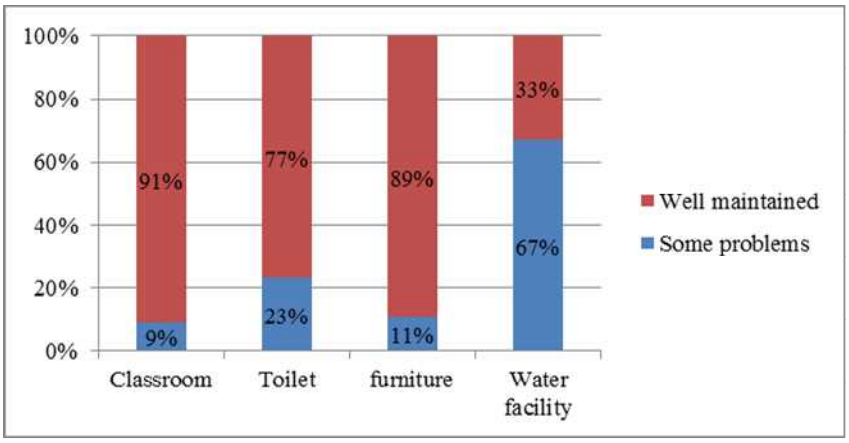


Source: Beneficiary Survey

Figure 3: Pupils' Opinions about the Maintenance of School Facilities

On the other hand, cracks in the floor of the classroom building, the lack of window glass panes, leaks in the rainwater tank, theft of water taps and rain gutters, damage to the toilet doors, and damage to furniture by pests has been confirmed in some schools. The beneficiary survey revealed some problems[19] in the maintenance of toilets and water supply facilities (Figure 4). The main cause of the damaged toilets and water supply facilities are the neighbouring residents, who have free access to the facilities due to the absence of a perimeter wall or fence.

[19] Certain water supply facilities cannot be used because they were damaged or the water taps were stolen.



Source: Beneficiary Survey

Figure 4: Operation and Maintenance Conditions of School Facilities

Problems have been observed in the structural and financial aspects, and current maintenance condition of water supply facilities. Therefore, the sustainability of the Project's effects is fair.

4. Conclusion, Lessons Learned, and Recommendations

4.1 Conclusion

The Project for the Construction of Primary School Classrooms in Antsiranana and Toliara Provinces (hereinafter: the Project) was implemented to support classroom construction in the two provinces. Its goal was to improve the education setting by alleviating classroom shortage, which was caused by population growth and aging school facilities. The ex-post evaluation revealed that the Project's purpose corresponded to the development policy and needs of Madagascar, and to the ODA policy of the Japanese government. Therefore, the relevance of the Project is considered high. The results of the field survey show that the effectiveness and impact of the Project are also high because of the increase in the number of pupils who benefited from it and the reduction in the pupil-classroom ratio. The improvement in the quality of education and achievements of the pupils brought about by the remediation of multiple classes is likewise seen as a positive impact. Efficiency is also high because both the project period and project cost were within the original plan. The sustainability of the Project is considered fair, as minor problems have been observed in the operation and maintenance system, and in financial and structural aspects; moreover, water facilities have not been properly maintained. In regard to the financial aspect, the budget allocation for each school's FAF, which plays a role in maintaining school facilities, has been decreased since the political turmoil in 2009.

In light of the above, the Project is evaluated as highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations for the Executing Agency

(1) Activation of FAF functions

FAF functions need to be reactivated by securing the subsidies to FAF, replacing FAF members and

conducting a retraining in budget management, and developing an action plan to enhance the operation and maintenance system of the facilities. In order to activate the FAF functions, DREN and CISCO should restart their monitoring of FAF, which has been suspended due to the current budget shortfalls.

(2) Use of the 'School for All' Model to Ensure the Sustainability of the School Management Committee

'School for All'[20] is a technical cooperation project for school management of the Japan International Cooperation Agency (JICA), which is being implemented in West African countries. Its monitoring, training methods, and training manuals promote the effective maintenance of school facilities by using school management committees such as FAF. By applying the 'School for All' model in the Soft Component of the school building project, instead of using inconsistent approaches, an effective operation and maintenance system can be established.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

(1) Restriction in the Unauthorised Use of School Facilities by Local Residents

In terms of the operation and maintenance of school facilities in the Project, the damage to toilets and theft of water taps are remarkable. This was attributed to the unauthorised use of school toilets by local residents. Gates and fences need to be installed to restrict unauthorised access—a responsibility of the Malagasy side which has not been carried out because of the lack of budget. Therefore, the installation of the gates and fences in the target schools by the recipient countries should be considered for inclusion in outputs of the Japanese side.

(2) Quality Control of School Facilities under the Grant Aid for Community Empowerment Scheme

Even if the Project reduced the unit construction cost by using local resources under the Grant Aid for Community Empowerment scheme, the quality of the facilities was not compromised, as it was almost on a par with that of the Grant Aid for General Projects. For quality management under this scheme, the administrator stationed at the project site has to enforce strict construction management.

Specifically, the following items are considered important:

- Appropriate technical guidance for local consultants and contractors by the Japanese technical supervisor
- Strengthening the field monitoring and guidance by local consultants
- Putting strict conditions on the tender for local consultants and contractors

[20] Inclusive education can be achieved through the activation of FAF by using the 'School for All' model, which has been promoted by UNICEF. (Members of MEN who are in charge of the project of UNICEF have experiences in the school management improvement project of JICA in Niger.) In the interview of the ex-post evaluation, the person in charge of MEN pointed out that training manuals and the monitoring system would be effective in activating FAF functions.

It is expected that the above remarks will be systematically summarised so that they can be applied to the implementation of other projects.

Republic of Madagascar

Ex-Post Evaluation of Grant Aid Project

The Project of the Primary School Construction Phase II in the Republic of Madagascar

(Le 2e projet de Construction d'écoles primaires en République de Madagascar)

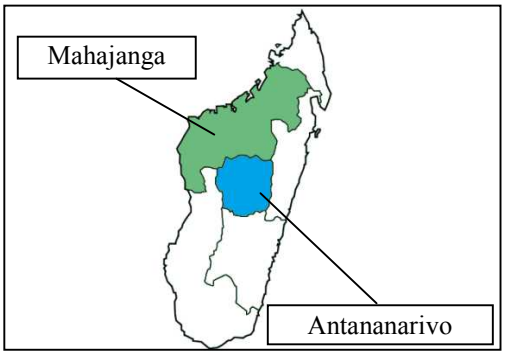
External Evaluator: Haruo Ito, ICONS Inc.

0. Summary

The Project of the Primary School Construction Phase II in the Republic of Madagascar (hereinafter: the Project) was implemented to support classroom construction in Antananarivo and Mahajanga provinces. Its goal was to improve the education setting by alleviating classroom shortage, which was caused by population growth and aging school facilities. The ex-post evaluation revealed that the Project's purpose corresponded to the development policy and needs of Madagascar, and to the Official Development Assistance (ODA) policy of the Japanese government. Therefore, the relevance of the Project is considered high. The results of the field survey show that the effectiveness and impact of the Project are also high because of the increase in the number of pupils who benefited from it and the reduction of the pupil-classroom ratio. The improvement in the quality of education and achievements of the pupils brought about by the remediation of multiple classes are likewise seen as positive impacts. On the other hand, although the project cost was reduced, the total cost would have been higher than the original estimate if all of the classrooms had been constructed. Meanwhile, since project duration slightly exceeded that of the plan, efficiency is rated as fair. The sustainability of the Project is also evaluated as fair, as some problems have been observed in the structural and financial aspects of the operation and maintenance system. For example, the budget allocation for each school's management board (called FAF [Fiarahana miombona Antoka ho Fampandrosoana ny sekoly]), which plays a role in maintaining school facilities, has been decreased since the political turmoil in 2009.

In light of the above, the Project is evaluated as satisfactory.

1. Project Description



Project Location

School Building Supported by the Project (Mahajanga)

1.1 Background

In 1988, 30% of Madagascar's economic growth was achieved through its structural adjustment plan,

with assistance from the World Bank and International Monetary Fund since 1983. However, political turbulence in 1991 reduced productivity, causing the economy to contract and go into depression. The budget for primary education has been cut under the austere fiscal policy, and the government has not been able to construct school buildings. In addition, since the start of the Project, population has grown by more than 3.0% yearly, increasing the number of school-age children as well. However, the country's net enrolment rate fell from 70% in 1991 to 65% in 1995 due to the aging of existing public primary schools, facility damage, and shortage of teachers. The government formulated the Second National Education Improvement Plan (PNAE-2) in 1997 in an effort to address the increase in the net enrolment rate—from 80% in 2005 to 97% by 2015; its priority was to improve basic education. Classroom renovation and construction were being undertaken by donors such as the World Bank, but the lack of classrooms and teaching materials continued to confront the country. Thus, the government requested this Japan's Grant Aid for General Projects for financial assistance for primary school facilities and related equipment, followed by the Primary School Construction Project in Madagascar in 1997 and 1998.

1.2 Project Outline

The Project aimed to alleviate the classroom shortage caused by population growth and aging school facilities through the provision of classrooms in Antananarivo and Mahajanga provinces.

Grant Limit/Actual Grant Amount	Term 1:897 million yen/872 million yen Term 2: 928 million yen/914 million yen
Exchange of Notes Date (Grant Agreement Date)	Term 1: 28 June 2004 Term 2: 1 August 2005
Implementing Agency	Ministry of Education and Scientific Research (MENRS), (currently, Ministry of National Education [MEN])
Project Completion Date	Term 1: 8 March 2006 Term 2: 13 March 2007
Main Contractors	Konoike Construction Co., Ltd.
Main Consultant	Matsuda Consultants International Co., Ltd. Atelier d'Architecture et d'Urbanisme Co., Ltd (joint venture)
Feasibility Studies, etc.	10 October 2003–30 April 2004
Related Projects (if any)	The Primary School Construction Project (1997–1998)

2. Outline of the Evaluation Study

2.1 External Evaluator

Haruo Ito, ICONS Inc. (Senior Consultant)

2.2 Duration of Evaluation Study

Duration of the Study: November 2012–November, 2013

Duration of the Field Study: 12 January–9 February 2013; 30 March 2013–13 April 2013

3. Results of the Evaluation (Overall Rating: B[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Relevance to the Development Plan of Madagascar

The Poverty Reduction Strategy Paper (PRSP) was drafted in 2003, coinciding with the development of the Project's Basic Design Study by the government. In the education sector, PRSP emphasises the reform of the education system, universalisation of basic education, and improvement of the quality of education, thereby confirming the Project's goal of improving the educational environment.

In 2007, upon the Project's completion, the Madagascar Action Plan 2007–2012 (MAP) was developed as a replacement for PRSP, which had been due for completion by 2006. To mitigate the extreme poverty of many people and attain 'poverty reduction through economic growth', MAP prioritised the education and health sectors.

Moreover, during the ex-post evaluation period, the achievement of the indicators of 'Education for All' was reportedly being threatened by the reduction of donor support due to political turbulence and the transitional government's lack of a clear educational strategy. Under these circumstances, the Mid-term Plan for Education 2013–2015 (Plan intérimaire pour l'éducation 2013–2015) has been drafted by the Ministry of National Education (MEN) and donors as a tentative sector development plan during the political stabilisation process. Increasing the number of primary school buildings will be one of the targets of the Mid-Term Plan under the overarching goal of expanding basic education.

For the above reasons, the project goal is highly relevant to the country's development plan, both at the project initiation and the ex-post evaluation.

3.1.2 Relevance to the Development Needs of Madagascar

The number of enrolled children had been steadily increasing before the Project's initiation, especially in the capital Antananarivo, driven up by high population growth (more than 3.0% per annum), the distribution of subsidies according to the number of children, and promotion of free primary education by the government. In 1999–2000, there were about 2.2 million pupils in the public and private primary schools and in 2002–2003, about 2.85 million; thus, since 1998–1999, the number of enrolled pupils had increased 1.3 times. The enrolment rate in primary education in Mahajanga was 99.8% (national average: 103%) and total entrance rate, 102% (national average: 107%), which shows that Mahajanga is one of the less developed areas in the field of education. Therefore, the selection of target areas for the Project, Antananarivo and Mahajanga, which had high population growth and low education indicators, corresponded to the development needs of the government. The number of pupils in primary schools has increased because of the sensitisation of community members and heightened parent awareness of the importance of education.

The school-age population in the primary level has been expanding because of increase of learning motivation through the sensitization for local residents (see Table 1). However the proportion of

[1] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[2] ③: High, ②: Fair, ①: Low

temporary classrooms built by the communities (13.5% in 2012). Moreover, Madagascar is hit by cyclones every year, and damaged roofs and building frames have not been fully repaired. Meanwhile, as existing classrooms age, school building programs by donors remain suspended because of the political turbulence of 2009. New classrooms have been constructed with the support of parents and community members, but the shortage of classrooms remains serious nevertheless because of the deterioration of the community members' living standards. The ex-post evaluation revealed that the implementation of the Project corresponded to the needs of Madagascar.

Table 1: School-Age Population at the Primary Level (between 6 and 10 years old)

2007–2008	2008–2009	2009–2010	2010–2011
2,680,136	2,760,137	2,842,525	2,927,374

Source: Plan intérimaire pour l'éducation 2013–2015

3.1.3 Relevance to Japan's ODA Policy

In regard to Japan's aid policy for Madagascar during project initiation in 1997, the promotion of 1) basic human needs (education, health and medical care, and water supply); 2) infrastructure for regional development; 3) agriculture, fisheries, and the environment; and 4) human resource development was a priority in the policy consultation of the Ministry of Foreign Affairs. Thus, the Project's goal of improving the educational environment was consistent with Japan's aid policy.

Since the Project is compatible with the country's development plan, development needs, and Japan's ODA policy, its relevance is considered high.

3.2 Effectiveness[3] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

(1) Number of Pupils in the Target Schools

The results of the beneficiary survey[4] revealed that the number of pupil increased slightly, from 29,508 during the preparatory survey in 2006–2007 and 29,860 at the project completion in 2009–2010, to 29,719 during the ex-post evaluation in 2011–2012 (see Table 2).

Table 2: Number of Pupils and Classrooms in Each Target School

	Target Provinces	2003–2004 Baseline	2008–2009 Project Completion	2011–2012 Ex-post Evaluation
Number of Pupils	Mahajanga	21,402	22,254	23,693
	Antananarivo	15,903	16,486	16,894
	Total	37,305	38,740	40,587
Number of Classrooms	Mahajanga	248	n.a.	476
	Antananarivo	142	n.a.	303
	Total	396	n.a.	779[5]

Source: Beneficially Survey

[3] The sub-rating for effectiveness is to be set in consideration of impact.
[4] Sample size = 56 schools: 18 in Antananarivo province and 38 in Antananarivo province. Two of the original target schools were excluded due to the impassability of the access roads during the rainy season.
[5] The Project built 109 new classrooms and rebuilt 223, for a total of 332. The current number of classroom has increased because of the classroom building implemented by the local government and community.

Of the 332 classrooms constructed by the Project, 223 were old classrooms that were rebuilt. The Project set the indicator showing that the educational environment for 17,840 pupils will improve once the old classrooms are rebuilt[6]. The results of the beneficiary survey proved that 19,657 pupils studying in 223 rebuilt classroom. This shows that the Project has accomplished the original target. On the other hand, the pupil-classroom ratio has increased. However, as regards the improvement of the learning environment in the target schools, many of the classrooms constructed by the community or Malagasy government before the Project were makeshift classrooms with noise and leaking roofs, and an insufficient number of desks and chairs. For the 19,675 pupils now studying in the classrooms rebuilt under the Project, the learning environment has improved.

Classroom with Clay Wall Constructed by the Community

(2) Pupil-Classroom Ratio

The results of the beneficiary survey show that the average pupil-classroom ratio in the target schools has slightly decreased (see Table 3). However, the pupil-classroom ratio of 54.8 after the project completion in 2008–2009 fell short of the 46.6 target[7] set in the project preparatory survey. The reason was that the increase in the number of pupils (Table 2) was not considered in setting up the indicator.

Nevertheless, the national ratio of 50 pupils per class was almost attained. Moreover, the significant improvement in the 95.5 pupil-classroom ratio before the Project (2003–2004) is a sign that overcrowding in classrooms has been eliminated. Therefore, by relieving teachers of the heavy burdento handle many pupils in a class and promoting contact between them and the pupils, the Project has improved the quality of learning.

[6] The formula: 223 rebuilt classrooms×50 (average number of pupils par classroom) × 1.6 (the rate of double-shift schools) = 17,840

[7] The formula: 37,363 pupils (36,403 in the target schools + 960 pupils in new schools) in 505 classrooms (396 existing + 109 built by the Project) × 1.6 (the rate of double-shift schools) = 46.6.

Table 3: Pupil-Classroom Ratio in Target Schools

2003–2004 (Baseline)	2007–2008 (Target)	2008–2009 (Completion)	2011–2012 (Ex-post Evaluation)
95.5	46.6	54.8	50.2

Source: Beneficiary Survey

With regard to the number of teachers in the target schools, principals in 76.8% of the schools replied that the number of teachers has increased since the project completion. This self-help effort of the Malagasy side—the allocation of the necessary number of teachers—also helps improve the learning environment.

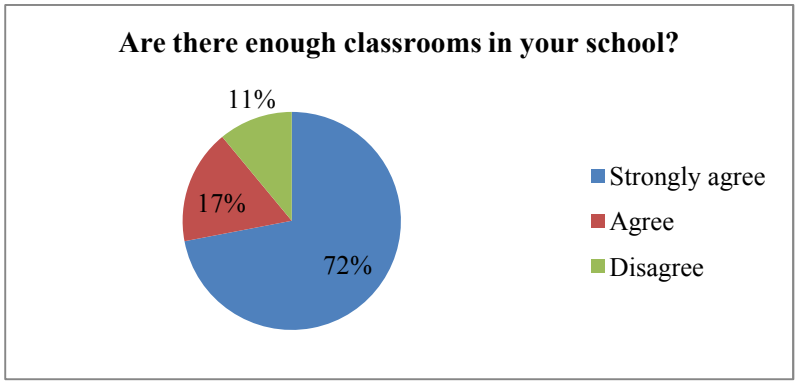
(3) Fewer Double-Shift Classes

By increasing the number of classrooms, the Project has helped reduce the need for double-shift classes. From 96.4% before the project implementation, the number of schools practising double shifting decreased 35.7 percentage points to 60.7% after the project completion. The reduction in double-shift classes allows the target schools to secure standard class hoursr and the teachers are able to conduct lessons in the morning, when pupils have better concentration. This positively affects the pupils' performance and raises their final exam passing rate. The reduction in double-shift classes has also encouraged parents to send their children to school because the latter would no longer have to commute in the late afternoon.

