

People's Republic of China

FY2017 Ex-Post Evaluation of Japanese ODA Loan Project

“Guizhou Province Environment Improvement and Education Project”

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0. Summary

The project aimed to improve environment and hygiene, and to develop human resources in local farming villages and suburban cities in 12 national poverty-stricken counties in Guizhou Province by constructing or improving facilities for (i) environmental measures such as methane gas facilities, waste and disposal facilities, and reforestation; (ii) hygiene measures such as roads for daily use, water supply, and medical services; and (iii) senior high school buildings. The project has been consistent with China’s development plans and development needs as well as with Japan’s ODA policy. Therefore, the relevance of the project is high. Although the project cost was within the plan, the project period significantly exceeded it. Therefore, the efficiency of the project is low. The effectiveness/impact is high. Indicators set to measure quantitative effects such as culling of forests, flooded area, volume of soil erosion, percentage of population served water, number of patients, volume and percentage of waste disposed, and senior high school enrollment rate have largely achieved targets or improved. As to qualitative effects, improvements in the environment (including living environment) such as the decrease in the collection of firewood and charcoal, improvement of medical services, improvement of hygiene as well as effects of education have been observed. As for impacts, a decrease in the population of rural poverty, regional economic development, sustainable environmental and social development, and a reduction in the women’s household workload have been observed. The sustainability is high, as no major problems have been observed in the institutional, technical, and financial aspects of the operation and maintenance systems, as well as in the status of operation and maintenance.

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

1. Project Description



Tianzhu Provincial Chinese Medicine Hospital

1.1 Background

Guizhou Province had the lowest per capita income among China's 31 provinces, and the 12 counties, the target counties under the project, were designated as national poverty-stricken counties¹ by the central government.

In the targeted province's farming villages, excessive logging to acquire fuel, combined with particular soil conditions in the province, such as the existence of many slopes and a karst topography that had low water-retaining ability, reduced the land's water retention capacity and brought serious soil erosion, thus causing increasingly extensive flood damages. The hygiene conditions of these villages had deteriorated. Due to the lack of water supply facilities, prevalence of infectious diseases was high and people were not able to receive proper medical service because of the lack of medical facilities. Thus, the target areas of the project needed to improve the natural environment, secure alternative fuel supplies, develop flood control facilities, and improve hygiene.

Furthermore, in the target areas, the population of students advancing to senior high schools remained low compared to the national average due to the lack of capacity for accommodating students. In order to nurture human resources capable of sustainable environmental and social development in the regions, construction of senior high school facilities was needed.

1.2 Project Outline

The objective of this project is to improve environment and hygiene, and to develop human resources in local farming villages and suburban cities in 12 national poverty-stricken counties in Guizhou Province by constructing or improving facilities for (i) environmental measures such as methane gas supply, waste treatment, and reforestation; (ii) hygiene measures such as roads for daily use, water supply, and medical services; and (iii) senior high school building, thereby contributing to the sustainable environmental and social development in the target areas

(Target areas)

- Tongren Prefecture: Jiankou County, Yinjiang Tujia and Miao Autonomous County, Shiqian County, Songtao Miao Autonomous County, Dejiang County, Yanhe Tujia Autonomous County, Sinan County
- Qiandongnan Miao and Dong Autonomous Prefecture: Shibing County, Sansui County, Cengong County, Tianzhu County, Jinping County

¹ Counties designated by the central government based on the poverty incidence and other factors. A total of 832 counties across the country were designated as of 2017.

Loan Approved Amount/ Disbursed Amount	9,173 million yen / 9,149 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	June 2006 /June 2006
Terms and Conditions	Interest Rate 1.5% (0.75% for training component) Repayment Period 30 years (40 years for training component) (Grace Period 10 years) Conditions for procurement General untied
Borrower / Executing Agency(ies)	The Government of the People’s Republic of China/ Guizhou Provincial People’s Government
Project Completion	December 2015
Main Contractor(s) (Over 1 billion yen)	—
Main Consultant(s) (Over 100 million yen)	—
Related Studies (Feasibility Studies, etc.)	F/S: Guizhou Province International Engineering Consulting Center, February 2005 JICA “Special Assistance for Project Implementation (SAPI)”, 2007
Related Projects	- The Village-based Integrated Poverty Alleviation Model Project in Daozhen County and Leishan County, Guizhou Province, 2005—2010 - Southwest Poverty Reduction Project (World Bank), 1995—2005

2. Outline of the Evaluation Study

2.1 External Evaluators

Toshihiro Nishino/Ayako Nomoto (International Development Center of Japan Inc.)

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: August 2017–November 2018

Duration of the Field Study: December 17, 2017– December 30, 2017, May 1, 2018–May 12, 2018

2.3 Constraints during the Evaluation Study

In the target areas and surrounding areas of the project, similar programs and projects² were implemented around the same time with the help of Chinese domestic funds. The quantitative indicators measure the effects not only of this project but also of these programs and projects; therefore, it was not possible to assess the effects of this project alone.

3. Results of the Evaluation (Overall Rating: B³)

3.1 Relevance (Rating: ③⁴)

3.1.1 Consistency with the Development Plan of China

The objective of this project has been consistent with the development plan. Environmental issues and poverty alleviation have been one of the priority areas under the five-year plans for economic and social development and the Guizhou Province five-year plans both at the times of appraisal and ex-post evaluations of this project.

(1) Development plans at the time of appraisal

Under the *11th Five-Year Plan for National Economic and Social Development (2006–2010)*, the Government of China planned to invest approximately 17 trillion yen in environment conservation for five years. The main objectives included (i) prevention of new environment pollution, (ii) prevention of destruction of ecological environment, (iii) improvement of environment in the designated areas and cities for environmental conservation, and (iv) conservation of ecological environment in the natural reserves. The *Guizhou Province 10th Five-Year Plan (2001-2005)* listed (i) conservation of forest resources through reforestation and others, (ii) environment improvement through promotion of detoxifying of waste, (iii) improvement of basic sanitation service and improvement of hygiene in villages by constructing drinking water facilities and sanitary toilet facilities, (iv) improvement in living environment by developing water supply facilities, and (v) increase in enrollment rate by constructing senior high school facilities.

As for poverty alleviation, the *China Rural Poverty Alleviation Program (2001-2010)* focused on the poverty alleviation of approximately 30 million people living below the poverty line as well as approximately 60-70 million people living barely above the poverty line who could drop below the poverty line if they faced problems such as illness or disasters. The program specifically set main principles including (i) increasing financial assistance and efficient use of financial

² As written in “3.1.1. Consistency with the development plan”, the *13th Five-Year Plan (2016-2020)* set programs on (i) building of ecosystem and environmental conservation, (ii) poverty alleviation and improvement of living conditions, and (iii) reinforcing support for infrastructure development.

³ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁴ ③: High, ②: Fair, ①: Low

resources; (ii) promoting the construction of rural infrastructure in poor areas; (iii) encouraging migrant works; (iv) promoting education, health, culture, science and technology, planned childbirth in poor areas, especially in areas where ethnic minority groups live; and (v) implementing poverty alleviation activities basically at the township and administrative village levels⁵.

(2) Development plan at the time of ex-post evaluation

At the time of ex-post evaluation, under the *13th Five-Year Plan for Economic and Social Development of the People's Republic of China (2016-2020)*, in order to achieve the goal of building a moderately prosperous society in all respects by 2020, major objectives such as poverty alleviation, improvement of public services including education and medical care, overall improvement of environment and ecosystem were set. Especially, part 13 of the plan, “the Fight against Poverty”, lists measures such as (i) realization of effective improvement through appropriate planning and inputs, (ii) support for accelerating development of poor areas (basic infrastructure development and improvement of public services), and (iii) improvement of the poverty reduction system. As for the overall improvement of the environment and ecosystem, which is one of the objectives, (i) promoting environment governance and (ii) reduction in pollutant emissions and others are being prioritized.

Under the *Guizhou Province 13th Five-Year Plan (2016-2020)*, the goal of building a moderately prosperous society has been prioritized in accordance with the central government plan, and (i) building of ecosystem and environmental conservation, (ii) poverty alleviation and improvement of living conditions, and (iii) reinforcing support for infrastructure development are set as objectives.

3.1.2 Consistency with the Development Needs of China

The project has been consistent with development needs of China both at the time of appraisal and ex-post evaluation.

At the time of appraisal, the project target areas were classified as national poverty-stricken counties, and their living conditions were extremely poor because of a lack of basic infrastructure for living. In addition, poverty resulted in excessive logging for fuel, which resulted in a burden on the environment and ecosystem. Under these circumstances, realizing sustainable social and environmental development in the region through conservation of the environment and ecosystem, development of infrastructure for living, and promotion of human resource development was an urgent need. Thus, the project was consistent with the development needs.

⁵ The township is one of the four tiers of local administration (province, prefecture, county and township). Among townships, there is a category of town, where commerce and industry are the main economic activities and the population density is relatively high. The administrative village is a community organization below the township.

At the time of ex-post evaluation, Guizhou Province was one of the provinces that had a large population of poor people (3.72 million; poverty rate: 10.6% in 2016), and therefore, the demand for poverty alleviation was still high. Partly because of the support from this project as well as the increasing support from the central government since 2008, an improvement in the living environment of people in the target areas and an improvement in the environment as well as a reduction in the population of poor people (as in Table 8 below) have been observed. However, the target 12 counties under the project continued to be classified in the national-level extreme poverty list, and thus, they need to be lifted out of the poverty list through further improvements in their living conditions, and the demand for poverty alleviation is still extremely high.