3.2.2 Qualitative Effects

(1) Pupil Satisfaction with the Number of Classrooms

A beneficiary survey was conducted on 246 pupils in the target schools regarding their satisfaction with the Project's classrooms construction. Around 90% replied that they 'strongly agree' or 'agree' to the question 'Are there enough classrooms in your school?' (see Figure 1). This implies that the Project installed a sufficient number of classrooms in the target schools.



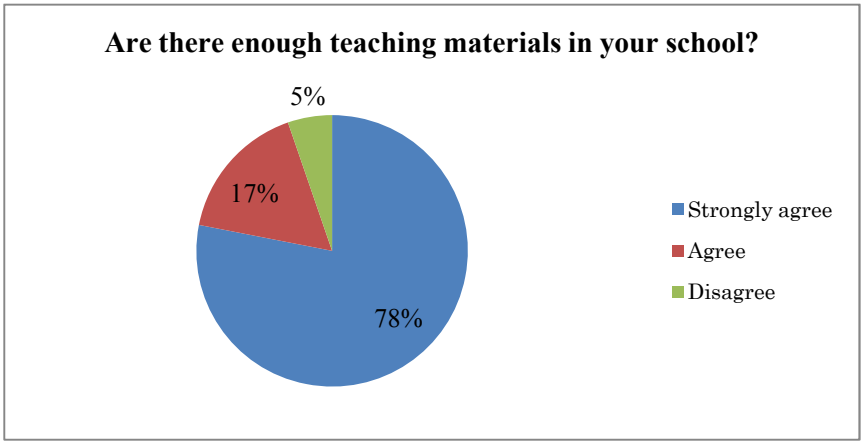
Source: Beneficiary Survey

Figure 1: Pupil Satisfaction with the Number of Classrooms

(2) Pupil Satisfaction with the Teaching Materials

To the question 'Are there enough teaching materials in your school?', 95% of the pupils replied that they 'strongly agree' or 'agree' (see Figure 2). Therefore, the effectiveness of the procurement of teaching

materials was confirmed. However, some of the procured teaching materials (dice, letter boards, etc.) have not been fully utilised in certain schools.



Source: Beneficiary Survey

Figure 2: Pupil Satisfaction with the Teaching Materials

3.3 Impacts

3.3.1 Intended Impacts

(1) Result of the Elementary Certificate of Primary Education

For the past three years, the average passing rate in the final examination of primary education (Certificat d'Etudes Primaires Elémentaires [CEPE]) in the target schools has exceeded the national average. Various factors contribute to the passing rate in the final exam, and the improved learning environment resulting from the Project's classroom construction is considered one of them, according to the field survey interviews[8]. Meanwhile, 96.4% of the target schools responded that the learning motivation of the pupils (e.g. increase in the attendance rate and attitude towards their studies) has improved since the Project built new classrooms.

Table 4: Passing Rate of CEPE in Target Schools[9]

	2008–2009	2009–2010	2010–2011
National average	78.5%	76.9%	74.4%
Target schools	79.5%	86.6%	86.0%

Sources: MEN, DREN, and Beneficiary Survey

(2) Enhancement of the FAF[10] Function by the Soft Component

Seminars on school operation and maintenance analysis, budget planning and accounting, facilities check and maintenance, and operation of the pupils' congress were implemented as the Soft Component of the

[8] In addition to the beneficiary survey, the Japanese consultant visited 15 schools in the two provinces—7 in Antananarivo and 8 in Mahajanga—to interview principals, teachers, pupils, and FAF members, and check the condition of the school facilities.

[9] Sample size: only 28 target schools in Antananarivo province.

[10] FAF (Fiarahana miombona Antoka ho Fampandrosoana ny sekoly) means 'school development partnership' (Partenariat Pour le Développement des Etablissements Scolaires = PPDES). FAF is a sort of school management committee that each school is required to install under ministerial ordinance No. 2002/1007, issued in 11 September 2002. The committee has seven or eight members, composed of residents, principals, teachers, pupils, etc.

Project. The positive impacts of the Soft Component on the enhancement of the FAF function have been confirmed, such as holding a General Assembly regularly to discuss school maintenance problems, strengthening participation in school activities, and ensuring the transparency of the FAF fund by reporting to community members how it was used. However, the activities of FAF members and the monitoring of FAF activities by Direction Régional de l'Education Nationale (DREN) and Circonscription Scolaire (CISCO) have been constrained by the low budgetary allocation, decrease in subsidies for FAF, and transfer of FAF members who attended the seminars. As a result, the continuity of the said positive impacts has been impeded. Moreover, the fact that only 46.4% of FAF (26 out of 56 schools) is currently involved in the maintenance of school facilities further dampens the positive impacts.

(3) Reduction of the Burden of School Maintenance on the Community

Across the country, 13.5% of primary school classrooms are makeshift structures built in 2012 with the support of the community. Low-standard materials were used, such as wood or mortared adobe bricks and galvanised iron for the roofs. Therefore, regular building maintenance and the repair of roofs, doors, and windows damaged by cyclones were a burden on the school staff and community members. The results of the interviews show that the construction of classrooms by the Project—using high quality materials, mortar, etc.—did away with roof leaks and ensured proper ventilation, thereby reducing the schools' maintenance expenses.

(4) Sanitary Improvement through the Installation of Toilets

Before the Project, few pupils used toilets because schools either had an insufficient number of toilets or none at all. The results of the beneficiary survey show that the sanitary environment has been improved in 91.1% of the target schools with the installation of toilets by the Project. Moreover, the improvement in health conditions brought about by the pupils' behavioural change (e.g. lower incidence of diarrhoea) is identified as a synergistic effect of health education; specifically, the instruction on the proper use of the toilet by other donors (United Nations Children's Fund [UNICEF] or non-governmental organisations).

3.3.2 Other Impacts

(1) Impacts on the Natural Environment

Negative impacts of the noise from school construction sites, soil disposal, and sewer water from toilets were not identified in the field survey.

(2) Land Acquisition and Resettlement

To be listed as a prioritised school construction site, documents proving site ownership (Certificat d'Immatriculation et de Situation juridique) have to be presented, and the target area should have no squatters. Since the classrooms, toilets, and water supply facilities of the Project were constructed on existing school sites, the Project has had no problem in the resettlement of residents.

The Project has largely achieved its objectives; therefore, its effectiveness and impact is high.

3.4 Efficiency (Rating: ②)

3.4.1 Outputs

(1) Outputs of the Japanese Side

The project provided classrooms, principal's offices and warehouses, toilets, and water supply facilities to 58 schools in the two target provinces. In 2004, when the country was hit by a record number of cyclones, some collapsed school facilities were renovated with financial support from MEN or other donors, so that the request for school buildings from the Japanese government was amended. As a result, though there was no change in the target schools' accomplished number of classrooms, the planned number of principal's offices/warehouses was decreased (see Table 5).

Table 5: Planned and Accomplished School Facilities

	Plan			Accomplishment		
	Total	Term 1	Term 2	Total	Term 1	Term 2
Target schools	58	27	31	58	27	31
Classrooms	343	175	168	332	169	163
Principal's offices/warehouses	48	17	31	45	15	30
Toilets (number of schools)	56	25	31	55	24	31

Sources: Baseline Survey Report (2004) and Defect Report (2007)

Furniture and equipment were also procured for the 58 target schools (see Table 6).

Table 6: Procured Furniture and Equipment

Furniture equipment	Teaching materials
Classroom: desks/chairs for pupils, cabinet Principal's office/warehouse: desks/chairs for principals, cabinets	Ruler, carpenter's rule, tape measure, abacus, large dice, letter board, terrestrial globe world map, plumb, thermometer, barometer, balance, weight for balances, large domino

Source: Defect Report (2007)

(2) Soft Component

The Soft Component seminars of the Project have been implemented in 20 target schools as planned (10 each in Antananarivo and Mahajanga). Seminar topics included the purpose of the Soft Component, facility check and analysis, school management/budget planning/accounting, diagnostic facilities and developing a maintenance plan, and the creation of a student council composed of pupils from each grade. A total of 1,189 participated in the seminars in Terms 1 and 2 (see Table 7).

Table 7: Number of Participants in the Soft Component Seminars

	Facility check/analysis	Management/ budget/accounting	Maintenance	Student council	Total
Term 1	107	110	83	198	498
Term 2	164	128	159	240	691
Total	271	238	242	438	1,189

Source: Soft Component Completion Report (term 1: 2006; term 2: 2007)

(3) Outputs of the Malagasy Side

The Malagasy side carried out its responsibility according to plan; it obtained the necessary land and expedited construction and equipment procurement. However, due to the inability of the Malagasy side to supply electricity in 3 schools (out of 14 that were visited in the ex-post evaluation), some fluorescent lamps were unused.

3.4.2 Project Inputs

3.4.2.1 Project Cost

While the original project cost was placed at 1,825 million yen, 98% or 1,786 million yen was actually disbursed, thus keeping the Project within the budget (see Table 8). However, if the cost of the 11 unbuilt classrooms and one toilet unit were included (estimated at 46.8 million yen[11], excluding supervision cost), the actual project cost would have exceeded the planned cost.

Table 8: Planned and Actual Project Cost (unit: million yen)

	Plan	Actual
Term 1	897	872
Term 2	928	914
Total	1,825 (Grant limit)	1,786 (98% of plan)

Sources: Baseline Survey Report (2004) and Defect Report (2007)

3.4.2.2 Period of Cooperation

While the Project undertook construction simultaneously in several sites, efficiency was achieved by carrying out the construction of different construction groups in three or four sites in shifts, depending on the size of the classrooms. The project period for each term was set at 19 months, inclusive of detail design (see Figure 9). There were slight delays in the construction periods—103% in Term 1 and 102% in Term 2—but the reasons for the delays were not identified.

Table 9: Planned and Actual Project Implementation Period

	Planned	Actual	Actual/Planned
Term 1	19 months	19.6 months (20 Jul. 2004 to 8 Mar. 2006)	103%
Term 2	19 months	19.3 months (3 Aug. 2005 to 3 Mar. 2007)	102%

Sources: Baseline Survey Report (2004) and Defect Report (2007)

In the implementation of the Soft Component, there was some delay in Term 1 (108%) but none in Term 2 (see Table 10). The reason for the delay during Term 1 was not identified.

Table 10: Planned and Actual Soft Component Period

	Planned	Actual	Actual/Planned
Term 1	12 months (1 Feb. 2005 to 31 Jan. 2006)	13 months (1 Mar. 2005 to 31 Mar. 2006)	108%
Term 2	12 months (1 Feb. 2006 to 31 Jan. 2007)	12 months (1 Apr. 2006 to 15 Mar. 2007)	100%

Sources: Baseline Survey Report (2004) and Defect Report (2006, 2007)

[11] Computation: 4 million yen (cost per classroom) × 11 unbuilt classrooms + 2.8 million yen (cost of unbuilt toilet) = 46.8 million yen. (Derived from the Baseline Survey Report 2004)

Although the project cost was within the plan, the original planned outputs were reduced. Moreover, as project duration slightly exceeded the planned period, the efficiency of the Project is considered fair.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional and Operational Aspects of the Implementing Agency

Table 11 shows the maintenance management system in each administrative level.

Table 11: Organisations and Their Roles in School Maintenance

Related organisations		Roles in school maintenance
National	MEN	Developing school construction and rehabilitation plans nationwide, school monitoring, and budget management. Seven technicians are assigned to school facilities.
Provincial	DREN	The Planning Division of DREN contacts CISCO and MEN in regard to the development of the plan for school rehabilitation and monitoring, and budget management. DREN scarcely has technicians for school facilities.
District	CISCO	Developing school rehabilitation plans at the district level, school monitoring, and budget management. CISCO has no technicians for school facilities.
Zone	ZAP	School monitoring and reporting to CISCO. ZAP has no technicians for school facilities.
School level	FAF	Maintenance of school facility by FAF members using FAF funds.

Sources: Ex-post evaluation

At the national level, the Department of Land Assets and Infrastructures in MEN has seven technicians; it is in charge of the infrastructure school rehabilitation plan and monitoring school facilities. Moreover, one or two persons in the Planning Divisions of DREN (regional level) and CISCO (district level) are responsible for budget management and monitoring school facilities. The maintenance of facilities at the school level is the duty of FAF members, but their activities are limited by insufficient FAF funds. The results of the beneficiary survey show that an FAF has been established in all target schools[12]. However enhancing the school maintenance system by activating the functions of FAF remains an issue, as only 26 out of 56 (46.4%) of the FAF in the target schools are involved in school maintenance activities. In addition, although indispensable, the periodical monitoring of FAF activities in target schools by CISCO and the Zone Administrative Pédagogique (ZAP) is hampered by an insufficient budget.

3.5.2 Technical Aspects of the Implementing Agency

The evaluation team confirmed that the engineers of the Land and Facilities Management Office, the department in charge of school infrastructures in MEN, have sufficient skills for monitoring and developing the facility repair plan. In the regional level, DREN and CISCO also have the skills for the periodical monitoring and budget management of school facilities. However, DREN and CISCO allocate a limited number of technicians for the maintenance of school facilities.

The Soft Component was aimed at detecting school facility conditions; however, the maintenance being

[12] FAF has managed and maintained school buildings since 2002, after the establishment of FAF in each school was legislated by ministerial ordinance.

carried out at present does not require any special techniques. In fact, after the completion of the Project, actual school maintenance has not required special skills, as current repairs are limited to door locks and revarnishing—something that even residents or school staff are capable of doing. In addition, since members of FAF school maintenance committees in some schools are composed of electricians, plumbers, carpenters, and plasterers, they are considered to have enough skills for the task. On the other hand, only 39% of target schools have utilised the maintenance manuals developed by the Soft Component, as school maintenance activities reportedly involve only daily cleaning or simple repairs.

3.5.3 Financial Aspects of the Implementing Agency

The national budget for the construction and maintenance of school buildings is lodged in the Directorship of Land Asset and Infrastructures of MEN, and is distributed according to the prioritised applications from DREN or each school. However, the budget is insufficient, so that MEN is unable to construct new school buildings. Therefore, only the emergency repair of school facilities that were damaged by cyclones or other natural calamities is prioritised. Table 12 presents the national budget of MEN for school facilities.

Table 12: National Budget of MEN for School Facilities

Unit: 1,000 Malagasy ariary (MGA)

	2010	2011	2012
Rent, water, electricity, and communication	0	45,000	15,000
Furniture	0	41,462	35,000
Transportation	15,000	161,862	75,000
Maintenance	0	25,000	25,000
School buildings	127,500	38,826,000	1,358,044
Total	142,500	39,099,324	1,508,044

Source: MEN

In addition to the national budget, governmental subvention to FAF (FAF fund) is distributed to each school according to the number of pupils. The fund is intended for buying pupils' textbooks and stationery, but part of it has actually gone to the maintenance of school facilities. The FAF fund had been increased each year (see Table 13), but political turbulence has caused its suspension. The purpose of the FAF fund is to reduce the financial burden of parents, so that schools do not generally require contributions from them. On the other hand, the Fikambana'ny Ray-Amandrenin'ny Mpianatra (FRAM) [13] requires contributions from parents however most of the contributions are spent in the salary of part-time teachers hired by FRAM to compensate for the lack of the full-time teachers.

[13] The salaries of full-time teachers and subsidies of part-time teachers hired by FRAM are paid by the national government.

Table 13: Governmental Subvention to FAF

(in MGA)

	2010	2011	2012
Total	4,743,810,340	6,298,995,563	7,803,999,990
Total per pupil	961	924	2,000[14]

Source: MEN

Compared to the cost of maintaining other school facilities, that of the Project's target schools is low, as the work involves only daily cleaning and simple repairs (repainting, replacement of door locks, etc.) because of the high quality of the construction. Therefore, the average operation and maintenance cost of each target school is only 183,930 MGA (about 7,725 yen) per year (see Table 14). Since the priority of the FAF subsidy is textbooks and stationery, it is not enough to cover the repair of damaged toilets and windows, however the minimum maintenance activities of each target school are conducted within the budget.

Table 14: Average Operation and Maintenance Costs of the Target Schools

(in MGA)

	2010	2011	2012
Classroom	41,677	50,423	86,764
Furniture	18,477	16,500	18,559
Equipment, spares	128,153	117,605	78,607
Total	188,307	184,528	183,930

Source: Beneficially Survey

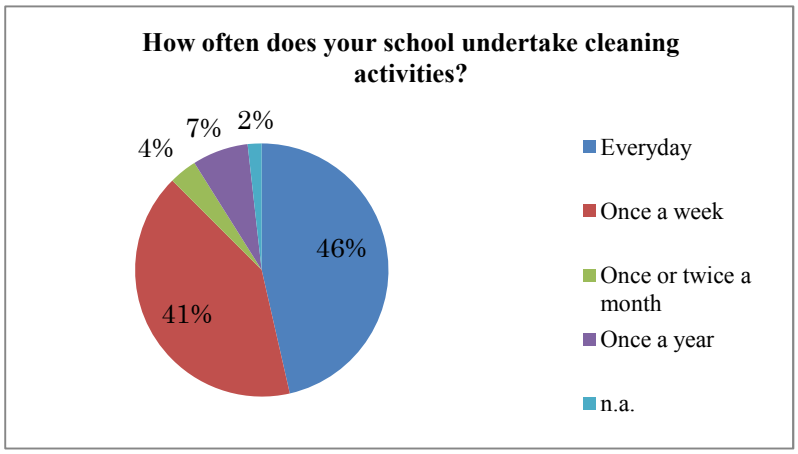
Meanwhile, UNICEF distributes the Fonds Catalytique Local (FCL)[15] to the schools to compensate for the insufficiency of the FAF fund. Though the FCL fund also prioritises the textbooks and stationery of the pupils, part of it can be used to improve the learning environment by maintaining the school facilities.

3.5.4 Current Status of Operation and Maintenance

In its school visits, the ex-post evaluation team confirmed that the school facilities established by the Project were sufficiently maintained. Further, the results of the beneficiary survey show that 87% of the target schools rotate pupils and teachers in cleaning the school building at least once a week (see Figure 3).

[14] The amount of subsidies to FAF per pupil in public schools was increased because the allocation to private schools has been suspended since 2012.