3.1.3 Consistency with Japan's ODA policy

The project was consistent with Japan's ODA policy at the time of appraisal; the *Japan's Official Development Assistance Charter* prioritized addressing global issues (environmental problems), and the mid-term ODA policy prioritized freeing individuals from fears such as environmental destruction from the perspective of human security.

In addition, the *Economic Cooperation Program for China*, the *Basic Strategy of Japan's ODA Loan*, and the *Country-Specific Action Policy* at the time of appraisal focused on environmental protection and human resource development. Further, the *Economic Cooperation Program for China* and the *Basic Strategy of Japan's ODA Loan* prioritized assistance for poverty alleviation.

Thus, this project has been highly relevant to China's development plan and development needs, as well as to Japan's ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ①)

3.2.1 Project Outputs

The comparison of planned and actual outputs is shown in Table 1 below. The actual production of project outputs relative to the plan varies depending on sectors. The outputs of "methane gas facility", "reforestation", "roads for daily use", "drinking water facilities", and "domestic training" achieved 90% or more of the planned outputs. On the other hand, the outputs of "flood controls," "water supply facility," "medical facility", "waste treatment and disposal facility", "senior high school facility" and "overseas training" were 40%-75% of the plan.

The main reasons for shortfall in the outputs are as follows: (i) Prices of domestically procured materials and seedlings escalated due to inflation; (ii) The project was affected by a change in government policies (change in earthquake-resistance standards after the Great Sichuan Earthquake, change in standards for leachate treatment at a waste management facility, restriction of overseas training for government officials and others); (iii) The scope of procurement was

reduced due to the depreciation of the yen at the later stage of project implementation; (iv) The project cost fell short and additional input was needed in some subprojects as the cost was underestimated at the time of planning. Also, part of the planned senior high schools were amalgamated, and therefore the construction was canceled. As some planned subprojects needed urgent implementation, they were constructed with own funds. As a result, an adjustment in outputs (including adjustment among sectors in accordance with the progress of own projects and availability of own resources) was made.



Economic forest in Shiqian County



Leachate treatment facility at a waste treatment and disposal facility



A dormitory at Dejiang First High School

Table 1 Comparison of the Plan and Actual Project Outputs

	Plan	Actual	Change
1. Activities to improve hygiene and the environment in local farming villages			
①methane gas facility	Installation (58,664 sites) (Portion from 11 of 12 counties: 53,704 sites)	Installation (50,369 sites: Portion from 11 of 12 counties)	Number of sites installed: 94% (Portion of 11 counties)
②flood controls	(41 sites): Development of embankments (Total length: 50 km), development of drainage (Total length: 370 km)	(23 sites): Development of embankments (17.5 km), drainage (36 km), channel improvement (5.7km), etc.	Number of sites developed: 56% Total lengths of embankments: 35% Total length of drainage: 10%
③reforestation	(46,000 ha): Protection forest: 35,000 ha; Economic forest: 11,000 ha (Portion from 11 of 12 counties: (42,047 ha): Protection forest: 32,313 ha; Economic forest: 9,733 ha)	(38,736ha): Protection forest: 28,749ha; Economic forest: 9,986ha (Portion from 11 of 12 counties)	Planted area: 92% (Portion of 11 counties)
④roads for daily use	(Total length: 3,547 km): Low-cost pavements for daily use, procurement of equipment: (Portion from 11 of 12 counties:	(Total length: 2,952km): Low-cost pavements for daily use, procurement of equipment:	Total length: 92% (Portion of 11 counties)

	3,212 km)	(Portion from 11 of 12 counties)	
⑤drinking water facilities	(86 sites): Construction of reservoirs, procurement of equipment, development of water distribution network (Portion from 11 of 12 counties: 70 sites)	(73 sites): Same as planned (Portion from 11 of 12 counties)	Number of sites installed: 104% (Portion of 11 counties)
2. Activities to improve hygiene and the environment in suburban cities			
①water supply facility	(24 sites): Expansion and construction of a purification plant, procurement of equipment, development of water distribution network	(16 sites): Same as planned	Number of facilities: 67%
②medical facility	Expansion and construction of county hospitals (18 sites), maternal health centers (7 sites), health monitoring stations (2 sites), procurement of medical equipment 97,488 m ²	Expansion and construction of county hospitals (8 sites), maternal health centers (4 sites), procurement of medical equipment 27,915 m ²	Number of facilities: 44% Area: 29%
③waste treatment and disposal facility	(3 sites): Construction of landfill waste treatment and disposal facilities	(2 sites): Construction of landfill waste treatment and disposal facilities	Number of sites: 67%
3. Education			
high school facility	(47 sites): Expansion and construction of school buildings and dormitories, procurement of education equipment Area: 277,717 m ²	(31 sites): Same as planned Area: 138,365 m ²	Number of sites: 66% Area: 50%
4. Training			
①domestic training	Training on health for government officials of counties and below, staff of hospitals and maternal health centers. Number of participants: 420,800 persons	Same as planned 376,204 persons	Number of participants: 89%
②overseas training	Training on health and environmental education for government officials of province, municipalities, and counties as well as senior high school teachers (16 persons x 3 times=48 in total)	19 persons	Number of participants: 40%