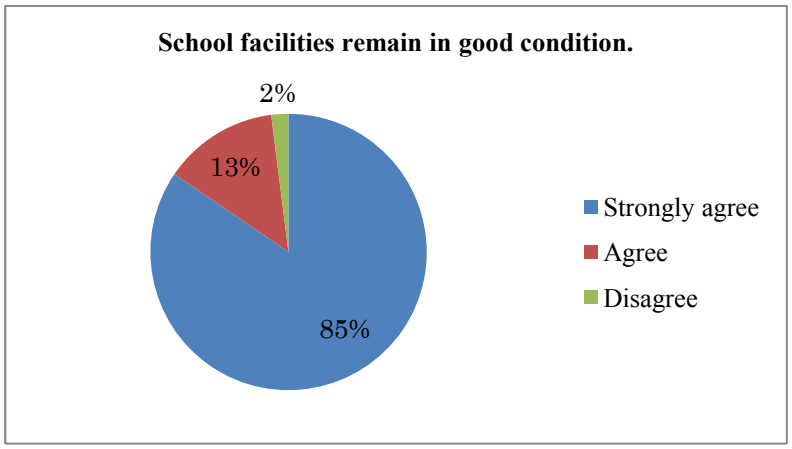
[15] The total FCL fund in 2012 was 9,449,940,000 MGA. Unlike the FAF subsidy, which is based on the number of pupils, the FCL fund is distributed at a flat rate according to the school criteria.



Source: Beneficially Survey

Figure 3: Cleaning of Facilities in Target Schools

In the beneficiary survey, 98% of the pupils ticked either 'strongly agree' or 'agree' to the statement 'School facilities remain in good condition' (see Figure 4). This implies that the facilities of the target schools have been maintained at an acceptable level.



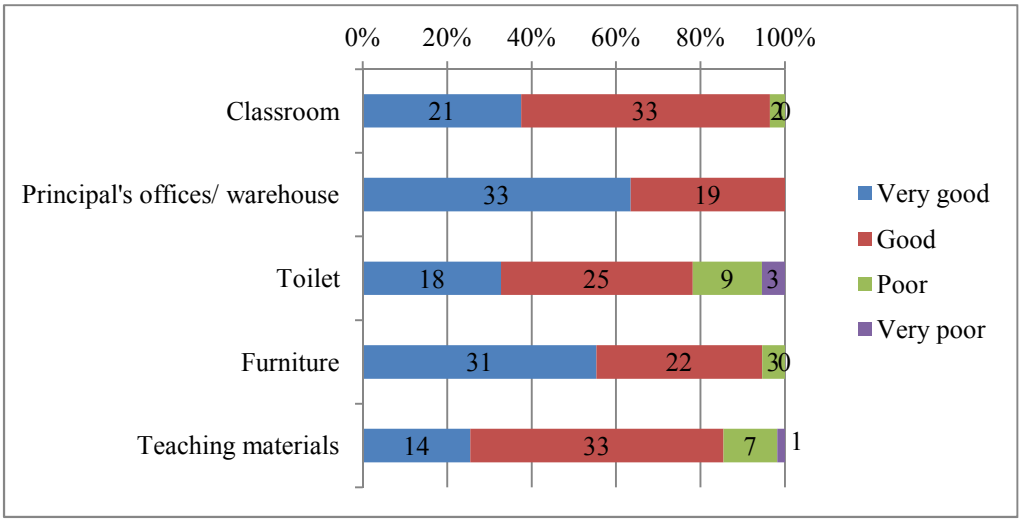
Source: Beneficially Survey

Figure 4: Pupils' Opinions about the Maintenance of School Facilities

On the other hand, cracks in the floor of the classroom building, the lack of window glass panes, leaks in the rainwater tank, theft of water taps and rain gutters, damage to toilet doors, and damage to furniture by pests has been confirmed in some schools.

The beneficiary survey revealed problems[16] with unused teaching materials because of insufficient maintenance, unclean toilets due to improper use by pupils, the undesired free access to toilets by neighbouring residents, and the lack of water for cleaning (see Figure 5).

[16] Certain water supply facilities cannot be used because they were damaged or the water taps were stolen.



Source: Beneficially Survey

Figure 5: Operation and Maintenance Conditions of the School Facility

Problems have been observed in the structural and financial aspects, and current maintenance condition of water supply facilities. Therefore, the sustainability of the Project's effects is fair.

4. Conclusion, Lessons Learned, and Recommendations

4.1 Conclusion

The Project of the Primary School Construction Phase II in the Republic of Madagascar (hereinafter: the Project) was implemented to support classroom construction in Antananarivo and Mahajanga provinces. Its goal was to improve the education setting by alleviating classroom shortage, which was caused by population growth and aging school facilities. The ex-post evaluation revealed that the Project's purpose corresponded to the development policy and needs of Madagascar, and to the ODA policy of the Japanese government. Therefore, the relevance of the Project is considered high. The results of the field survey show that the effectiveness and impact of the Project are also high because of the increase in the number of pupils who benefited from it and the reduction of the pupil-classroom ratio. The improvement in the quality of education and achievements of the pupils brought about by the remediation of multiple classes are likewise seen as positive impacts. On the other hand, although the project cost was reduced, the total cost would have been higher than the original estimate if all of the classrooms had been constructed. Meanwhile, since project duration slightly exceeded that of the plan, efficiency is rated as fair. The sustainability of the Project is also evaluated as fair, as some problems have been observed in the structural and financial aspects of the operation and maintenance system. For example, the budget allocation for each school's FAF, which plays a role in maintaining school facilities, has been decreased since the political turmoil in 2009.

In light of the above, the Project is evaluated as satisfactory.

4.2 Recommendations

4.2.1 Recommendations for the Executing Agency

(1) Activation of FAF Functions

FAF, the main actor in the operation and maintenance of school facilities, is not functioning properly. This confirms that the government subsidies and the monitoring done by the local education authorities—DREN and CISCO—are insufficient. To resolve this issue, FAF functions need to be reactivated by securing the FAF subsidies, replacing FAF members and conducting a retraining in budget management, and developing the action plan to enhance the facility operation and maintenance system developed by the Project. In order to activate the FAF functions, DREN and CISCO should restart their monitoring of FAF, which has been suspended due to the current budget shortfalls.

(2) Use of the 'School for All' Model to Ensure the Sustainability of the School Management Committee

'School for All'[17] is a technical cooperation project for school management of the Japan International Cooperation Agency (JICA), which is being implemented in West African countries. Its monitoring, training methods, and training manuals can be adopted in Madagascar for promoting the effective maintenance of school facilities through school management committees such as FAF. By applying the 'School for All' model in the Soft Component of the school building project, instead of using inconsistent approaches, an effective operation and maintenance system can be established.

(3) Necessity of Repairing Toilets

The field survey of the ex-post evaluation discovered remarkable damage in toilets. To improve maintenance conditions and repair the damaged toilets, the government is expected to provide guidance to pupils for appropriate toilet use, secure the water source for cleaning the toilets, and prevent the free access of neighbouring residents to the toilets.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

(1) Outer Wall Installation and Secure Water Sources in School Facilities

In terms of the maintenance of facilities in the Project, the damage to and unsanitary conditions of toilets in the target schools were frequently observed in the ex-post evaluation. This was caused by the unauthorised use of school toilets by local residents and lack of water for cleaning. Some schools have yet to install a gate and fence and provide water supply inside the school land—both original burdens of the government of Madagascar—due to the lack of budget. Therefore, these two aspects should be considered for inclusion in outputs of the Japanese side.

[17] Inclusive education can be achieved through the activation of FAF by using the 'School for All' model, which has been promoted by UNICEF. (Members of MEN who are in charge of the project of UNICEF were able to visit the school management improvement project of JICA in Niger.) In the interview of the ex-post evaluation, the person in charge of MEN pointed out that training manuals and the monitoring system would be effective in activating FAF functions.

Republic of Madagascar

Ex-Post Evaluation of Japanese Grant Aid Project

Project of Construction of a By-Pass of National Route 7

(Projet de construction d'un By-Pass de la Route Nationale N°7)

External Evaluator: Makoto Tanaka, ICONS Inc.

0. Summary

This Project was implemented in Antananarivo, the capital, in order to shorten travel times, to ensure smooth logistics that are not affected by traffic restrictions in the capital region, to ease traffic congestion in the city center, to decrease transport costs and to promote logistics, by the construction of a by-pass that connects National Route 7 and National Route 2 in the suburbs of the capital as part of the Ring Road Plan around the capital. The objective of the Project meets Madagascar's development policy, developmental needs and Japan's ODA policy, therefore its relevance is high. The implementation of the Project has largely achieved its objectives of decreasing time required between National Route 7 and National Route 2 and between the city center and the suburbs, therefore its effectiveness is high. Both the cost and period of the Project were within the plan, therefore efficiency of the Project is high. On the other hand, some problems have been observed in terms of the current status of operation and maintenance, such as thefts of steel parts of road signs and collapse of shoulders; therefore sustainability of the Project effect is fair.

In light of the above, this Project is evaluated to be highly satisfactory.

1. Project Description

Project Location

Starting Point of the By-pass of the National Road 7

1.1 Background

Antananarivo, the capital of the Republic of Madagascar (hereinafter referred to as "Madagascar"), is located in the center of the national road network, which is the starting

point of national roads that connect the three most important ports, Toamasina in the east (National Route 2), Mahajanga in the north (National Route 4), and Toliara in the south (National Route 7). The capital is at once the accumulating point of most imported and exported goods and the greatest consuming area in the country. These national routes, as well as National Route 6 to Antsiranana in the north, divided from National Route 6, are recognized as one of the most important infrastructures for the social economy of the country, connecting five regional capitals out of six.

Before this Project started, however, trunk roads from the capital only consisted of radial ways without any detour connections between them. Accordingly, many vehicles large and ordinary had to pass the central part of the capital where main national routes were connected. In addition, when it was decided to commence the By-pass project in the year of 2003[1], the Malagasy economy recovered very rapidly from the bad situation in the previous year caused by political disorders[2] resulting in increase of traffic and the enlargement of vehicle sizes. Accordingly, social and economic activities as well as daily lives became badly affected by increased traffic pollutions of air and noise in addition to all-day long traffic jams and frequent traffic accidents. Especially on National Route 7 in the suburbs of the capital, where the roadway is occupied by houses, stores, chariots and mobile shops, the traffic was heavily obstructed by disorderly use of the road as public space,. On the other hand, large vehicles were restricted to limited hours to enter the urban area through National Route 2 to avoid traffic congestion there, since there was no route to the capital from Toamasina Port in the east but National Route 2 on which large vehicles for the urban area were concentrated and parked on the shoulders while waiting for the opening hours for long times obstructing the general traffic there.

Against such a background, the Government of Madagascar requested to the Government of Japan a grant aid project for the construction of road facilities of the By-pass of National Route 7 as a part of the Ring Road Plan, in order to ensure smooth logistics between National Route 7 and National Route 2 and to aim the economic development of Madagascar.

1.2 Project Outline

The Project constitutes “the Ring Road Plan” included in “the Construction of Roads in Antananarivo”. The objective of this Project is to realize smooth logistics and to ease traffic congestion in Antananarivo, the capital, by the construction of a by-pass of about 15 km long that connects National Route 7 and National Route 2, which are main routes of logistics in Madagascar.

[1] The Exchange of Notes for this Project was June 2003.
[2] Source: “ODA Country-by-Country Data Book 2012”, Ministry of Foreign Affairs (MOFA), Japan

Grant Limit / Actual Grant Amount	3,127 million yen / 3,044 million yen
Exchange of Notes Date	June 2003
Implementing Agency	Ministry of Public Works (currently Ministry of Public Works and Meteorology, MTPM)
Project Completion Date	December 2006
Main Contractor(s)	Daiho Corporation
Main Consultant(s)	Construction Project Consultants, Inc. and Chodai Co., Ltd. (JV)
Basic Design	"Basic Design Study on the Project of Construction of a By-Pass of National Route 7" Construction Project Consultants, Inc. and Chodai Co., Ltd. (JV), February 2000 – December 2001
Detailed Design	
Related Projects	<Grant Aid> "The Project of Construction of a Connection Road in the Southern Zone of the Capital" (2007)[3] <French Development Agency> "The Project of Construction of Marais Masay Road" (2000-2006) <European Development Fund> "Construction of Roads in Antananarivo" (2002-2005)

2. Outline of the Evaluation Study

2.1 External Evaluator

Makoto Tanaka, ICONS Inc.

[3] A road that makes a shortcut between a point near 5.5k of this By-pass and a point on National Route 7 near Ikopa River. Only Preliminary Study (2005-2006), Basic Design Study and Implementation Review Study (2007) were implemented there as parts of Grant Aid. The High Authority of the Transition entrusted the construction of another road parallel to this plan in 2010 to a local private company (for tthe road part) and a private company in People's Republic of China (for the bridge part) and completed it in 2011.

2.2 Duration of Evaluation Study

Duration of the Study: November 2012 – November 2013

Duration of the Field Study: January 12 – 26 and March 23 – April 6, 2013

3. Results of the Evaluation (Overall Rating: A[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Relevance with the Development Plan of Madagascar

In the road sector, Madagascar regarded development plans by foreign donors as important, especially those by the European Development Fund (EDF) on the agreement with European Union (EU), which was the national development plan de facto. This is because about half of the national budget of Madagascar depended on financial assistance by such foreign donors. At the time of ex-ante evaluation of this Project, the development guideline for the road sector was the EDF 8th Road Plan (1999-2003). Although EU greatly limits its assistance sectors at the time of ex-post evaluation due to the political crisis in 2009[6], the sectors of infrastructure construction and transportation are still one of its assistance objectives, where the construction of roads is included (EDF 10th Plan). Under the High Authority of the Transition that was established in the crisis, the Madagascar Action Plan (MAP), which had been established before the crisis, was brought to a halt, however, development objectives such as the promotion of agriculture and the construction of infrastructures are still regarded as important.

The current road development plan of Madagascar is based on the EDF 10th Plan (2008-2013). The Ring Road Plan is included there, which aims to improve the connection between national routes and to ease traffic congestion in Antananarivo as well. The By-pass is relevant to the current road plan since it is part of this plan[7] (see Table 1 and Figure 1).

[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[5] ③: High, ② Fair, ① Low

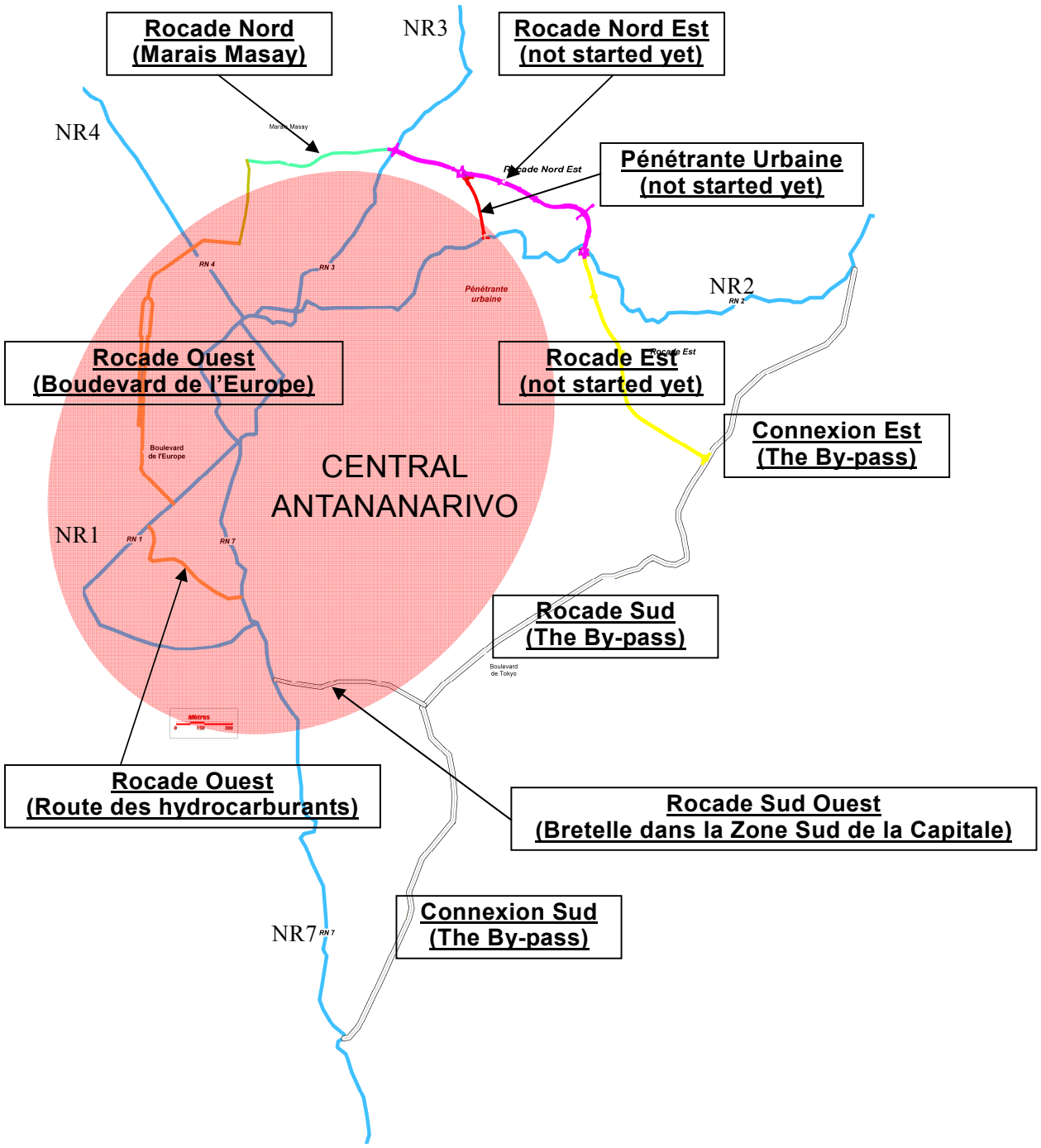
[6] In March 2009, the then President resigned and all the authority of the president was transferred to newly established "High Authority of the Transition" represented by "President of the Transition". International society criticized this as a change of power not following the constitutionally prescribed procedure. Major donors including Japan decided to stop their new assistance projects except humanitarian and emergent ones (source: "ODA Country-by-Country Data Book 2012", MOFA, Japan).

[7] Sections of the Ring Road were assigned to donors after the discussion between them and the Malagasy Government.

Table 1: Construction Plan of the Ring Road

Planned Sections	Names	Contents	Donors	Status (at the time of ex-post evaluation)
Rocade Sud Ouest (Southwest Ring Road)	*Bretelle dans la Zone Sud de la Capitale* (Connection Road in the Southern Zone of the Capital)	Newly constructed	Gov. of Japan (plan only)	Already opened (constructed by High Authority of the Transition)
Connexion Sud (South Connection Road)	By-pass of National Route 7 (this Project)	Newly constructed	Gov. of Japan	Already opened
Rocade Sud (South Ring Road)				
Rocade Est (East Ring Road)				
Rocade Ouest (West Ring Road)	*Route des hydrocarbures* (Fuel Road)	Newly constructed	AFD	Already opened
	Boulevard de l'Europe (Boulevard of Europe)	Newly constructed, improvement of existing roads		
Rocade Nord (North Ring Road)	Marais Masay	Newly constructed	AFD	Already opened
Rocade Nord Est (Northeast Ring Road)	—	Newly constructed	AFD	Not started yet (freezing)
Rocade Est (East Ring Road)	—	Newly constructed	AFD	Not started yet (freezing)
Pénétrante Urbaine (Urban Penetrant)	—	Newly constructed	AFD	Not started yet (freezing)

Source: the Evaluator, making reference to Basic Design Study Report, "Basic Design Study Report for the Project of Construction of a Connection Road in the Southern Zone of the Capital", JICA, 2007, pamphlet prepared by Madagascar Road Authority (ARM) and the results of interview survey to ARM



NR: National Routes, **Bold Underlined**: sections of the Ring Road Plan

Figure 1: The Ring Road Plan

Source: "Basic Design Study Report for the Project of Construction of a Connection Road in the Southern Zone of the Capital", JICA, 2007

Thus, the By-pass is relevant to Malagasy development policy at the time of ex-ante and ex-post evaluation.