Source: Documents provided by JICA, response to questionnaires, and interviews with executing agency

3.2.2 Project Inputs

3.2.2.1 Project Cost

Total project cost slightly exceeded the plan (the ratio against the plan: 116%). Although the ratio against the plan, if simply compared, would have been 78%, the decrease in the actual outputs needed to be taken into consideration. As there are many sectors, it is difficult to accurately calculate the degree of reduction of the project output; however, the ratio against the plan would be approximately 67% after multiplying the ratio of actual outputs relative to the plan in each sector (refer to Table 1) and the weighted planned inputs. Thus, when comparing the 8,854 million yen, which is 67% of the planned total cost of 13,216 million yen and actual project cost of 10,309 million yen, the ratio against the plan would be 116%. Therefore, although the project cost was smaller than the plan, the actual project cost to produce the actual outputs was judged to have exceeded the plan after taking into account the decrease in the scope.

The actual inputs in accordance with the above-mentioned changes in the outputs exceeded the plan because of the factors mentioned in “3.2.1 Project Outputs” above. Among them, the biggest factors are (i) escalation of prices for materials and labor costs necessary for the construction due to inflation, and (ii) depreciation of the yen. The average exchange rate during the project period was 1 yuan =14.9 yen while the rate at the time of appraisal was 1 yuan=13.7 yen. The yen depreciated 8.8% and resulted in an increase in the yen-based project cost.

Table 2 Planned and actual project cost

(Units: million yen)

	Plan (at the time of appraisal)						Plan (after revision)						Performance					
	Foreign currency portion		Local currency portion		Total		Foreign currency portion		Local currency portion		Total		Foreign currency portion		Local currency portion		Total	
		ODA loan		ODA loan		ODA loan		ODA loan		ODA loan		ODA loan		ODA loan		ODA loan		ODA loan
methane gas	0	0	2,176	1,038	2,176	1,038	343	343	163	0	506	343	363	363	63	0	426	363
flood controls	0	0	948	829	948	829	949	949	0	0	949	949	744	744	0	0	744	744
reforestation	0	0	2,380	1,915	2,380	1,915	2,217	2,217	720	0	2,937	2,217	2,351	2,351	682	0	3,033	2,351
roads for daily use	0	0	483	415	483	415	480	480	15	0	495	480	525	525	14	0	539	525
drinking water	0	0	354	323	354	323	329	329	33	0	362	329	348	348	31	0	379	348
water supply	0	0	461	431	461	431	323	323	108	0	431	323	342	342	102	0	444	342
medical facility	0	0	1,111	1,038	1,111	1,038	3,383	3,383	0	0	3,383	3,383	3,586	3,586	0	0	3,586	3,586
waste treatment	0	0	530	497	530	497	372	372	0	0	372	372	393	393	0	0	393	393
education	0	0	2,940	2,447	2,940	2,447	463	463	0	0	463	463	373	373	0	0	373	373
training, etc.	38	38	201	201	239	239	32	32	6	0	38	32	40	40	0	0	40	40
price escalation	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
contingency	2	0	609	0	611	0	96	96	0	0	96	96	0	0	0	0	0	0
interest during construction	384	0	0	0	384	0	0	0	0	0	0	0	0	0	268	0	268	0
others	0	0	599	0	599	0	94	94	0	0	94	94	84	84	0	0	84	84
Total	426	40	12,790	9,133	13,216	9,173	9,081	9,081	1,045	0	10,126	9,081	9,149	9,149	1,160	0	10,309	9,149

Source: Based on documents provided by JICA and the executing agency

Note: 1) The exchange rates applied were: (planned) 1 yuan=13.7 yen; (planned-after revision) 1 yuan=15.8 yen (2013); (actual) 1 yuan=14.9 yen (Average of 2006-2015). 2) No data on breakdown of local currency portion and foreign currency portion for the ODA loan amounts for plan (after revision) and actual. The local currency portions in the table are domestic funds from China. 3) Total amount may not be consistent because of rounding down to million yen.

3.2.2.2 Project Period

The project period significantly exceeded the plan (the ratio against plan: 192%), as the actual period was 115 months while 60 months was planned. The project period exceeded the plan mainly due to the following reasons: (i) It took a long time to appoint a procurement/tender management company required for a Japanese ODA loan project (appointed in 2008 and tender started in 2010); (ii) Adjustment and approval for the scope of the project were required due to inflation and other reasons; (iii) Change of design was necessary after the change in standards; (iv) Management and adjustment were necessary as other similar projects by own funds were implemented at the same time. (v) There were some problems on implementation procedure (such as a delay in opening of bank accounts necessary for procurement, delay in the disbursement process of funds from the Japanese ODA loan, and others).

Due to the delay in the project period, the project was influenced by external factors such as adjustment of plans by the Government of China. As a result, the project needed further time for responding to external factors, revision of project scope (designs were changed and needed to be approved), and others.

Table 3 Planned and actual project period

	Plan (Appraisal)	Actual
Signing of loan agreement	June 2006	June 2006
Activities to improve hygiene and the environment in local farming villages	July 2006-May 2011 (59 months)	July 2006-December 2015 (114 months) (the ratio against the plan: 193%)
Activities to improve hygiene and the environment in suburban cities	September 2006-May 2010 (45 months)	May 2009-December 2015 (80 months) (the ratio against the plan: 178%)
Education	September 2006-May 2010 (45 months)	December 2009-December 2015 (73 months) (the ratio against the plan: 162%)
Training	July 2006-May 2011 (59 months)	May 2009-September 2015 (77 months) (the ratio against the plan: 131%)
Project completion (project period)	May 2011 (60 months)	December 2015 (115 months) (the ratio against the plan: 192%)

Source: Documents provided by JICA and the executing agency, response to questionnaires by the executing agency

3.2.3 Results of Calculations for Internal Rates of Return (Reference only)

At the time of appraisal, Financial Internal Rate of Return (FIRR) of the entire project and FIRR and Economic Internal Rate of Return (EIRR) of each sector were calculated based on the following conditions.

Table 4 Internal rates of return at the time of appraisal

Item	FIRR/EIRR	Benefits	Costs	Project life
Entire project	FIRR: 3.26%	Cash income	Project cost, operation and maintenance (O&M) cost	40 years
Water supply facility	FIRR: 13.5%	Income from water rates and others	Project cost, O&M cost	20 years
Medical facility	FIRR: 6.2%	Income from medical charges and others	Project cost, O&M cost	20 years
Methane gas facility	EIRR:19.7%	Savings of fuel cost, decrease in workload of firewood and charcoal collection	Project cost, O&M cost	20 years
Flood controls, reforestation	EIRR:16.0%	Income from forest products, decrease in flood damages	Project cost, O&M cost	40 years

Source: Documents provided by JICA

Internal Rate of Return (IRR) at the time of ex-post evaluation were not recalculated due to the following reasons. (i) As this project consists of various subprojects in 12 counties, it was difficult to collect information within the duration of this ex-post evaluation study; (ii) It is difficult to precisely compare the IRR before and after the project, as factors at the time of appraisal were not known. For reference, EIRR of “methane gas facility” and “flood controls and reforestation” based on the actual results and the above-mentioned conditions in Dejiang County were recalculated, as relatively detailed information was obtained. This is for reference only as the IRR below are of a part of the subprojects in one county.

- Methane gas facilities in Dejiang County: 22.68%
- Flood controls and reforestation in Dejiang County: 5.92%

In light of the above, the project cost exceeded the plan and the project period significantly exceeded the plan. Therefore, efficiency of the project is low.

3.3 Effectiveness and Impacts⁶ (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

Operation and effect indicators set at the time of appraisal have largely achieved the targets or improved, and therefore, the intended effects have been produced.

(1) Activities to improve hygiene and the environment in local farming villages

At the time of appraisal, (i) reduction in culling of forests for “methane gas facility”, (ii) decrease in maximum flooded area and maximum number of households flooded for “flood controls”, and (iii) planted area for “reforestation” were set as operation and effect indicators.

As for “methane gas facility”, although the data collected has not reached the target, culling of forests has significantly decreased, and interviews with the executing agency and farmers who introduced the facilities at the site surveys (refer to footnote 7) support this trend.

Among the indicators set to measure the effects of “flood controls”, the reduction in maximum flooded area has surpassed the planned figures. There are many cases where even once-in-50-years heavy rain that hit the area resulted in no damage. On the other hand, maximum number of households flooded has not achieved the target as the actual results exceeded the plan by 148%. Significant transformation of agricultural land to residential land and population growth accordingly in the centers of counties, where the flood controls were mainly implemented, is deemed to influence this result.

Reforestation was implemented mostly as planned, and therefore, reforested land area has been achieving the target, with the significant improvement in soil erosion.

Thus, effects of activities to improve hygiene and the environment in local farming villages have been attained mostly as planned or improved significantly compared to the status before the project. The improvement of indicators has been brought about by this project as well as the similar projects implemented by the domestic fund in the target areas and surrounding areas.

⁶ Sub-rating for Effectiveness is to be put with consideration of Impacts.