3.1.2 Relevance with the Development Needs of Madagascar

Traffic between the starting and terminal points of the By-pass was estimated to be about 4,400 – 6,500 vehicles/day in 2000 before its opening[8], and was predicted to be about 12,000 vehicles/day in 2015 after the opening (source: "Feasibility Study Report on the Ring Road Plan", EU, 1996 and the Basic Design Study Report). Before the opening of the By-pass, it was recognized that the then existing road network did not have enough capacity to handle such traffic demand since it was necessary for the traffic between National Route 7 and National Route 2 to pass through the central part of Antananarivo, where very severe traffic congestion existed and the entrance to which was available only during restricted hours.

According to interview survey with the Ministry of Public Works and Meteorology (MTPM) and other government offices concerned with roads[9], the traffic in Antananarivo keeps increasing, thus the Ring Road is still regarded as important for connecting National Routes 1, 2, 4 and 7 to each other, which are important trunk roads that connect the capital and other important cities, from the viewpoint of ensuring smooth logistics. It also contributes to easing traffic congestion in Antananarivo, by diverting traffic between these routes from the city center.

Thus, the Ring Road Plan and the By-pass Project that constitute it are relevant to development assistance policy at the time of ex-ante and ex-post evaluation.

3.1.3 Relevance with Japan's ODA Policy

"ODA Country-by-Country Data Book 2002", Ministry of Foreign Affairs (MOFA), Japan, says "A political consultation on grant aid and technical cooperation was performed in December 1997, where it was confirmed to implement assistance projects, regarding as important in the fields of basic life, infrastructure for regional development, environment and human development" and regards as important, assistance in the field of infrastructure that contributes to regional development, including road projects such as the one implemented in the Project. This Project follows this direction since it will contribute to regional development, make the traffic easier between the area beside National Route 7 and Toamasina Port, the terminal point of National Route 2, which is an important hub of import and export, and make it easier to provide materials to the former and to export agricultural products from there[10].

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[8] Data of OD traffic investigation in 2000 showed that traffic at the whole section between the National Routes 7 and 2 was about 1,500 vehicles/day. OD traffic is the quantity of traffic originated from a certain zone and destined for another zone. OD stands for origin-destination.

[9] There are two government offices concerned in roads other than the Ministry of Public Works and Meteorology (MTPM), the implementing agency of the Project: the Vice-Prime Ministry in Charge of Development and Improvement of the Territory (VPDAT) and the Ministry of Transport (MT). MTPM has jurisdiction over national routes, VPDAT over local ones and MT over road traffic.

[10] Before the construction of the By-pass, it greatly interfered with inter-regional traffic that national routes passed through the central part of Antananarivo; it became at least the next day for a freight truck to arrive at

Thus, the Project was relevant to Japanese development assistance policy at the time of ex-ante evaluation.

From above, this Project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Effectiveness[11] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

3.2.1.1 Time required and traffic quantity between the starting and terminal points of the By-pass

Before the opening of the By-pass, vehicles must have passed through the central part of Antananarivo when they go between National Route 7 and National Route 2. There was also time restriction for heavy vehicles to enter the city from National Route 2. Table 2 shows the time required between the starting point (Iavoloha District) and the terminal point (Ambohimangakely District) before and after the opening of the By-pass as quantitative indices reflecting this improvement. The time required between the starting and terminal points of the By-pass has been greatly improved up to one sixth (except peak hours) with its opening.

Table 2: Time required between the starting and terminal points of the By-pass

Indices (unit)	Target (2005)	Actual (2000)	Actual (2010)
Time required between the starting and terminal points of the By-pass (min.)	20	restricted hours: 90 (except peak hours) other hours: 90	15

Source: Basic Design Study Report for target (2005) and actual (2000) values and Data Traffic on By-pass of National Route 7 by MTPM, 2010 for actual (2010) values

3.2.1.2 Traffic inside Antananarivo city and between the city center and outside

It was expected beforehand that after the opening of the By-pass, traffic congestion in the city would be eased since vehicles going between National Route 7 and National Route 2 would go through the By-pass not via the city center. In order to investigate this quantitative effect, questionnaire survey was performed on habitants beside the routes and transport companies about the situation of traffic congestion in the city center and the traffic between

National Route 7 from National Route 2, during which there were some cases that consigners canceled their freight agreement during the trucks were waiting for the opening time of entrance into the city; for example, it took two days for a bus to drive on a regular route between Toamasina (352 km via National Route 2 from Antananarivo) and Antsirabe (163 km via National Route 7 from Antananarivo) (source: the result of interview survey to MT).

[11] Sub-rating for Effectiveness is to be put with consideration of Impact

there and outside before and after the opening of the By-pass[12]. As a result of the survey, great improvement was found in the time required and traffic congestion as described below.

First, after the questionnaire survey to 50 habitants beside the routes, the improvement in the time required was confirmed about the access to suburbs after the completion of the Project: the mean velocity in all directions was 6.6 km/h before and 14.3 km/h after the opening of the By-pass respectively (see Table 3). 90% of the habitants answered that it became easier to go between National Route 7 and National Route 2 and to go to the city center from the suburbs.

Table 3: Mean travel velocity before and after the opening of the By-pass[13]

Directions	Number of answers	Mean travel velocity (km/h)	
		Before	After
Direction of NR2	13	7.3	16.4
Direction of NR3	1	2.4	6.4
Direction of NR4	1	6.9	27.6
Direction of NR7	15	7.0	14.6
Other directions	9	11.7	25.9
Mean in all directions	39	6.6	14.3

Source: The evaluator's calculation from the results of questionnaire survey for habitants

Questionnaire survey was also performed on five passenger transport companies that operate bus routes connecting the city center and outside and one cargo transport company about the traffic between the city center and outside. As the results of the survey, answers were obtained as listed in Table 4 and Table 5 about the time required before and after the opening of the By-pass. The time required has been shortened between the city center and each point in the directions of National Route 7 (south) and National Route 2 (east) respectively. According to MTPM, the time required has been shortened by the following two effects: because the Project has shortened the waiting queue since heavy vehicles going from

[12] On each of 50 residences of habitants beside National Route 7, National Route 2 and the By-pass and 7 transport companies (5 passenger and 2 cargo transport companies) questionnaire survey and interview survey were performed door to door. They were requested to answer how much they are satisfied with the By-pass and the times required and the travel costs between certain points before and after the opening of the By-pass and to make comments on it. The habitants were also asked about the improvement of air quality.

[13] Each habitant targeted in questionnaire survey was requested to declare a certain point they often visit and to answer the time required between the declared point and the city center. The evaluator measured the distance on maps and classified the points into directions, and calculated the mean travel velocity as the sum of the distances from the city center divided by the sum of the time required.

National Route 2 to National Route 7 stopped going via the city center to avoid waiting for the entrance from National Route 2 into the city, and because the whole lengths of the two national routes (NR7: Antananarivo – Toliara, NR2: Antananarivo – Toamasina) were improved (pavement on unpaved sections, widening of narrow sections, strengthening on bridges which often fall and slopes which often collapse due to heavy rain, etc.).

Table 4: Time required between the city center and outside before and after the opening of the By-pass (Answers by passenger transport companies)

Companies	Section		Direction	Distance (km)	Time required (h:mm)	
	From	To			Before	After
TRANSTAFITA	City center	Moramanga	East (NR2)	98.2	2:30	2:20
KOMPIMA					3:00	2:00
FIFIABE	City center	Toamasina	East (NR2)	324	10:00	8:00
MADATRANS	City center	Toliara	South (NR7)	923	16:00	14:00
FIFIABE					19:00	15:00

Source: results of the questionnaire survey for passenger transport companies (except distances) and the evaluator (distances)

Table 5: Time required between the city center and outside before and after the opening of the By-pass (answers by cargo transport companies)

Companies	Section		Via	Distance (km)	Time required (h:mm)	
	From	To			Before	After
SALONE	Anosy, City center	East, Ambohimangakely	East (NR2)	13.0	2:00	0:30

Source: results of the questionnaire survey for cargo transport companies

In addition, in questionnaire survey of habitants beside the routes, 94% of the targeted habitants answered that traffic congestion in the city decreased with the opening of the By-pass. The results of questionnaire survey to one cargo transport company are as shown in Table 6, about the traffic between the starting and terminal points before and after the opening of the By-pass. Although it took a very long time beforehand because of the necessity to pass through the city center, the time has been shortened since vehicles drive via the By-pass.

Table 6: Time required between the starting and terminal points before and after the opening of the By-pass (answers by cargo transport companies)

Companies	Section		Via	Distance (km)	Time required (h:mm)	
	From	To			Before	After
COLAS	13k of NR7, South	11k of NR2, East	City center	31	2:30	—
			By-pass	21	—	0:20

Source: results of the questionnaire survey for cargo transport companies

From above, it can be said that the habitants and the transport companies think that traffic congestion in Antananarivo has been eased and the traffic between the city center and outside has improved with the opening of the By-pass. There is only limited effect in terms of reducing transport cost because of the rapid inflation of fuel expenses[14], which was expected at the time of basic design, even though fuel consumption decreased due to the opening of the By-pass.

3.2.2 Qualitative Effects

3.2.2.1 Improvement of transport between ports and industrial and agricultural areas

City Job Institute (IMV)[15] has announced a research result that it has become possible to transport efficiently between ports and industrial and agricultural areas. It has become possible to transport agricultural products within a day from agricultural areas beside National Route 7 to Antananarivo, a consuming area, and to Toamasina Port (the terminal point of National Route 2), an important hub of import and export, and moroever, cases of goods on vehicles being stolen during traffic congestion, etc. have decreased. From this, it is thought that the effectiveness of the By-pass improved the transport between ports and industrial and agricultural areas.

3.2.2.2 Entrance restriction for vehicles into Antananarivo

MTPM and IMV told that the restriction of the entrance into Antananarivo depends on three classes of gross vehicle weight. At the time of ex-post evaluation, the restriction was strengthened for vehicles classified in the heaviest group (over 16 tons) compared to the time

[14] The price of fuel increased: the retail prices of regular gasoline and diesel oil were 1,002 and 714 in June 1, 2003 before the Project and 2,710 (increased by 170%) and 2,540 (by 256%) in March 26, 2008 after the Project respectively (unit: MGA/ℓ) (source: statistics by Malagasy Hydrocarbon Office (OMH)). MGA stands for Madagascar Ariary, the currency of Madagascar, the exchange rate of which is 1 MGA = 0.0427 yen as of March 2013 (source: announcement by Central Bank of Madagascar (BCM)).

[15] A research institute established in 1989 by Île-de-France (Autonomous entity) in France for the purpose of technical exchange and reciprocity with Antananarivo Urban Commune (CUA), dealing with general urban problems in Antananarivo, currently under the management of CUA.

of ex-ante evaluation, because vehicles have absolutely increased and because there are few parking areas for heavy vehicles inside the city: they are not allowed to enter the city from National Route 2 from 6:00 to 20:00 as a general rule. However, the restriction is removed for vehicles going to the truck terminal that is the largest logistical hub in the city, to go to and go out from the terminal, since the access road to the terminal had been improved. For vehicles classified in the light and middle groups (gross vehicle weight of not more than 16 t), the restriction was abolished.

The transport companies commented the following as free answers in the questionnaire survey:

- The drivers are to be paid extra even during waiting not only for overtime but also for night-work since the restriction is over at 21:00. Such personnel expenses had been heavy before the opening of the By-pass. However, it has been reduced because the waiting time has been shortened after the opening of the By-pass.
- It has become easy to plan the arrangement of drivers since it has become possible to estimate the time or driving.

As described above, it is thought that the effectiveness of the By-pass shortened the time required and improved the transport between ports and industrial and agricultural areas.

3.3 Impact

3.3.1 Intended Impacts

3.3.1.1 Impact on agriculture

At the time of ex-ante evaluation of the Project, the increase in agricultural incentive was expected as one of the indirect effects, since the increase in sales had been anticipated because the transport of agricultural products would become more efficient and expand the sales area.

According to IMV, the agriculture in the suburbs of Antananarivo has been activated with the opening of the By-pass. Its causes are that the development beside the By-pass has come under surveillance of the authorities to prevent the destruction of farmland and that displays and sales of agricultural products began to be held on weekends and holidays at open-air markets beside it (especially on the north of the railroad crossing near 11k). There is as well a report on the activation of agriculture that the area of farmland increased by 66% from 2000 to 2008 after the opening of the By-pass in Ambohijanaka Commune beside it while it decreased by 12% from 1999 to 2006 in Antananarivo[16].

[16] p. 23 of the research report of the first year by Mr. Pauline Abrieu, a master course student tutored by IMV.

3.3.1.2 Impact on transport

As described in 3.1.1, the Ring Road has already opened in the year of 2011 except some part, forming a route from the By-pass via Androndrakely to the western part of the capital. This made it possible to connect National Routes 1, 2, 4 and 7 to each other, to improve the traffic between them and to realize the objective of the By-pass, that is, "to ensure smooth logistics that are not affected by the traffic restrictions" between the four routes, not only National Route 7 and National Route 2 but National Routes 1 and 4.

3.3.2 Other Impacts

3.3.2.1 Impacts on the natural environment

Ac cording to interview survey to the government offices concerned such as MTPM, VPDAT and MT etc., there is no report of Impacts on the natural environment beside the By-pass (including flooding on the central section of the By-pass (ca 5km length) which were examined in basic design study) and there is a negative Impact on the natural environment such as air pollution and noise and vibration etc. that were worried beforehand, except few air pollution cases reported. Answers were obtained also in questionnaire survey to habitants beside the routes (total 50 residents: 20 residents beside National Route 7 inside the urban area, 10 residents beside National Route 2 inside the urban area, 10 residents beside National Route 2 in the suburbs and 10 residents beside the By-pass) as shown in Table 7.

Table 7: Results of questionnaire survey to habitants on the effect by the By-pass on air quality

Question	Improved	Not Changed	Degraded[17]
Change in air quality	28%	68%	4%

Source: results of the questionnaire survey for habitants

And according to Antananarivo Urban Commune (CUA), there were many cases of unsanitary situation caused by drivers' defecation and urination beside the road before the opening of the By-pass, as well as exhaust gas, noise and vibration by vehicles waiting for the opening hours, but such cases are currently very few because the waiting time has been greatly shortened.

[17] Of the 50 residents there were two who answered that the air quality was degraded. One of the two was in Andoharanofotsy about 3 km north of the start point of the By-pass, while the other was in Ambohimanambola about 4 km southeast of the Bridge No. 2 of the By-pass. The reason the air quality degraded is not clear for the former, for the latter, however, it would be the increase in the population and the insider traffic since the zone is located in the suburbs.

3.3.2.2 Land Acquisition and Resettlement

According to MTPM, Land Acquisition and Resettlement at the expense of the Malagasy side was implemented as described in the Basic Design Study Report without any problem[18]. However, no more information has been obtained since there were no detailed references of Land Acquisition and Resettlement at the ministries and organizations concerned including MTPM; they might be scattered and lost because of the political crisis, etc.

3.3.2.3 Unintended Positive/Negative Impact

There can be listed the following unintended Positive/Negative Impacts.

(1) Positive impacts

①Cargo transport companies using the routes answered that the thefts of transported goods during waiting have been decreased since the time has been greatly shortened before the opening time to enter the city.

②According to CUA, the access to Antsirabe became easier because traffic congestion in the city was eased; many citizens go for recreation to Antsirabe on Sundays since there are few amusement facilities in the city.

③According to MT, the areas beside the By-pass become amusement parks of carnivals, street stalls and cleaning volunteers on weekends and holidays (especially in Amoronakony area in Ambohimangakely Commune).

④It has become possible to commute to the city center from the areas beside the By-pass with its opening, which were only lonely villages beforehand, and many houses have been built there. The fact provides some support for it that land price has increased here[19].

(2) Negative impacts

①In Madagascar, it is common that crossing points between trunk roads are planned as roundabouts while those between a trunk road and an existing non-trunk road as plane crossings where users of that non-trunk road should once stop there. This general rule is also applied to the Ring Road Plan (the By-pass is part of it). However, traffic accidents occur at two of the plane crossings in Ambohijanaka Commune, which are of the

[18] In the Basic Design, total 11,323 million FMG expense of the Malagasy side was appropriated; 11,020 million FMG for land acquisition (5,310 million FMG for land, 3,190 million FMG for residences, and 2,520 million FMG for resettlement), 300 million FMG for the movement of electric wires, water pipes and telephone lines (100 million FMG for each), 3.10 million FMG for the equipment of traffic signs etc. FMG stands for Madagascar Franc, the former currency of Madagascar, the exchange rate of which was fixed as 1 MGA = 5 FMG. This means the total expense of 203 million yen on the Malagasy side, calculation depends on the rate of 1.00 FMG = 0.0179 yen (as of May 2001 – October 2001) (source: .Basic Design Study Report).

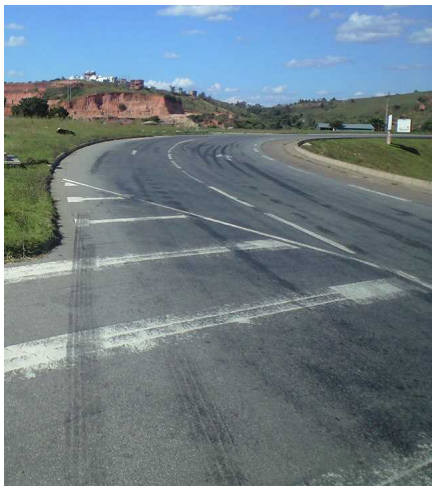
[19] 10,000 – 15,000 MGA/m^2 before the opening of the By-pass and about 250,000 MGA/m^2 afterward (source: result of interview survey to MT).

By-pass and existing non-trunk roads, probably caused by carelessness of users of the latter[20]. MTPM commented in interview survey that they cannot find any effective measures of hardware[21].

②The Evaluator actually ran over the By-pass and found many brake tracks as shown in Photo 1. According to MTPM and CUA, these are caused by reckless driving and grazed animals rushing out to it.