Table 5 Operation and effect indicators for activities to improve hygiene and the environment in local farming villages (Total)

		Baseline	Target	Actual	Ratio against the plan
		2004	2013	2017	
			2 Years after Completion	2 Years after Completion	
Methane gas facility	Culling of forests (10,000 tons/year)	450 (Average: 37.5)	52 (Average: 4.3)	63(6 counties) (Average: 10.5)	Increase by 121%
Flood controls	Maximum flooded area (km ²)	399	244	134	Decrease to 55%
	Maximum number of households flooded (1,000 households)	19.3	9.5	14.1	Increase by 148%
Reforestation	Planted area (1,000 ha)	31	77	70	91%
	Volume of soil erosion (10,000m ³ /year) *1	3,964	2,704	618	Decrease to 23%

Source: Documents provided by JICA, responses to questionnaires from the executing agency and others

Note: Volume of soil erosion was set as an indicator for reference at the time of appraisal.

(2) Activities to improve hygiene and the environment in suburban cities

At the time of appraisal, (i) increase in population served with water and percentage of population served with water for “water supply facility”; (ii) increase in the number of in-patients, out-patients and emergency patients for “medical facility”; and (iii) increase in volume and percentage of waste disposed for “waste treatment and disposal facility” were set as operation and effect indicators.

In the case of “water supply facility”, the ratio of the actual result of population served water against the plan was 74% in accordance with the scaling down of the scope. However, the use of water has shown an increasing trend, and the volume of water supply has been mostly the same as planned. Percentage of population served with water significantly exceeded the plan.

All indicators for “medical facility” have surpassed the plan significantly. As the target medical facilities are core hospitals in each county, in addition to this project, expansion of the scale and procurement of equipment has been actively implemented by the domestic financial resources. These efforts resulted in this significant improvement. Also, introduction of a new health insurance for farmers (approximately 65% of the premium is covered by the central and local governments; as of 2014, almost 100% of the farmers participated in the program nationally) is one of the reasons for this increase in number of patients.

Development of waste treatment and disposal facility was implemented in two counties, though it was planned in three. However, the volume of waste disposed has been significantly larger than the plan. In addition to the increase in the quantity of refuse per person and

increase in the population in urban areas, measures for waste treatment in villages have also progressed, resulting in an increase in the volume of waste disposed. The percentage of waste disposed has been as planned.

Table 6 Operation and effect indicators for activities to improve hygiene and the environment in suburban cities

		Baseline	Target	Actual	Ratio against the plan
		2004	2013	2017	
			2 Years after Project Completion	2 Years after Project Completion	
Water supply	Population served with water (1,000 people)	706	1,016 (Target of 7 counties for which data for the actual results was collected: 854.5)	751 (7 out of 12 counties)	74%
	Volume of water supply (m ³ /day)	n.a.	122,074	113,869	93%
	Percentage of population served with water (%)	40	50	79	158%
Medical	In-patients (1,000 people)	102	125	193	154%
	Out-patients (1,000 people)	255	303	1,257	414%
	emergency patients (1,000 people)	20	32	154	481%
	Infant mortality rate (per 1,000 live births)	31	24	9	15p improvement from the plan
	Maternal mortality rate (per 100,000 live births)	118	90	46	44p improvement from the plan
	Mortality rate from diseases (per 100,000 population)	281	226	n.a.	n.a.
Waste disposal	Volume of waste disposed (1,000t/year)	0	96	225	234%
	Percentage of waste disposed (%)	0	86	86	100%

Source: Documents provided by JICA, responses to questionnaires from the executing agency and others

Note: 1) Among the above indicators, percentages indicate average figures and the other figures represent total figures. 2) "Infant mortality rate", "maternal mortality rate" and "mortality rate by diseases" for medical were set as indicators for reference. 3) "Volume of water supply" for water supply is for reference only.

(3) Education

Enrollment rate for senior high school was set as an operational and effect indicator at the time of appraisal, and the actual results significantly surpassed the plan. In the target schools, construction of dormitories and school buildings under the project have contributed to the increase in the number of enrolled students. In China, various measures to improve

the enrollment rate of senior high schools such as construction of facilities and assistance for poor households have been implemented. Those measures and implementation of this project have led to the improvement in the indicator.

Table 7 Operation and effect indicator for education

		Baseline	Target	Actual	Ratio against the plan
		2004	2013	2017	
			2 Years after Project Completion	2 Years after Project Completion	
Education (Senior high school)	Enrollment rate of senior high schools	37	54	86	Improvement of 32p from the plan

Source: Documents provided by JICA, responses to questionnaires from the executing agency and others
 Note: The figures are average.

3.3.1.2 Qualitative Effects (Other Effects)

At the time of appraisal, “improvement of environment”, “improvement of hygiene”, “improvement on education” were expected as qualitative effects of the project. The effects observed during the site surveys⁷ were as follows:

(1) Improvement of environment

Regarding “improvement of environment (including living environment)”, the following effects have been observed under the category of “methane gas facility”, “roads for daily use” in local farming villages as well as “medical facility” in suburban cities.

Under the category of “methane gas facility”, by utilizing the facilities, use of fuelwood decreased from 40-50 kg to 5-10 kg in the villages visited during the site surveys. People used fuelwood for cooking previously; however, they cook with mainly methane gas currently. Therefore, there was a problem whereby in the past people cut trees in the land other than that owned by them; however, they no longer need to cut trees even in their land, and they only use tree branches and fallen leaves for fuel. As a result, the burden on the environment and ecosystem has significantly reduced.

As for roads for daily use, in areas where the roads were developed under the project,

⁷ Site surveys were conducted in eight counties among the target 12 counties. Sites visited are as follows: (i) activities to improve hygiene and the environment local farming villages: 18 sites (three sites for methane gas facilities, four sites for flood controls, three sites for roads for daily use, five sites for reforestation, and three sites for drinking water facilities); (ii) activities to improve hygiene and the environment in suburban cities: 10 sites (three sites for water supply facilities, five sites for medical facilities, and two sites for waste treatment and disposal facilities). (iii) Education: seven sites. Among the sites visited, individual interviews with beneficiaries (farmers) and key informant interviews were conducted for activities to improve hygiene and the environment local farming village (methane gas facilities, flood controls, roads for daily use, reforestation and drinking water facilities), and key informant interviews were conducted for activities to improve hygiene and the environment in suburban cities and education.

when it rained in the past, because of the unpaved surface, roads completely got muddy and people were not able to use roads for transportation. However, after the construction of the roads under the project, such problems have been solved and vehicles can be used because of the widening of the roads. Thus, the living environment has significantly improved.

As a result of facility construction and equipment installation under the medical facility, the following improvements have been observed in the medical services. Although improvements in facilities were also implemented by other projects, the project helped some hospitals upgrade their status to come under the national system to the category of secondary A hospital⁸.

- Many of the medical equipment items including color ultrasound diagnostic equipment introduced under the project were one of the first advanced equipment items in the target hospitals, which allowed them to provide medical services in the counties appropriately and promptly. As a result, the hospitals have become able to provide more detailed examination and diagnosis. Also, they used to send patients to hospitals in other counties because they were incapable of treating certain cases (such as difficult delivery); however, the hospitals are now providing such treatment. Thus, the quality of medical services has improved a lot.
- The target hospitals used to have small building areas and faced difficulty in setting up necessary medical equipment and even in providing treatment. As a result of the expansion of building areas under the project, the hospitals were able to secure spaces for examination rooms (including enhancement of equipment after securing the spaces for equipment), nurse stations, and training rooms. With the increase in staff members in some hospitals, medical services have improved. In one hospital, there was no other department than obstetrics and gynecology before the project because of the lack of space; however, the hospital has now set up various departments such as an outpatient department for pediatrics, an outpatient department for high-risk maternal care, all of which provide appropriate treatment respectively. Examples of effects of expansion of areas and improvement of medical services in accordance with the appropriate institutional setup accordingly include (i) one of the hospitals is able to conduct hearing checkups for all newborns; (ii) another hospital provides health checkup services; and (iii) yet another hospital is able to provide hemodialysis service as a part of the building constructed under the project has been allocated to a hemodialysis center.

⁸ Hospitals in China are classified into three levels in accordance with their infrastructure and functions. Further, they are labeled A or B within the above-mentioned three levels (The third A hospitals are the highest-ranked hospitals).

(2) Improvement of hygiene

Before the project, there were problems with the quality of water: it was smelly and cloudy, and coliform was detected. After the development of water supply and drinking water facilities under the project, safe water was provided, which has met the domestic water quality standard-2 (There is a case where the quality has significantly improved from 4 to 2). As a result, although there is no statistical data, water-borne diseases such as diarrhea are not as prevalent as before, according to interviews with executing agency and beneficiaries. Also, the problem of cuts in water supply in some areas have been solved. The Government of China has currently implemented a policy of building elementary schools in each town, and as a result, the demand for water in towns has increased. The project has responded to these increased demands.

In accordance with the development of waste treatment and disposal facilities and leachate treatment facilities under the project, the burden on the surrounding environment from the final disposal has been eased. Further, as appropriate final disposal of garbage has become possible, collection of garbage has progressed. As a result, the situation of garbage-strewn litter bins in streets has improved.

(3) Education

As for the construction of senior high schools, effects such as the ability to accept students from rural and mountain areas because of the dormitory construction and improvement in the number of students per class have been observed.