③According to CUA, crimes such as purse-snatching take place and many human accidents occur in the areas beside the By-pass because of narrow views caused by poor lighting while the number of population and people passing through increased with the opening of the By-pass.

Near 9k600, inside Alasora Commune



Near 10k000, inside Alasora Commune

Near 10k600, Amolonakony area inside Ambohimangakely Commune

Photo 1: Brake tracks on the By-pass

From above, this Project has largely achieved its objectives, therefore its effectiveness is high.

[20] According to interview survey to the mayor of the commune, there were 10 accidents after the opening of the By-pass till now (5 years), in which 80% of the victims pedestrians (half adults and half children): the rest are one motorcycle and one bicycle cases. All the accidents except the motorcycle case occurred in daytime.

[21] For example, President's Office opposes making speed-reducing bumps on the By-pass (Presidential Palace is near the starting point and the By-pass is an access road to it). The habitants who carry goods over their head would not use footbridges since they can see very far ahead from the crossings. The cars rapidly driving on the By-pass would not slow down or stop even if there are signs "Pedestrians' Crossing" on the road surface. Steel-made road signs installed beside the By-pass are often stolen and lost.

3.4 Efficiency (Rating: ③)

3.4.1 Project Outputs

3.4.1.1 Japanese Side

The construction of facilities in the Project was implemented almost following the basic design except adding the movement of railroads[22] as shown in Table 8.

Table 8: Output of this Project (Construction of facilities)

Items	Plan (at the time of Basic Design Study)	Actual
Construction of a road	Total length about 15 km One lane per direction: (lane width 3.5 m, shoulder 2.0 m) Asphalt pavement	Total length 15.205 km One lane per direction: (lane width 3.5 m, shoulder 2.0 m) Asphalt-concrete pavement
Construction of bridges	Bridge No. 1 (length 96 m, one lane per direction) Bridge No. 2 (length 150 m, one lane per direction)	Bridge No. 1 (length 95.50 m, one lane per direction) Bridge No. 2 (length 150.25 m, one lane per direction)
Movement of railroads	—	1,245.0 m

Source: Basic Design Study Report, Completion Report and Defect Inspection Report

3.4.1.2 Malagasy Side

According to the Completion Report and the Defect Inspection Report, the items at the expense of the Malagasy side described in the Basic Design Study Report (listed below) were implemented as planned without any problem.

(1) Securing the land for Resettlement

(2) Land Acquisition for residents

(3) Handling electric wires, telephone lines and water pipes and moving wells, etc.

(4) Land Acquisition for farmland

There is no report on the influence about Land Acquisition.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The actual Project cost was 3,044 million yen, which was lower than the planned cost of

[22] The movement of railroads is for the purpose of coping with the improvement of the angles between the railroads and the By-pass and with the height of road embankment. If the railroads and the road cross each other acutely, there are dangers of missing steering control and jumping out of the road for vehicles passing through the crossing.

3,127 million yen (97% of the planned cost).

3.4.2.2 Project Period

This Project started in June 2003 and ended in December 2006, thus the Project period was 42 months, which was shorter than the planned Project period of 46 months (91% of the planned Project period)[23].

From above, both Project cost and Project period were within the plan, therefore efficiency of the Project is high.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

As the results of interview survey to related ministries, the maintenance activities are under the superintendence of Department of Road Maintenance (DER), MTPM. DER is a department of MTPM established in 2006, which generally deals with planning of maintenance of national routes, where seven exclusive persons are in charge. Actual maintenance activities are divided into routine (cleaning road surface, clearing drain outlets, removing grasses etc.), convention (confirming faults caused by the construction works), annual (repairing and replacing regularly parts such as buffers and curbs etc.), urgent (coping with bridge collapse, tree toppling and rock fall caused by natural disasters and traffic accidents etc.) and special (others) ones, each of which is implemented by the entities listed below respectively (see also Table 9).

- Routine: Bureau of Inter-Regional Public Works and Meteorology (DIRTPM), MTPM
  A department of MTPM established in 2007, which implements the maintenance plans for the By-pass established by MTPM-DER. There are seven exclusive persons in charge.
- Convention, annual and special: Road Maintenance Fund (FER)
  A public organization under MTPM established in 1998, which accepts funds subventions from donors. It performs conventional, annual and special maintenance

[23] Pavement surface was cracked at a section of about 100 m long around 10k700 in January 2007 due to slide of the embankment. A survey clarified that the month had three times as much rain as in the average year and the slide was because of rainwater flown on private access roads and drains that habitants who live there had connected to the By-pass without permission. Since this is for an exceptional reason to which the contractor is not responsible, the consultant and MTPM, the counterpart organization in charge of supervision discussed and decided to implement restoration works paid by the Malagasy side with no defect period. The Malagasy side agreed to regard the whole completion of the plan as the completion of those works. After a survey for the confirmation of the causes had completed, restoration works were implemented in the section from 10k600 to 10k750 just after the rainy season was over, since it was judged that the works were impossible during the season. Although the Project itself was completed in December 2006, the opening of the By-pass was postponed to March 2008 after the completion inspection was performed in that month.

activities by itself and pays the costs of routine maintenance activities by MTPM-DIRTPM and urgent ones by Office of Urgent Works (OTU). It has a voice in the establishment of plans by MTPM but cannot make decisions on them.

- Urgent: Office of Urgent Works (OTU)

  A public organization under MTPM established in 2006, which is dispatched to cope with urgent maintenance activities in emergencies such as cyclone attacks.

Table 9: Entities implementing the maintenance of national roads

Kinds	Entities	Forms of implementation	Cost payer
Routine	MTPM -DIRTPM	Entrusted to private companies	FER
Convention, annual and special	FER	Entrusted to private companies	FER
Urgent	OTU	Directly implemented	FER (paid after discussion with OTU)

Source: results of interview survey to MTPM, FER and OTU

Different departments of and public organizations under MTPM are in charge of each of the maintenance activities, routine, annual and urgent, in close cooperation with each other without any bad effect.

3.5.2 Technical Aspects of Operation and Maintenance

Every one of MTPM-DER, DIRTPM, FER and OTU holds enough personnel and technology for maintenance activities.

The maintenance activities for the By-pass are entrusted from MTPM-DIRTPM to private companies that are selected in bids every year considering prices and technical skills as shown in Table 10 without any technical and financial problem. It will continue that FER entrusts the maintenance activities to technically skilled private companies. There have been periods in which no maintenance activities were entrusted from MTPM-DIRTPM and FER to private companies. However, on weekends and holidays during those periods, cleaning volunteers came there from the city center and cleared drain outlets and removed grass, etc. (almost equivalent to routine maintenance activities) voluntarily, without any problem on maintenance.

Table 10: Results of the entrustment for the maintenance of the By-pass

Years	Kinds of works	Implementing entities	Cost payer	Period	Entrusted companies
2007 - 2008	Routine	MTPM-DIRTPM	FER	N/A	N/A
2008 - 2009	Routine	MTPM-DIRTPM	FER	3 months from May 26, 2009	VONJY
	Convention, annual, special	FER	FER	3 months from May 26, 2009	EGECI
2009 - 2010	Routine	MTPM-DIRTPM	FER	8 months from August 30, 2010	TAMBATRA
	Convention	FER	FER	8 months from August 30, 2010	TAMBATRA
2010 - 2011	Convention, annual, special	FER	FER	4 months from November 7, 2011	BRAIN
2011 - 2012	Convention, annual, special	FER	FER	3 months from November 29, 2012	AVIG

Source: references prepared by FER

OTU prepares in ordinary times technology and financial procedure and performs required works by itself for emergency measures when the road beds are washed away, the bridges fall, the soil masses collapse and the trees are blown over in emergency cases such as attacks of cyclones and heavy rainfalls. After the temporal restoration, the works leave from the jurisdiction of OTU and are entrusted to private companies via MTPM and FER. Many previous results by OTU are confirmed about urgent maintenance activities on national routes, accordingly there is no problem in the maintenance technology of OTU.

From above, there are no technical problems for public organizations in charge of the maintenance of the By-pass such as MTPM-DER, DIRTPM, FER and OTU and private companies to which MTPM and FER entrust the works.

3.5.3 Financial Aspects of Operation and Maintenance

Since the By-pass was registered as a national route (No. 60) and designated as strategically important at the time of its opening, it is expected that the budget for its operation and maintenance is given priority in allocation[24].

[24] Generally, it is easier to allocate maintenance budget to national routes than to regional and communal routes. It is also possible to allocate budget to national routes that are important under the national policy prior to other national routes. Although the By-pass did not satisfy the conditions required for the registration of national routes at the time of opening, it was registered as a national route under a political

According to MTPM, the expenses of the operation and maintenance are paid from the budget of the government, main source of which is fuel tax (7% of the retail price of automobile fuels) collected from automobile users. FER once accepts the funds from the national budget and the subventions (donation from donors as maintenance expenses); it pays the maintenance expenses each time maintenance activities are implemented. Table 11 shows the situation of funds accepted by FER. Before the political crisis in 2009, a great part of the maintenance expenses was subventions. However, the share of subventions greatly decreased since donors except the French Development Agency (AFD) froze most of their assistance with the political crisis, resulting in most part of the maintenance expenses being shared by fuel tax. Moreover, the disbursements greatly exceeded the revenues in campaign 2011-12 since the allocated budget to FER greatly decreased as described before, however, the balance of the fund has never been 0 because of remainder from the previous year (source: results of interview survey to FER).

Table 11: Funds accepted by Road Maintenance Fund (FER)

Unit: Million MGA

	2009	2010	2011	2012
Subsidy for Road Maintenance (RER)	75,735	68,023	34,986	-214
Affected Resources (RA)	7,769	0	7,099	0
Petrol Product Tax (TPP)	2	0	0	0
Subventions (SUB)	6,290	0	8,915	2,760
Contributions from Decentralized Territorial Collectivities (ACTD)	1,527	990	0	0
Other resources (AR)	6,901	6,600	8,000	8,200
Total	98,224	75,613	59,000	10,746

Source: announcement by FER

On the other hand, the finance of operation and maintenance will greatly pick up since the World Bank (WB), Delegation of the European Union to Madagascar (DUEM) and African Development Bank (BAD) express that they will resume their assistance including financial assistance on condition that international society recognizes the new government that will set

decision (source: the result of interview survey to the Minister of MTPM). At the time of ex-post evaluation, revisions of laws including the change of the criteria of national route registration (MTPM: the bill of "Act on the Second Revision of the Road Chart") is proposed to and discussed in the Parliament. The By-pass will satisfy the new criteria after the bill is passed. The national routes are classified into three ranks prescribed by a decree (MTPM: Decree on the Revision of the Classification of the National Routes) and the By-pass is classified in the highest rank of Primary National Routes as well as the National Routes 2, 4, 6 and 7.

up after the presidential election.

Next, here is described the status of disbursements for the maintenance of national routes. As described before, all the funds for the maintenance of national routes are once accepted by FER and paid from it. Table 12 shows the total amount and the amount per 1 km of estimates and allocated budgets for the maintenance of all national routes calculated by FER[25]. The amount per 1 km is for the convenience of comparison since the total length of national routes increases year by year.

Since 2008, the actual amounts allocated from the national budget are no more than 59 – 77% of the estimates. Since campaign 2009-10, the budgets for the maintenance of national routes are not enough. The actual amount per 1 km for the By-pass is less than the estimate and actual amount per 1 km for all national routes. Especially, that greatly decreased in campaign 2011-12. This is because there was no need for large-scale repair works since the By-pass is a new paved road passing in a plain. It was confirmed that each public organization makes efforts to allocate the budget to the By-pass giving priority from what little budget, ranking its projects.

The actual amount per 1 km for the By-pass is less than the estimate and actual amount per 1 km for all national routes. Especially, that greatly decreased in campaign 2011-12. This is because there was no need for large-scale repair works: there is not any financial problem.

Table 12: Estimates and allocated budgets for the maintenance of all national routes and the By-pass by Road Maintenance Fund (FER)

Campaign	Total amount (million MGA)				Amount per 1 km (thousand MGA/km)			
	2008-09	2009-10	2010-11	2011-12	2008-09	2009-10	2010-11	2011-12
Estimate (all NR)	60,170	60,438	62,496	62,906	5,488	5,246	5,415	5,358
Allocated (all NR)	44,189	46,652	36,734	47,195	4,030	4,049	3,183	4,020
Allocated (By-pass)	38	19	30	13	2,542	1,234	2,000	896

Source: references prepared by FER

As above, the budget for its maintenance is secured constantly, since each public

[25] In the fiscal system of FER, the revenues are appropriated as the sum from January 1 to December 31 every year, while the disbursements are appropriated as the sum from the end of the rainy season to that of the next year, the term of which is called “campaign”. Because of this fiscal system, it was impossible to compare the balance of revenues and disbursements year by year. Madagascar adopts this system since there occurs many natural disasters in the rainy season (November – April).

organization makes efforts to allocate the budget to the By-pass giving priority from what little budget, ranking its projects. After donors resume their assistance, the finance of operation and maintenance will pick up since WB, BAD and EU recognize the importance of the By-pass.

3.5.4 Current Status of Operation and Maintenance

The Evaluator actually drove the whole By-pass and found some minor defects that do not affect the functions, such as collapse of shoulders mainly caused by parking of heavy vehicles, settlement of pavement surface, bumps at bridge connections and thefts of road signs and railings (see also 3.5.3 for thefts). Although there is no major defect that affects the function of the road, it is expected that driven vehicles would be affected if they are left unattended. MTPM-DER recognizes it and expressed that it wants to start repair works just after donors resume their assistance, although it cannot currently do it because of short funds.

Steel parts of road illumination facilities, road signs and railings[26] are often stolen. Once, steel columns were stolen that had been protected with concrete covers as measures against thefts, after the covers were broken with machines like a rock drill. Drastic measures against them are difficult since there are limitations in measures against thefts of steel parts of road signs and railings such as strengthened control and fluent repair works.

In the section of the By-pass where the embankment slid and the pavement surface was cracked just after the completion (see Note 23 in p. 17), there has been no defect of such kind. VPDAT has prohibited and started to control unauthorized connection of private access roads and drains, which had caused this defect.

From above, some problems have been observed in terms of the current status of operation and maintenance, therefore sustainability of the Project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This Project was implemented in Antananarivo, the capital, in order to shorten the travel time required, to ensure smooth logistics that are not affected by traffic restriction in the capital region, to ease traffic congestion in the city center, to decrease transport costs and to promote logistics, by the construction of a by-pass that connects National Route 7 and National Route 2 in the suburbs of the capital as part of the Ring Road Plan around the capital. The objective of the Project meets Madagascar's development policy, developmental needs and Japan's ODA policy, therefore its relevance is high. The implementation of the Project

[26] The railings of the Bridge No. 1 contain iron parts because of the necessity of water passage in case of flooding. This did not allow to adopt reinforced concrete walls as used in the Bridge No. 2.

has largely achieved its objectives of the decrease in time required between National Route 7 and National Route 2 and between the city center and the suburbs, therefore its effectiveness is high. Both the cost and period of the Project were within the plan, therefore efficiency of the Project is high. On the other hand, some problems have been observed in terms of the current status of operation and maintenance, such as thefts of steel parts of road signs and collapse of shoulders, therefore sustainability of the Project effect is fair.

In light of the above, this Project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Preventive maintenance

The Malagasy side recognizes the importance of the By-pass and makes efforts to secure personnel, technology and institutions and to allocate the budget for its operation and maintenance giving priority. In spite of these efforts, there are some minor defects that do not affect the functions, such as bumps at bridge connections, cracks and settlement of pavement surface, damage on shoulders and clogging up of drain outlets. Although no severe problem currently occurs, these defects will expand and finally cause a status that requires major repair works if they are left unattended. Since the budget for the operation and maintenance is allocated to the By-pass although the amount is small, it will prevent the increase in the cost for operation and maintenance to use the budget to preventive maintenance giving priority.

(2) Traffic safety education

In Madagascar, it is common to make crossing points between trunk road roundabouts and ones between trunk and non-trunk roads plane crossing. There is a fear that many drivers are not aware of the duty that one or both drivers are to notice other traffic when they pass plane crossings. New measures for traffic safety are also required since there were few roads like the By-pass that meet high standards and have no traffic congestion. It is necessary for road users to be awakened that drivers should notice other traffic when they drive rapidly and pass crossings and pedestrians should notice vehicles when they walk on and go across trunk roads, by some means such as instruction at school education and lectures on acquisition of driving permits.

(3) Measures against parking of heavy vehicles

It might be possible that most collapse of shoulders is avoided if heavy vehicles are not parked there. It is recommended to control parking of heavy vehicles there and to avoid such parking by preparing parking areas for heavy vehicles and to guide them to those areas.

(4) Measures against the theft of steel parts

Parts of road signs are sometimes stolen for the purpose of selling iron fillings on the black market if they are made with steel and are erected on the ground. Possible measures against it are setting of speed limits and painting of direction instructions on the surface. MTPM discussed this idea beforehand, however, it was not adopted because it is hard to see in the night since there is no road illumination[27].

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

The main purpose of the By-pass is to ease traffic congestion and further to ensure smooth logistics. However, there are many cases where new problems such as traffic accidents occur with the construction of new trunk roads. It cannot be avoided if new roads are constructed. This Project has improved traffic congestion in the central part of Antananarivo and traffic between the city center and suburbs with the opening of the By-pass, but also caused a new problem of traffic accidents in the areas beside the By-pass, which were only lonely villages beforehand. According to MTPM and CUA, the main causes of the traffic accidents are reckless driving, careless passing of crossings and grazed animals rushing out to it. Most such traffic accidents would involve drivers who are not familiar with trunk roads like the By-pass that have no traffic congestion and habitants who have not encountered vehicles driving rapidly. It will be possible to minimize negative impacts such as traffic accidents in the cases like this Project of construction of new plane roads in surrounding areas of large cities which are not urbanized, to examine the plans of crossings in consideration of the possible increase of traffic in local roads to be connected to the new roads, including the adoption of roundabouts, as well as supplementary soft components of traffic safety education for drivers and habitants (including making them aware of the duty that one or both drivers are to notice other traffics when they pass plane crossings).

End

[27] It might be another idea to adopt road signs on the surface with paint containing fluorescent colors for limited use that reflects vehicle lamplight. This kind of paint has been experienced in Antananarivo Ivato International Airport. It may be able to domestically purchase such paint, but it is potentially difficult because of its high price.

Republic of Madagascar

Ex-Post Evaluation of Japanese Grant Aid Project

The Project of Groundwater Development in South-Western Region of Madagascar (Phase II)

(Le Projet d'exploitation des eaux souterraines dans la région sud-ouest de Madagascar (Phase II))

External Evaluator: Satoshi NAGASHIMA, ICONS Inc.

0. Summary

This Project was conducted with the aim of improving the water supply rate in the target area and enhancing the targeted local residents' maintenance capacity of the water supply facilities by constructing deep well water supply facilities in the 61 villages of Menabe region located in southern part of Madagascar, by procuring the drilling equipment and by maintaining the existing drilling equipment.

This Project is consistent with the development policy of Madagascar, development needs, and Japan's ODA policy, and the relevance is high.

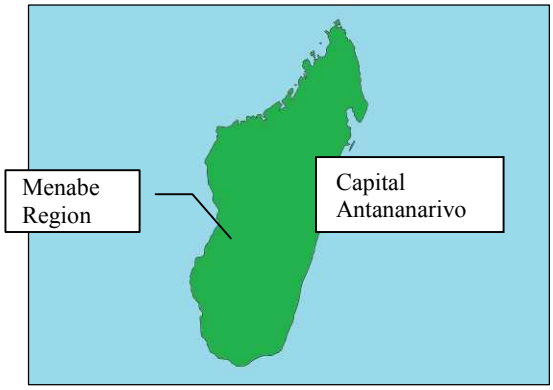
Not only are around 80% of water supply facilities constructed under this Project running, but the water supply rate in the target region has improved beyond the planned target in synergy with other donors' assistance, and water committees have been organized in each village. In addition, the effect of the equipment procured by the Project has spread to other regions, and this Project seems to contribute to reducing waterborne diseases. Therefore, the effectiveness and the impact are high.

On the efficiency, the number of public fountain type water supply facilities has decreased by two places. In addition, the extension of the Project period was because of the evacuation in line with worsening political situation and of one additional construction phase associated with it. However, the extension of the Project was also occurred apart from the suspension of the Project: it is regarded that the period of 4th phase of the detail design was longer than planned because of the adjustment for change of exchange rate. Because of the overall reasons above, the efficiency is fair.

For the sustainability, even though about 80% of the water supply facilities are functioning, there is a problem on the supply system of spare parts, there is a limit to the monitoring system of the water supply facilities, and half of the water committees haven't collected the water utilization fees. In such circumstances, there are a lot of problems for the future. As for groundwater development equipment, the equipment is partially broken and not repaired. Therefore, the sustainability is low.

In light of the above, this Project is evaluated to be partially satisfactory.

1. Project Description



Project Location

Public fountain type water supply facility

1.1 Background

In the water sector in Madagascar, the water supply rate in the rural area was only 12% at the end of 1999, and it was lagging significantly compared with 83% in urban areas and it was also the lowest level among neighbouring African countries. For this reason, the Ministry of Energy and Mines, which has jurisdiction over the water sector of the country, formulated the "Law concerning water" in 1999 with the help of the World Bank and the Poverty Reduction Strategy Paper (PRSP) in the following year (in 2000), and the goal was set to increase the water supply rate in the rural area up to 80% by 2015.

Japan has supported the water sector of the country from the early 1980s and in particular, the promotion of water supply equipment was carried out in the ex-southern Toliara province, which was one of the poorest areas. From 1992 to 1994, construction of water supply facilities was conducted in the 50 villages of the ex-provincial capital, Toliara city, as Phase I of this Project. Continuing this, a development study, "Onihira-Morondava area groundwater development plan" was implemented in the villages of Menabe region between 1994 and 1996, and it was verified the needs of the water supply facilities and the technical adequacy in the region.

Based on the results of the development study, Madagascar government requested a grant aid Project of which the main contents are construction of the water supply facilities of deep wells in 61 villages of Menabe region, former Toliara province, and procurement of equipment for excavation and maintenance of existing equipment.

1.2 Project Outline

The Project was conducted with the aim of improving the water supply rate in the target area and enhancing the targeted local residents' maintenance capacity of the water supply facilities by constructing deep well water supply facilities in the 61 villages of Menabe region located in southern part of Madagascar, by procuring the drilling equipment and maintaining the existing drilling equipment.

Grant Limit / Actual Grant Amount	347 million yen / 345 million yen (Phase 1) 474 million yen / 197 million yen (Phase 2) 475 million yen / 472 million yen (Phase 3) 651 million yen / 593 million yen (Phase 4)
Exchange of Notes Date	April, 2001 (Phase 1), August, 2001 (Phase 2) June, 2003 (Phase 3), June, 2004 (Phase 4)
Implementing Agency	Department of Water and Sanitation, Ministry of Energy and Mine (Currently Ministry of Water)
Project Completion Date	February, 2006
Main Contractor(s)	ITOCHU Corporation (Phase 1) Urban Tone Corporation (Phase 2 and 3) KOKEN BORING MACHINE Co, Ltd. (Phase 4)
Main Consultant(s)	Japan Techno Co., Ltd
Basic Design	July, 2000 - September, 2000
Related Projects (if any)	Technical cooperation - The Project of Groundwater Development in South-Western Region of Madagascar (1989-91) - Onihira-Morondava area groundwater development plan (1994-96) - The Project for Improvement of Rural Water Supply and Hygiene Practice in Atsimo Andrefana Region (2008-2013) Grant aid Project - The Project of Groundwater Development in South-Western Region of Madagascar (1992-94)

2. Outline of the Evaluation Study

2.1 External Evaluator

Satoshi NAGASHIMA, ICONS Inc.

2.2 Duration of Evaluation Study

Duration of the Study: November, 2012 – November, 2013

Duration of the Field Study: March 23rd, 2013 – April 6th, 2013

June 4th, 2013 – June 13th, 2013

3. Results of the Evaluation (Overall Rating: C[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Relevance to the Development Plan of Madagascar

Madagascar government developed the Poverty Reduction Strategy Paper (PRSP) (2000 - 2015) in January 2000. The need for promotion of the water supply facilities was pointed out as an important task of this policy, and the government set up a long-term water supply rate goal of 15 years from 2000 as shown in Table 1.

Table 1 Objective of the water supply rate in the PRSP in Madagascar

Unit: %

	Rural area	Urban area	Total
1999 (Actual)	12	83	26
2000	13	83	27
2005	37	92	48
2010	56	95	64
2015	80	100	84

Source: Basic Design Study Report

At the time of ex-post evaluation, the main principle of development policy of the Ministry of Water, in charge of the administration of the water sector in Madagascar, is Millennium Development Goals (hereinafter referred to as MDGs), and they don't follow-up the objective of PRSP. According to the Ministry of Water, the PRSP was recognized as the starting point of the development and Madagascar government hasn't regarded it as an important policy as of now.

Table 2 Indicator of MDGs "Proportion of the population using improved drinking water sources"

	2006	2007	2008	2009	2010
Total	43%	44%	45%	46%	46%
Urban area	75%	75%	75%	75%	74%
Rural area	30%	31%	32%	33%	34%

Source: Development Indicators unit, Statistics Division, UN

Even though the development goal was changed, improvement of the water supply rate still has been very important development goal as shown in Table 2, and there is no change in the fact that the assistance for the water supply is in a very important position.

[1] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[2] ③: High, ② Fair, ① Low

3.1.2 Relevance to the Development Needs of Madagascar

Water supply rate in whole Madagascar was 26% in 1999. Though the water supply rate of the urban areas was 83%, that in the rural areas was 12%, which was significantly low, and it was seen as a cause of the low water supply rate of whole Madagascar[3]. In the rural areas where improvement of the water supply rate was delayed, the Project site of former Toliara province was one of the poorest areas of the country, and the water supply rate was 10% and lower than the average of rural areas in Madagascar.[4]

According to the yearbook of the Ministry of Water issued in 2013, the water supply rate of former Toliara province in 2012 is about 42.4%. In particular, Menabe region which is the target area of the Project has attained a water supply rate of approximately 60% and has the highest rate out of the four regions of former Toliara province. According to the document prepared by the Regional Department of Water (hereinafter referred to as RDW) for Menabe region, though some donors such as UNICEF have also provided some assistance, implementation of the Project has contributed the most significantly to the improvement of the water supply rate. (Since 2000, about 71 % of public fountain type water supply facilities of Menabe region, and about 68% of foot pump type water supply facilities were constructed by the Project.)

Table 3 Water supply population of 4 regions of former Toliara province in 2012

	Population	Water supply population	Water supply rate
Androy	621,947	192,110	30.9%
Anosy	668,970	278,960	41.7%
Atsimo-Andrefana	1,284,660	535,160	41.7%
Menabe	468,750	280,060	59.7%
Total in ex-province	3,044,327	1,286,290	42.4%
Total in Madagascar	21,757,964	10,013,520	46.0%

Source: Ministry of Water

On the other hand, in terms of "reducing by half the proportion of people without sustainable access to basic sanitation and safe drinking water by 2015," which is aimed in the MDGs, it is necessary to improve the rate of access to safe water in all Madagascar up to 64.5% by 2015, and there is still a need for improvement of the water supply rate in four regions of former Toliara province.

3.1.3 Relevance to Japan's ODA Policy

In the 2002 version of Official Development Assistance (ODA) national data book, there was an

[3] Basic Design Study Report
[4] Basic Design Study Report

indication that “in December, 1997, policy consultations on the technical cooperation and the grant aid were held, and it was agreed to support the basic human needs area, infrastructure area that contributes to the rural development, environment area and capacity building area;” and basic human needs area including the water supply aid was one of the important areas. Since Japan has selected the water supply assistance as one of the priority areas in Madagascar, the relevance of this Project was high.

In the consequence above, this Project has been highly relevant to the country’s development plan, development needs, as well as Japan’s ODA policy, therefore its relevance is high.

3.2 Effectiveness[5] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

1) Improvement of water supply rate in the target area (rural area in Menabe region)

In the Project, new and rehabilitated foot pump type water supply facilities were constructed at 129 units in 59 villages and new public fountain type water supply facilities were constructed at seven units in six villages. Among them, approximately 78.3% of foot pump type water supply facilities and about 75% of public fountain type water supply facilities are still running during the survey at the time of the ex-post evaluation.

For the water supply rate of rural area in Menabe region, the target indicator in 2005 set during the Basic Design Study was 28%, and the actual indicator in 2006 has improved to 48.9%, which was much beyond the target. There were some documents that UNICEF and other donors supported the construction of wells in 2002 apart from the Project[6], and each activity was carried out as planned. That is the factor to achieve the target indicator higher than expected.

Number of facilities which has been constructed by this Project is about 70% of the number of the water supply facilities constructed in whole Menabe region since 2000. Though about 20% of the facilities aren’t working, it seems that the Project contributes largely to the improvement of the water supply rate.

[5] Sub-rating for Effectiveness is to be put with consideration of Impact.

[6] According to the materials obtained from RDW, the percentage of the number of facilities in whole number of facilities in Menabe region since 2000 is about 71% for public fountain type water supply facilities (others from NGO assistance) and about 68 % for foot-pump type water supply facilities (including hand pump type water supply facilities) (Others from UNICEF and NGO assistance).

Table 4 Indicators concerning the improvement of water supply rate in the target area (rural area in Menabe region)

Name of indicators (Unit)	Plans (2005)	Actuals (2006)	Actuals (2012)
Water supply population in the target area (Rural area in Menabe region)	86,917	147,700	201,420
Water supply rate in the target area (Rural area in Menabe region)	28%	48.9%	56.3%

Source: Ministry of Water

2) Organization and the activation of water committees in the villages

Results for these indicators are as follows.

Table 5 Result of indicators concerning organizing and activation of the water committees in the villages

Name of indicators (Unit)	Plans (2005)	Actuals (2005)	Actuals (2013)
Number of water committee in the target area	61	64	52
Number of female members	More than120[7]	157	156
Number of members who received maintenance training	More than 366[8]	323	265

Source: Site survey result conducted in the ex-post evaluation and the survey entrusted to the local consultant

According to the survey in the target site[9], because it was confirmed that the water committees were present at all sites when the water supply was started (in 2005), the number of the committees in the target area in 2005 was 64. Because it was aimed to organize the water committees in all villages in the soft component of the Project, the objective has been achieved. However, at the time of the ex-post evaluation, it was observed that there were some water committees which haven't used the water supply facility due to trouble of the pump and have become dormant. Therefore the value of the indicator in 2013 excludes these numbers. As shown in Table 5, at the time of the ex-post evaluation, the number of active water committees decreased slightly (from 64 villages to 52 villages, about 18.8% decrease). Even though 8-9 years have passed since organizing water committees, more than 80% of the water committees are still active and continue their activities.

[7] In case of 6 members per water committee. In the ex-ante evaluation sheet, it was set at least one third (1/3) of the members.

[8] In case of 6 members per water committee.

[9] Interview survey with the water committees was carried out by the evaluator and the local consultant in 59 villages with foot-pump type water supply facilities and 6 villages with public fountain type water supply facilities: 64 villages in total (in Ambatolahy, there are the both kind of facilities and each are counted independently.)

For the number of women constituting the water committees, the achievement of the target value of the indicator was confirmed by the results of the survey at all villages. The main reason behind achievement of the indicators is that the villages where the surveys were conducted in the ex-post evaluation had a number of women who work for collecting the water utilization fee.

For the number of participants of the maintenance training of the soft component of the Project, achievement could not be confirmed in this survey. During the planning period, number of trainee was assumed as members of the water committees were six. That is because there are some villages where they did not have six members from the start, and the villagers who attended the maintenance training tend to decline by replacement by members re-election or by moving.

3.2.2 Qualitative Effects

1) Groundwater development ability of Ministry of Water (formerly Department of Water, Ministry of Energy and Mines) is improved.

Because the target value on the indicator wasn't set during the planning period, the number of excavation by Ministry of Water is used to measure the improvement of the capacity as alternative indicator for the ex-post evaluation[10]. As a result of the interviews at the Ministry of Water, the number of excavations by Ministry of Water from 2007 to 2012 was as shown in Table 6.

Until 2009, the actual number of excavations by the Ministry of Water had increased steadily. Since 2010, there was no excavation by the Ministry of Water because of a political crisis in Madagascar and there were no drilling works that the Ministry could participate (conducted with the assistance by the donors)[11] in. In this way, contribution to increasing the number of excavations is explained not only by the capacity improvement, but by presence or absence of excavating works. Therefore, it was difficult to measure the capacity of the underground water development works by increase or decrease of the number of excavations since 2010.

[10] It was assumed that if the capacity was improved, the Ministry of Water can carry out more excavations.

[11] Comparing the number of excavations in whole Madagascar and the number of excavations by Ministry of Water, the number of excavations by Ministry of Water is significantly less (in 2010 and 2011 excavation by Ministry of Water was 0, but there were 1,546 excavations in 2010 and 1,949 excavations in 2011 in all Madagascar). This is because an agreement with the donor is required in case Ministry of Water wants to participate in the excavation works with supports by the donors. On the water supply works conducted by African Development Bank or the World Bank financed after 2010, bidding is taken for the selection procedure to ensure fairness, and Ministry of Water cannot participate in the bidding as it is the main organizer of implementation of the bidding.

Table 6 Number of excavations by Ministry of Water

	2007	2008	2009	2010	2011	2012
UNICEF	0	0	37	0	0	0
African Development Bank	150					
Budget of Ministry of Water	7	1	0			
Request from private company	0	0	2			

Source: Ministry of Water

On the other hand, according to interviews with Ministry of Water, there was information that retired technicians of the Ministry of Water have high demand of employment from private companies. From the interviews, there were comments from the Ministry that technical improvement of technicians was seen by the soft component of the Project. It seems that there might be an improvement of groundwater development capacity of technicians by the soft component of this Project as the background of high demand of the retired technicians from the private sector.

2) Maintenance capacity of Ministry of Water is strengthened.

In the soft component of the Project, it was aimed to improve the operation and maintenance capacity of the workshop in the Ministry through a) the inventory of existing equipment and preparation of equipment registration book, b) confirmation of current operation and maintenance methods, c) technical training for workshop personnel, and d) workshop maintenance.

At the time of the ex-post evaluation, it can be seen from the response of questionnaire that the Ministry grasps the current situation of the equipment. However, among the equipment that was provided to Ministry of Water, part of the equipment (such as pumps, trucks), except the major equipment such as excavation machine used in Ambovombe, has been broken and stored at the workshop of Antananarivo. As described above, at the time of the ex-post evaluation, the Ministry doesn't have a place to use the equipment even after the maintenance because there are no excavation works. Therefore there is no incentive to maintain the equipment, and the equipment isn't repaired[12]. However, the issue isn't a matter of maintenance technique but the fact that Ministry doesn't have enough excavation works. Therefore, the cause of the problem isn't insufficient capacity strengthening of the operation and the maintenance by soft component of this Project.

[12] However, the Ministry's intention was confirmed that Ministry of Water will repair and use all equipment if the assistance from donors will be recovered and excavation works by Ministry of Water will be re-stared.

3.3 Impact

3.3.1 Intended Impacts

1) Excavators, support vehicles and other groundwater development equipment procured in the Project will be utilized in other areas and be beneficial to more population.

In the Basic Design Study Report, there was no description of how many numbers of excavation works where equipment procured in the Project will be used, but it seems that the equipment is basically planned for use in this Project.

The equipment procured in the Project, apart from utilization by the Project, was utilized for the groundwater development outside of the Project area such as Boeny, Vangaindrano and Ambovombe and Ambosary, and it contributed to digging new wells in 197 sites in 2008-2009 as shown in Table 7. Because a part of the equipment for groundwater development was utilized well for development of other areas, it is considered that the effect of the equipment also benefited other areas.

Table 7 Equipment utilized outside of the Project are and the way of utilization

Equipment	Way of utilization
Excavator Excavating tools High pressure compressor Equipment for trial pumping Large size truck Medium size truck	- Conduct five (5) excavation works in Boeny, and three (3) excavation works in Vangaindrano. - Conduct thirty seven (37) excavation works for UNICEF Project in Ambovombe and Ambosary (part of the Project. The total was 100 wells) - Conduct a hundred and fifty (150) excavation works for part of African Development Bank Project

Source: Ministry of Water

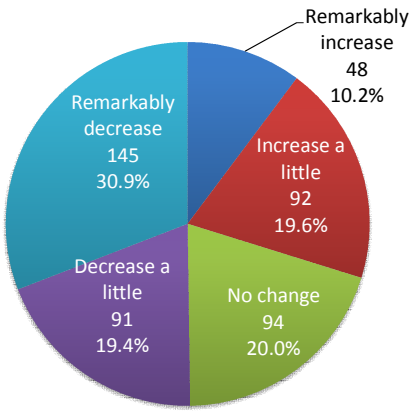
2) Prevention of waterborne diseases has progressed by safe water supply, and the prevalence in the whole target area is reduced.

According to the results of interview surveys by the evaluator in target villages where the water supply facilities are still running (14 villages), people mentioned that waterborne diseases of villagers who use the water supply facility were reduced drastically.

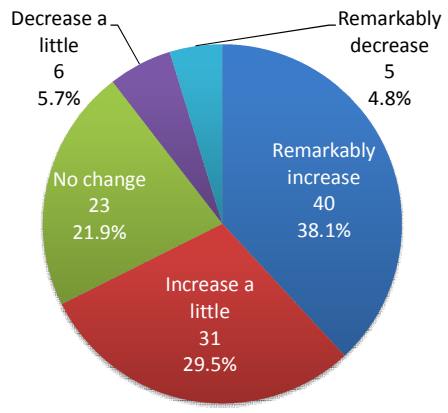
Further, in the beneficiary survey[13], looking at the infection rate of waterborne disease before and after installation of the water supply facilities in the villages where water supply facility is functioning and not functioning, the result (at the time of ex-post evaluation) of the infection rate

[13] 24 villages out of 64 target villages were selected (all 6 villages of public fountain type water supply facilities and 18 villages of foot pump type water supply facilities which were randomly selected), and beneficiary survey entrusted to a local consultant was carried out. The survey method was questionnaire survey and 345 males and 608 females answered.

of diarrhoea (children (15 years and under) and adult (16 years or more)) was as follows.



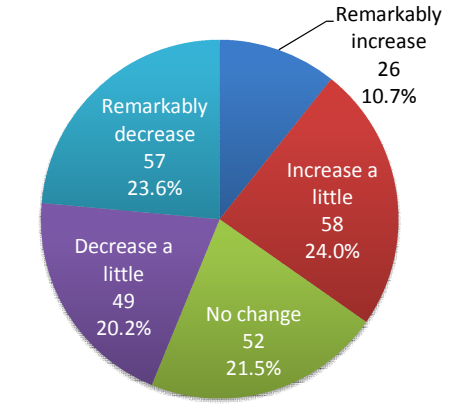
Villages where water supply facilities are functioning (21 villages)



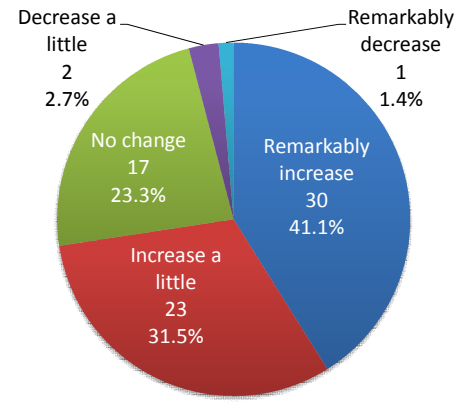
Villages where water supply facilities aren't functioning (3 villages)

Figure 1: Increase or decrease in the infection rate of diarrhoea for children (under 15 years old) before and after the installation of water supply facilities

Source: Beneficiary survey



Villages where water supply facilities are functioning (21 villages)



Villages where water supply facilities aren't functioning (3 villages)

Figure 2: Increase or decrease in the infection rate of diarrhoea for adults (over 16 years old) before and after the installation of water supply facilities

Source: Beneficiary survey

Upon comparing the villages where water supply facilities are functioning with the villages where water supply facilities aren't functioning, the proportion of villagers who feel that the infection rate of cholera and diarrhoea has remarkably decreased is high among both the children and adults, and it seems that the installation of water supply facilities has contributed to reducing

these diseases.

3.3.2 Other Impacts

(1) Impacts on the natural environment

According to the interviews on the sites, drying up of the underground water or land subsidence weren't observed at all though it was pointed out the possibility in the Basic Design Study, and penetration of sea water into the wells also wasn't seen.

(2) Land Acquisition and Resettlement

According to the interviews in the Ministry of Water, resettlement of houses was reported in two cases (Croisement BST, Ambohibary) for constructing the water supply facilities. One house each was transferred internally in each village, the compensation was made properly and the resettlement was completed successfully. Further, according to the Ministry of Water, this was only internal transferring in the village, and there was no effect on their living condition.

(3) Unintended Positive/Negative Impact

1) Reduction in the required time to go the water source and required time to take the water

The change of required time to go the water source and required time to take the water are as follows in the villages where the water supply facilities are functioning and villages where the water supply facilities aren't functioning.

According to the results of the survey, required time to go the water source has decreased by about 53% in the villages where water supply facilities are functioning and required time to take the water has also declined about 72%. On the other hand, in the villages where water supply facilities aren't functioning, there was no change or it took longer than the required time to go the water source and required time to take the water.

Table 8 Average required time to go the water source and required time to take the water in the villages where the water supply facilities are functioning and villages where the water supply facilities aren't functioning

		Average required time to go the water source (minute)	Average required time to take the water (minute)
Villages where the water supply facilities are functioning	After the Project	3.75	5.66
	Before the Project	7.07	7.85
Village where the water supply facilities don't functioning	After the Project	2.85	9.24
	Before the Project	3.01	7.67

Source: Beneficiary survey

As described so far, the improvement of operation and maintenance capacity of the equipment by the Ministry of Water couldn't be confirmed at the time of ex-post evaluation since the Ministry hasn't had enough excavation works to be able to participate and there is no excavation record since 2010. On the other hand, not only are 80% of the water supply facilities constructed under this Project still running, but the water supply rate in the whole target area has improved beyond the target value in synergy with the assistance from other donors and about 80% of the water committees are also working at the time of the ex-post evaluation, so the effectiveness is high.

In addition, it can be seen that the effect of the equipment provided in the Project is spread to other areas, and the Project has contributed to reducing the waterborne diseases, while negative impact cannot be seen in terms of the social and the natural environment, and it is considered that the impact is also high.

Thus, this Project has largely achieved its objectives, therefore its effectiveness and impact is high.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

(1) Output from Japanese side

1) Construction of the facilities

Situation of the planned and actual facility construction in the Project is indicated as follows.

Table 9 Situation of the planned and actual facility construction in the Project

Items	Plan	Actual
New foot pump type water supply facilities	54 villages 121 units	56 villages 121 units
Renovation of existing foot pump type water supply facilities	8 villages 8 units	8 villages 8 units
Public fountain type water supply facilities	7 villages 9 units	6 villages 7 units

Source: Documents provided by JICA

Photo 1: Public fountain type Water supply facility

Photo 2: Foot pump type Water supply facility

For foot pump type water supply facilities, even though the part of the excavation site was changed because of unsuccessful exploratory drilling and high salinity, etc, the planned number of the water supply facilities was eventually constructed. On public fountain type water supply facilities, the number of actual excavations was two below of the planned number. This was due to the unsuccessful exploratory drilling in Ankirizato and it was also found that the possibility of new underwater development there was extremely low; and the plan was changed through the proper procedures. According to the consultant who was in charge of designing the Project, even after conducting a detailed study and several exploratory drillings in advance at the cancelled site, it was difficult to find good water source. Therefore it was an unavoidable cancellation. For public fountain type water supply facilities, it seems that it was difficult to change the site to neighbouring villages because the scale of the facility was big and they couldn't find good water source; and it was hard to find an alternative site.

2) Procurement of equipment

Though the procurement period was delayed because of the political crisis from 2001 to 2002, excavators, transporting trucks and maintenance parts of existing equipment and vehicles, were procured as planned.

3) Soft component

Activities of soft component of the Project were implemented as planned.

(2) Matters borne by the Madagascar side

Matters born by the Madagascar side were as follows. These activities were carried out as planned.

1) Securing of land and levelling
2) Development, repair and expansion works of access roads
3) Dispatch of counterparts
4) Maintenance works of existing equipment and vehicle by procured spare parts

5) Follow-up and monitoring survey for the phase 3 target villages after March 2004 of the Project completion (Implemented by NGO)[14]

3.4.2 Project Inputs

3.4.2.1 Project Cost

For the Project cost, 1,516 million Japanese yen for three phases was estimated in the planning stage. However, because of the political crisis in Madagascar, one more phase had to be added and the actual input became 1,607 million Japanese yen for four phases, and the Project was completed within the limit of the E / N. However, since two public fountain type water supply facilities were decreased and the reduction in output was observed, the efficiency is slightly reduced from planning period.

From the above, the Project cost is higher than planned considering the decrease of the output

3.4.2.2 Project Period

The Project period was supposed to be 35 months in total for three phases during the planning period but the actual result was 58 months in total for four phases (166% of the plan). As this factor, since the political situation had deteriorated because of the results of the presidential election held in Madagascar in December 2001, the Project implementation has been suspended for five months from March to August 2002. This is because the members of soft component evacuated to outside of the country[15] and it took long time to transport the equipment due to suspension of the custom procedure and blocking transporting means[16]; therefore it was unavoidable suspension. In consequence of this, one more phase had to be added due to the political crisis though the Project period was originally three phases in the plan.

However, though it was expected that the detail design of 4th phase took about 4.5 months in the original plan, it actually took about 8.5 months because re-calculation of the Project cost was necessary due to the effect of the slump of Madagascar currency and steep rise in commodity price and it was necessary to adjust about one hundred million Japanese yen difference from original Project cost[17]. Therefore the efficiency is reduced on the Project period, and it was slightly longer than planned.

As described above, the number of public fountain type water supply facilities was two less than planned. In addition, the extension of the Project period was because of the evacuation due to the worsening political situation and one additional construction phase associated with it. However, it is also regarded that the extension of the Project period also occurred because of factors apart from the suspension of the Project: the period of 4th phase of the detail design was longer than planned because

[14] Survey on the situation of utilization of water supply facilities, survey on the situation of utilization by users and survey on the system of operation and maintenance
[15] Material provided by JICA
[16] Material provided by JICA
[17] Interview result from the consultant who was in charge of designing the Project

of the necessity to respond to change of exchange rate.
In consequence of above, both Project cost and Project period slightly exceeded the plan, therefore efficiency of the Project is fair.

3.5 Sustainability (Rating: ①)

3.5.1 Institutional Aspects of Operation and Maintenance

(1) Operation and maintenance of water supply facilities

The new Water Act was enacted in 1999 and the management of water supply facilities in the villages was supposed to take place by the water committees approved by the Water Management Mechanism, which is incorporated in the law. Therefore, it was decided to let the water committee of each village conduct the operation and maintenance of water supply facilities of the Project.

According to the plan during the Basic Design Study of the Project, the water committees were supposed to be established at the village level, and the committees consisted of more than four members (one president, one treasurer and two or more technicians and members in charge of village activities) without payment. As the main roles of the water committee, collection of water fees, storage and management of the collected money, bookkeeping, and troubleshooting among residents at the time of taking water and support for pump trouble, etc. were planned. The current management system of water supply facilities by type during the ex-post evaluation is mentioned below.

1) Organization of the operation and maintenance for water supply facilities

In 48 villages out of 59 villages where foot pump type water supply facilities were installed (81.4%), the water committees have operated until the time of the ex-post evaluation. On the other hand, foot pump type water supply facilities have been broken and the activities of the water committees have stopped in 11 villages. Most of the water committees consist of a president, treasurer, technicians, secretary, assistant, etc., and the number of members is different for each water committee.

In the water committees where foot pump type water supply facilities were installed, the policy has been continued as originally planned that the facilities are managed by the users without payment. However, only Ambatolahy where public fountain type water supply facilities were installed is exception, and technicians are employed with payment to manage the facility. In addition, in Ambatolahy, even water fee collectors can get the 10% of an incentive from the collected money.

In all villages where public fountain type water supply facilities were installed (six villages), the water committees continue their operation. The committees consist of a president, vice president, treasurer, technician, secretary, assistant, water fee collector; the number of members varies from village to village. In most villages, water collectors are assigned at least one person for each water tap, and the number of water committee members is large.

In the water committee where public fountain type water supply facility was installed, there are some cases where the water committee pays to the technicians and they work in full-time. Three out of six villages have assigned full-time technicians and the facility utilization rate of these is higher than in the other villages. Furthermore, as described above, there is a mechanism where water fee collectors can receive 10% of revenue as an incentive in Ambatolahy.

2) Procurement management system of spare parts for water supply facilities

In the Project, spare parts were provided to the water committees of each village during handing over period to facilitate the operation by residents smoothly. In addition, it was planned that each water committee purchase the parts by their own effort after completion of the Project: in the plan, NGO organization[18] managed the stock and water committee purchased it from the NGO when the spare parts were necessary.

However, according to the result of the site survey at the time of ex-post evaluation, purchasing and stock management of spare parts weren't done by the NGO and each water committee carried out by their own effort. Most of the water committee have already used all the spare parts granted at the time of the construction, and the other necessary spare parts were procured by their efforts. However, at the time of ex-post evaluation, in 30 villages out of 59 villages (50.8%), it wasn't possible to procure the genuine spare parts because of raising price of spare parts, lack of funds and high transportation costs to the large cities, and they have repaired by using materials which they can easily be procured in the neighbouring villages. Especially in the villages far from Morondava, which is the center of the province, a problem is seen that it is difficult to improve the situation to procure the spare parts only by the efforts of the village people.

An interview survey was carried out with the NGO that was entrusted the works from Ministry of Water, this NGO only conducted follow-up activities for one year from completion of the Project as specified in their contract[19], and they didn't carry out any management of spare parts. In this way, it is regarded that the management system of spare parts of this Project wasn't planned sufficiently. It seems that it was necessary to plan to establish a system to procure the spare parts easily even in the remote areas as establishment of the management system of spare parts. In the technical cooperation Project implemented from 2008 to 2013 "The Project for Improvement of Rural Water Supply and Hygiene Practice in Atsimo Andrefana Region", a plan of collecting utilization fee, a system of procuring the spare parts and a system for technical back up, etc. were proposed and improvement was expected.

(2) Monitoring system of the water supply facilities

For monitoring activities of water supply facilities, it was described in the Basic Design Study

[18] This was NGO Talatra who had worked for the enlightenment activities in the soft components of the Project.

[19] Because this was only 1 year following up activities, it was considered that water committees can repair by the parts provided after completion of the Project and there was few order of spare parts during the period.

Report, etc. that an NGO would carry out the monitoring and the follow-up for one year after the completion of the Project, but there is no clear indication about follow-up system after the activities. At the time of ex-post evaluation, RDW in Morondava as the regional department of Ministry of Water continues the monitoring activities, but it is insufficient on the grasping the situation of the operation on the water supply facilities because of the lack of human resource and malfunction of vehicle, etc.

On the other hand, as a result of the support by RDW in Morondava for a part of the water committees on improvement of the utilization fee collection system and re-structuring of the members in Ambatolahy and Ankilivalo, weakened activities of the water committees were strengthened.

However, it is difficult to cover the vast Menabe province only by RDW in Morondava, and it is necessary to consider establishing a new monitoring system.

(3) Maintenance and management system of the groundwater development equipment

For maintenance system of groundwater development equipment, there is a workshop of Ministry of Water in Antananarivo, and five technicians are working. In whole Ministry of Water, there are 12 members such as two engineers and 10 technicians, but of the remaining seven members (two engineers, five technicians) are actually working at head office of the Ministry because there isn't enough work in the workshop. Therefore, at the time of ex-post evaluation, there is no sufficient volume of work at the workshop of Ministry of Water and lack of personnel hasn't been seen to carry out the minimum operation and maintenance.

3.5.2 Technical Aspects of Operation and Maintenance

(1) Technical aspect of operation and maintenance for water supply facilities

The technical level of the newly established water committee in each village at the time of the commencement of the Project seemed to be low, because there was no experience on the voluntary operation and maintenance. Therefore, in order to assist organizing the population for the management of water supply facilities, a soft component was carried out in the Project. Technical aspects of operation and maintenance by the type of the water supply facilities are as follows at the time of the ex-post evaluation.

1) Technical aspects of operation and maintenance for foot pump type water supply facilities

The number of villages where the technicians trained in the soft component of the Project are remaining was 46 villages out of 59 villages during the site visit in this ex-post evaluation. The reasons that there are no technicians who have received the training include moving. In addition, there were some cases where the predecessors didn't hand over to the successors. According to the interview surveys at the site, there were some opinions that some technicians forgot what they learned in the training since the period of the training was only two days and there was no frequent opportunity to use the techniques even though the contents of the training were sufficient.

In such cases, village people invite technicians from outside and ask them to repair the facilities. It seems that training of new members is required since 8-9 years have passed after establishment of the water committee and moving and aging of the members of the water committee are observed.

2) Technical aspect of operation and maintenance for public fountain type water supply facilities

For public fountain type facilities, most of the technicians trained by the soft components of the Project continue the operation and maintenance activities, and half of the water committees have assigned them as full-time technicians. Therefore, for public fountain type water supply facilities, major problems haven't been seen for repair technology at the time of ex-post evaluation.

(2) Technical aspect of operation and maintenance for groundwater development equipment

Among the equipment provided for Ministry of Water, a part of the equipment is broken and stored at the workshop in Antananarivo. This is because there isn't enough volume of works and lack of budget, and it isn't problem of lack of technique. Therefore, it is difficult to determine the repairing technique level at the time of ex-post evaluation. However, the maintenance was carried out smoothly until 2009 and equipment was also used effectively. In addition, according to the interviews with Ministry of Water, there was a comment that the level of technicians in the Ministry of Water was clearly improved by the soft component, and there is high demand for retired technicians of Ministry of Water from private companies because of their technique. Based on this information, it is considered that there is no technical problem.

3.5.3 Financial Aspects of Operation and Maintenance

(1) Financial aspects of operation and maintenance for water supply facilities

1) Maintenance costs for hand pump

In the Basic Design Study Report, it was planned that water committees at target villages of foot pump type water supply facilities reserve the amount as follows.

Table 10 Reserve of operation and maintenance for foot pump type water supply facilities

	Reserve for operation and maintenance (FMG[20])	Test calculation of reserve including the renewal of equipment (FMG)
A village of 1 well	150,000	450,000
A village of 2 wells	300,000	900,000
A village of 3 wells	450,000	1,350,000
A village of 4 wells	600,000	1,800,000
A village of 5 wells	750,000	2,250,000

Source: Basic design study report

In addition, the system of water utilization fee and the rate of the water utilization fee were planned as follows.

Table 11 System of water utilization fee for foot pump type water supply facilities in plan

	System of utilization fee	Rate of utilization fee
Foot pump type water supply facilities	The operation and maintenance fee for one well, 25,000FMG / month will be borne by each household (minimum)	Though number of household per one well is different in each village, the average will be about 60 -70 households. Therefore, the rate of utilization fee per one household will be more than 300～400FMG / month (minimum)

Source: Basic Design Study Report

Actual situation of financial aspects for foot pump type water supply facilities is mentioned as follows.

1)-1 Current situation of the reserve of operation and maintenance costs

The reserve for operation and maintenance during the soft component in each village ran out in 22 villages out of 59 villages (no information for six villages because the treasurer was in agricultural activities). On the other hand, it was confirmed that there were 31 villages where the reserve still remained. 18 villages of these even increased the initial reserve.

1)-2 Utilization fee

For foot pump type water supply facilities, the water supply is stopped in 11 villages out of 59 villages (about 18.6%) at the time of ex-post evaluation. One of the reasons why foot pump type

[20] 1FMG＝1/5MGA＝0.008Yen（October, 2012）
In Madagascar, instead of the Madagascar Franc (FMG) used in parallel until 2004, Madagascar Ariary has been independently used since 2005. However, even the timing of ex-post evaluation, the price is frequently exchanged to Madagascar Franc in the rural areas. The exchange rate of FMG and MGA is fixed.

water supply facilities haven't worked in 11 villages is that there are not enough funds for purchasing the spare parts, and water committees cannot repair. The factors for why funds aren't enough are that users don't pay the utilization fee and the prices of the spare parts have risen[21].

In the sites of foot pump type water supply facilities, the majority of population is farmers and don't have regular cash income. Therefore, there are a lot of cases where the population cannot even pay 200MGA / month (about 10 yen) regularly, and the water committee cannot buy spare parts because there isn't enough income. According to the site survey in 59 target villages, 29 villages out of 59 villages (about 49.2%) have collected the utilization fee on a regular basis at the time of ex-post evaluation. This is because the practice to pay for the water on a regular basis did not take root and village people who had regularly paid started not to pay after seeing other people who refuse to pay and continue to use the water. In addition, among some of the villages visited, there were two villages where the water committees cannot collect the water utilization fee sufficiently, they cannot repair the troubled pump, and people no longer use the well, and the activities of the water committee have been stagnant. On the other hand, there are five villages where the water committee doesn't collect the utilization fee regularly, but they decided to collect the fund for spare parts when the pump is broken and there are some cases where the operation and maintenance is carried out in their own way even without collecting utilization fee.

In addition, during the interviews at the site, it was surveyed that the water committee needs about 400,000 MGA (about 20,000 yen) to replace just a filter of the water pump which is malfunctioning in many villages. Therefore, even as about 50 households continue to pay without fail, it needs the deposit for four years only to purchase this part and income is insufficient absolutely. On the other hand, increase in utilization fee hasn't been implemented even since establishment of the water committees. Therefore, it is necessary to transfer a technique for revising utilization fee to correspond to the rise of the spare parts price. Moreover, in the case that it is difficult to adjust the utilization fee depending on the circumstances, it is necessary to take measures considering future inflation and so forth when the rate is set.

In order to improve the sustainability, it is necessary to instil residents with the fact that the fund is necessary to maintain the pump by regular educational activities of regional direction of water, local government and the water committee.

2) Financial aspect of operation and maintenance for public fountain type water supply facilities

In the Basic Design Study Report, the reserve in the target villages of public fountain type water supply facilities was planned as follows, and the reserve was deposited in every village as planned during the soft component period.

[21] In the Basic Design Study, 300,000 FMG (60,000 MGA) was estimated for annual spare parts expense as 5% of the price of the pump. Therefore the annual operation and maintenance cost per household was planned as 300,000 FMG÷67 households=about 4,500 FMG (375 FMG/month/a household).

Table 12 Reserve of operation and maintenance for public fountain type water supply facilities

	Reserve for operation and maintenance cost (×1000FMG)	Test calculation of reserve including the renewal of equipment (×1000FMG)
Bemanonga	7,200	9,000
Analaiva	9,900	15,000
Betsipotika	7,400	9,900
Ankilivalo	9,700	15,000
Ankilizato	22,500	35,000
Tsimafana	7,500	12,000
Ambatolahy	20,000	34,300

Source: Basic Design Study Report

Moreover, in the Basic Design Study Report, the system of water utilization fee and the rate of the water utilization fee for public fountain type water supply facilities were planned as follows.

Table 13 System of water utilization fee for public fountain type water supply facilities in plan

	System of utilization fee	Rate of utilization fee
Public fountain type water supply facilities	The cost of the operation and maintenance is different by facilities and is estimated 1,200,000 - 3,700,000 FMG / month (Minimum). The cost will be divided into number of households.	One public fountain will be used by 50 – 70 households. The rate of the water utilization fee will be 2,500 - 4,000 FMG / month (Minimum).

Source: Basic design study report

Actual situation of financial aspects for public fountain type water supply facilities is mentioned as follows.

2)-1 Current situation of the reserve of operation and maintenance costs

At the time of ex-post evaluation, in two villages out of six villages (Analaiva and Betsipotica) where public fountain type water supply facilities were installed, the amount of the reserve for operation and maintenance has become zero. The factor of this is that the water committee has spent on fuel and spare parts because the collected water utilization fee was small. For the four other villages, the balance of the reserve for operation and maintenance costs remains.

Table 14 Reserve for the operation and maintenance cost of public fountain type water supply facilities at the time of ex-post evaluation

	Reserve for the operation and maintenance cost (MGA)
Bemanonga	59,000
Analaiva	0
Betsipotika	0
Ankilivalo	300,000
Tsimafana	1,500,000
Ambatolahy	700,000

2)-2 Utilization fee

Two systems have been adopted for collecting water utilization fee for public fountain type water supply facilities: monthly rate or measured rate. The villages where measured rate are employed are two villages (Ambatolahy, Analaiva). Three other villages have adopted monthly fee rates (except Tsimafana because the facilities haven't functioned), and the monthly rate is 1,500 - 2,200 MGA.

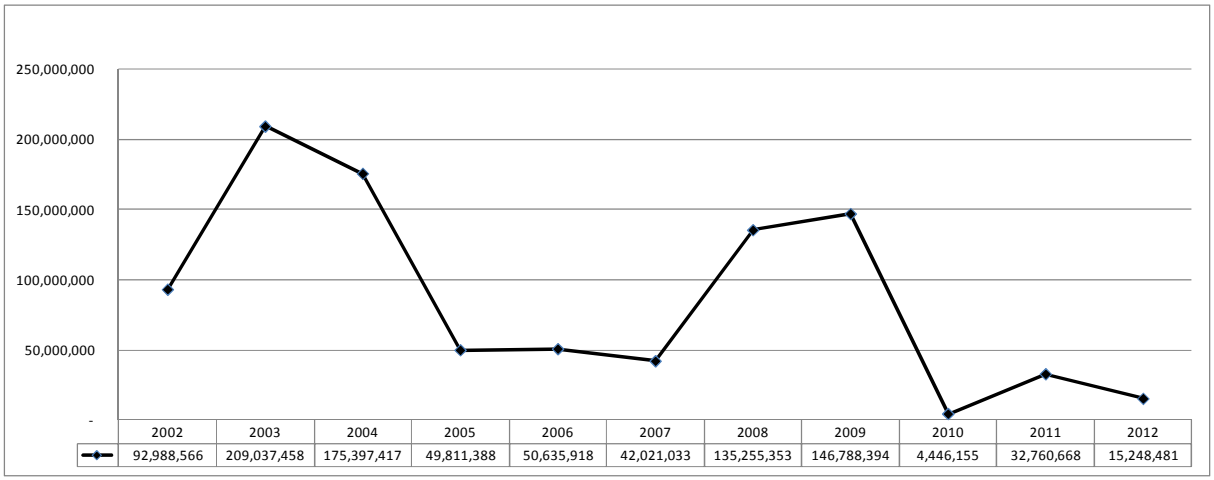
For utilization fee, the water committees have established the system to collect the fee according to the situation such as increasing price as needed and collection of money based on measured rate (per litter). This is because improvement was made in Ambatolahy, Bemanonga and Ankilivalo with the aid of the RDW in Morondava. On the other hand, in Analaiva and Betsipotika, there are a few problems such as stopping water supply partly as a response to unpaid water utilization fee.

As described above, appropriate support by RDW in Morondava is necessary to improve the system of collection of the utilization fee because the system hasn't worked very well in some villages.

In Ambatolahy, Ankilivalo and Bemanonga, the time of water supply is fixed for two hours each in the morning and the afternoon, and water utilization fee collectors are always arranged in each facility during the period. This enables to prevent the persons who don't pay the utilization fee to use the water, and to make sure to collect the fees. Therefore, it is considered that this method is very effective for collection of the utilization fee. However, as in the case of Betsipotika, it is sometime difficult to introduce the system of measured rates due to opposition of the village people. In addition, even if the measured rate system was introduced, such as the case in Analaiva where a treasurer reads just the value of the meter installed beside the facilities monthly (not sales record of water), and collects the money based on the value read from water utilization fee collectors, the money collectors have to bear the rates of water leakage too, and water taps are closed because the water utilization fee collectors cannot bear the expense.

(2) Financial aspects of operation and maintenance for the groundwater development equipment

Annual budget of the Ministry of Water since 2002 is shown in Figure 3 below. Though the budget was about $200 million, including the funds to develop underwater between 2003 and 2004, the budget was drastically decreased up to $50 million in 2005. Trend of recovery was observed in 2008 - 2009, but the budget was decreased again approximately $4 million in 2010, and the budget is stagnant at around $15 million to $30 million[22].



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
◆	92,988,566	209,037,458	175,397,417	49,811,388	50,635,918	42,021,033	135,255,353	146,788,394	4,446,155	32,760,668	15,248,481

Figure 3 Change of annual budget for Ministry of Water from 2002 to 2012

Unit: US$

Source: Ministry of Water

At the time of ex-post evaluation, the budget of Ministry of Water has been greatly reduced, and the budget for repairing the procured equipment by the Project also hasn't been allocated. However, according to the Ministry of Water, if the political turmoil is settled and the assistance of the donors resumes, it will become possible to include the budget to repair these equipment provided by the Project in the budget of donor's assistance, and to repair the equipment.

3.5.4 Current Status of Operation and Maintenance

(1) Operation and maintenance of water supply facilities

1) Current status of the operation and maintenance for foot pump type water supply facilities

Among 115 units of the foot pump in 59 villages during the site survey, 25 units were unusable (the operation rate is 78.3%).

As the main factor of the villages where foot pump type water supply facility isn't running, the users don't want to pay the water utilization fee, or they are unable to collect the utilization fee because there is no money in the pre-harvest. As a result of continuing the water supply without payment, it can no longer repair because they cannot buy spare parts when the facilities are

[22] However, there was a comment from the Ministry of Water that the loans for water supply development from the World Bank and African development bank (PAEPAR and PAEAR) are included in the budget and the budget isn't only for the operation of the Ministry.

broken.

Currently, there are a lot of villages that aren't able to collect the utilization fee, or have already spent their reserves, and there is a risk to stop more water supply facilities in the future. In addition, in some cases, technicians trained in the soft component of the Project have been replaced by moving, etc., and there is no one in the village that can carry out the maintenance and repair.

On the other hand, cases were observed during the site survey where, a) some water committees have decided not to collect regularly and but to collect the money and buy the spare parts when the facilities were broken, b) some water committees have tried to repair by inviting technicians from outside, and c) village volunteers continue the operation and maintenance even though the water committees have stopped working. As can be seen from these cases, village people understand the importance of water supply facilities and they continue the operation and maintenance in their own way even though the habit to maintain the facilities regularly hasn't taken root well in half of the villages.

2) Current status of operation and maintenance of public fountain type water supply facilities

Even though there is no problem on generators and water towers, etc. for public fountain type water supply facilities, there are two villages where part of the public tap wasn't used because of the problem of the unpaid water utilization fee. 16 taps out of 64 taps are unusable (the operation rate is 75%)[23].

Since the maintenance is carried out on a regular basis, there was no site where the water pumps, generators are broken, but since the submerged pump is dropped into the well in Bemanonga and it was impossible to pull out, the water committee procured and installed new ground pump by its own effort. In addition, in Bemanonga, some cracks were seen on the water tower. On the cracks, interview survey was made with the consultants who were in charge of supervising the construction. According to them, the cracks weren't seen during the completion period and defect inspection period and it wasn't the problem during the construction period. They also mentioned that it is suspected due to internal shrinkage and external expansion in the water tower by internal and external temperature difference during the day. It was fixed by self-help efforts and there was no water leakage. Therefore, it isn't urgent problem. However it is desired to conduct follow-up by specialists in the future.

[23] However 8 taps are in Tsimafana where the water supply facilities aren't running because of the political problem in the village.

On the other hand, two villages out of six villages (Analaiva and Betsipotika) have already spent up the reserve, and it is difficult to renew the equipment by their own effort. In addition, the main reason for not using public fountain type water supply facilities in Tsimafana is a political issue between the chief of Village (Fukutan) and the mayor of commune[24].

(2) Current status of operation and maintenance for groundwater development equipment

Among the equipment provided, it was confirmed orally from the Ministry of Water that major excavating equipment listed in Table 7 are stored in South Water Agency (AES) in Ambovombe, Androy region and the status is good. However, parts of the equipment such as part of tracks, compressors and the pumps are stored in the workshop of Ministry of Water in Antananarivo and most of the equipment is broken. However, as described above, this is because the absence of donor assistance where Ministry of Water can enter the works, there is no excavation work, and the equipment will be usable if they replace the spare parts. Therefore, Ministry of Water doesn't expect to scrap the equipment that isn't currently available.

As mentioned above, in relation to foot pump type water supply facilities in particular, there is a problem about the supply of spare parts; there is a limit to the monitoring system of RDW in Morondava; more than half the villages don't collect the utilization fee; therefore, there are many challenges to be solved in the future.

For maintenance of the groundwater development equipment, the problem is not observed on the system and the technology. However, it was confirmed that part of the equipment has been malfunctioning even though major equipment such as excavation machines are working, and budget for repairs is also not allocated.

Major problems have been observed in terms of the institutional / financial aspects, therefore sustainability of the Project effect is low.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This Project was conducted with the aim of improving the water supply rate in the target area and enhancing the targeted local residents' maintenance capacity of the water supply facilities by constructing deep well water supply facilities in the 61 villages of Menabe region located in southern part of Madagascar, by procuring the drilling equipment and by maintaining the existing drilling equipment.

This Project is consistent with the development policy of Madagascar, development needs, and Japan's ODA policy, and the relevance is high.

[24] The water supply facility was used as a tool of political strife, and someone had destroyed the all taps up to now. In order to take advantage of the scheduled election campaign, the mayor of the commune might want to implement by himself to re-operate the facility, and it hasn't repaired until now. JICA Madagascar office has sent a letter to request a re-operation to the governor on 24th May 2013 for handling the issue.

Not only are around 80% of water supply facilities constructed under this Project running, but the water supply rate in the target region has improved beyond the planned target in synergy with other donors' assistance, and water committees have been organized in each village. In addition, the effect of the equipment procured by the Project has spread to other regions, and this Project seems to contribute to reducing waterborne diseases. Therefore, the effectiveness and the impact are high.

On the efficiency, the number of public fountain type water supply facilities has decreased by two places. In addition, the extension of the Project period was because of the evacuation in line with worsening political situation and of one additional construction phase associated with it. However, the extension of the Project was also occurred apart from the suspension of the Project: it is regarded that the period of 4th phase of the detail design was longer than planned because of the adjustment for change of exchange rate. Because of the overall reasons above, the efficiency is fair.

For the sustainability, even though about 80% of the water supply facilities are functioning, there is a problem on the supply system of spare parts, there is a limit to the monitoring system of the water supply facilities, and half of the water committees haven't collected the water utilization fees. In such circumstances, there are a lot of problems for the future. As for groundwater development equipment, the equipment is partially broken and not repaired. Therefore, the sustainability is low.

In light of the above, this Project is evaluated to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

(1) Necessity of follow-up by RDW

The number of villages where water utilization fees aren't charged has increased among the villages of foot pump type water supply facilities. It is necessary that RDW visits each village and enlightens the necessity to collect the utilization fees for village people, and teaches the water committees that they should improve the system of water utilization fees, and makes the water committees deposit enough money to buy the spare parts in case the facilities are broken.

(2) Establishment of a new spare parts management system

In some water committees that are far from Morondava, the provincial capital, there is a problem of high transportation costs just to go to town and to buy the spare parts. Rather than managing the spare parts by the water committee of each village, it is necessary to establish a system such that the distance won't be the problem; for example, the establishment of a new spare parts management system by RDW and NGO as reflecting the result of the relevant technical cooperation project, etc.

(3) Establishment of a new monitoring system

In the new Water Act, which came into effect in 1999, it was decided that the owner of the water supply facilities will be transferred to the local government and it will be continued as a public service of the local government. However, capacity building for local governments, etc. wasn't

carried out in the framework of the Project, and the role of local government in the Project is weak. In addition, it is considered difficult for RDW to manage e all villages where the water supply facilities were installed because the area of Menabe province is vast, and it is necessary to establish a new monitoring system such as establishment of regular reporting system by RDW, NGO and the water committees as reflecting the results of the relevant technical cooperation project, etc.

(4) Solving the problem of Tsimafana

For Tsimafana, where the facility isn't running because of the political problems in the village, it seems necessary to solve the problem by the effort of the related parties. Therefore, it is necessary to seek their solutions through other routes such as coordination by the Ministry of Water and others.

4.2.2 Recommendations to JICA

Nothing at all

4.3 Lessons Learned

(1) Establishment of a system of spare parts supply from the medium- and long-term perspective

In the Project, for the supply of spare parts of water supply facilities, it was "the policy that NGO involved in educational activities manages it and village side purchases from NGO with payment if necessary". However, in the Project, the problem was seen in the plan because NGO did not continue the supply of spare parts after the contract was terminated and the supply of spare parts was difficult in remote villages. Therefore, when the supply system of spare parts is established, it is necessary to examine the establishment of the supply system of the spare parts utilizing an existing public organization, etc. standing on a medium- and long-term perspective.

(2) Project formulation, including capacity building of local government

In the Project, it was planned to establish a community-based system of management for the water supply facility in each village. However, there was a limit for capacity building of the village people who didn't have experience on the operation and maintenance and had capacity building opportunity only by soft component. Some problems are seen such as in particular, unpaid water utilization fee for the operation and maintenance of foot pump type water supply facilities. In addition, though the monitoring on the activities of the water committees is currently conducted by RDW, it is difficult to cover the vast Menabe region due to lack of human and financial resource. In order to provide a continuous water supply service, it is necessary to formulate the Project not only with the support of the water committees but also with the support of strengthening the function of the local governments, which can continuously support each village from closer place, including the operation and maintenance and establishment of the monitoring system.

(3) Set the water utilization fee considering the future inflation

In the Project, because the water utilization fee was set based on the spare parts prices at the time of Project planning, there are cases where the reserve will be insufficient in the future in countries where inflation is continuing as Madagascar. Because it is difficult to increase the rate of the water utilization fee once the rate has been set, it is desirable to set the rate taking into account the inflation rate, etc. in the future so that it becomes possible to cope with the rise in spare parts for future; and the sustainability will be improved.

(4) Employment of full-time technicians

For public fountain type water supply facilities that are larger scale and need regular operation and maintenance, there is a tendency that the possibility of functioning the operation and maintenance system will be increased if full-time technicians are employed using the collected funds of the water committees. Therefore, it is necessary to examine carefully whether to offer salary or no salary during the planning period from the view point of effectiveness of the water committees and the sustainability.