- The project constructed senior high school buildings and dormitories were included in many sites. As it is difficult for students in rural and mountain areas to commute, they need to rent a room in a dormitory or a private apartment nearby after enrollment. However, if a student cannot afford the rent for the apartment, which is about 100 yuan per month, he/she needs to rent a bed in a dormitory (30 yuan per month). However, dormitories were not able to accept all candidates, which was an obstacle for enrollment in the senior high schools. Following the construction of dormitories under the project, the senior high schools are able to increase the number of students for recruitment, and students from rural and mountain areas now have a chance to enroll themselves in senior high schools.
- Because of the lack of the classrooms, the number of students per class in a target school was 60 before the project. As the number of classrooms has increased after the project, the number of students per class has improved to 45. Thus, the education environment has improved a lot.
- As a result of improvement of education through this project and through other projects, enrollment to universities and vocational schools has improved. In a target

school under the project, the number of students enrolled in universities has increased significantly from 100 students in 2004 to 500 in 2017.

3.3.2 Impacts

3.3.2.1 Intended Impacts

At the time of appraisal, “reduction of the number of the rural poor”, “regional economic development”, “sustainable environmental and social development”, and “decrease of workload of housework for women (collection of firewood and charcoal and fetching of water)” were expected as impacts. Based on statistical data provided by the executing agency and the site surveys as mentioned above, the following impacts have been observed.

(1) Reduction of the number of the rural poor and regional economic development

The Government of China revised the poverty standard in 2011 from its own standard to a standard that incorporates international norms, in order to further strengthen the measures against poverty. In order to target a larger poor population, the standard of net per capita income of the poor was set higher, and as a result, the number of the rural poor has increased. Therefore, it is difficult to compare the status before the project (2006) and after. However, according to the statistical data and the responses to questionnaires from the executing agency, the number of the poor in the target 12 counties dropped from approximately 1.47 million in 2012, the year in which the new standard⁹ was introduced, to approximately 780,000 (reduced by half) in 2016. Therefore, it is judged that the overall reduction in the number of poor has shown steady progress.

Table 8 Poor population in the target 12 counties

(unit: 10,000 persons)

	2012	2013	2014	2015
Total of 12 counties	147	119	100	78

Source: Documents provided by the executing agency

According to documents provided by the executing agency, the GDP in the target counties and farmer’s net per capita income have significantly increased. GDP has increased from 29.3 billion yuan in 2013 to 37.5 billion yuan in 2017 (1.3 times higher with 6% annual growth). Farmer’s net per capita income also has increased from 5,500 yuan in 2013 to 8,613 in 2017 (1.6 times higher and 12% annual growth).

⁹ The standard of net per capita income for rural poverty have varied from 668 yuan in 2004, 1,196 yuan in 2008, and 2,300 yuan in 2012.

Improvements in GDP, net income, and poverty are greatly influenced by macroeconomic trends and measures against poverty by the domestic fund, and therefore, it is judged that the improvements in the above indicators have been achieved through various poverty measures including this project and economic conditions.

(2) Sustainable environmental and social development

According to interviews with beneficiaries, staff of counties and townships, impacts related to revenue increase, protection of farmland, and promotion of migration have been observed as a result of construction of facilities and installation of equipment.

Table 9 Impacts on sustainable environment and social development

Facilities and equipment	Impacts
Roads for daily use	<p>Increase of income in accordance with the improvement of transportation of agriculture products, etc.</p> <p>As a result of road construction, transportation of people and goods has become smooth. Many cases wherein such improvements have led to the increase of income of the residents and farmers have been observed.</p> <ul style="list-style-type: none"> • In a village where the main product is mandarin oranges, people used to carry the products on their shoulders to a middleman. After the road was constructed, they have been able to carry the product in carts. The workload has decreased and at the same time sales have expanded. In response to the increase in sales, the cultivated area in the village has expanded from 1,000 mu¹⁰ (approximately 6.67 are) to 3,000 mu. Income per mandarin orange-producing household has increased by about 2,000 yuan. • In another village, after the construction of roads, some farmers opened farm-restaurants from 2012 onward, targeting tourists who visit a lake nearby. Also, sales of citrus fruit targeting tourists and sales of mandarin oranges in urban areas by using road have expanded, and as a result, cultivated areas have increased. • Improvement of access through road development was a key factor in the success in attracting a company from another province in another village. In 2014, the company started producing herbal medicine from the plum trees in the village and hired 100 villagers, paying them wages. Also, part of the profit has been shared among the residents every year.
Embankment	<p>Increase of agriculture production as a result of construction of embankments with irrigation functions</p> <p>In some areas, embankments with irrigation functions were constructed. After the construction, irrigation in the areas has been utilized and as a result, agricultural production and crops have progressed in a more sophisticated manner including the transformation of crops from corn to rice. Agricultural income has also increased.</p> <p>Protection of important farmland in a poor mountain area</p> <p>In a mountain area where poor ethnic minorities live, the farmland is limited. Cultivated area per person is 0.4 mu for paddy fields near the river</p>

¹⁰ Unit of measurement for area in China.

	<p>and 0.4 mu for farmland on the slope (though principally farming is not allowed there). Among these, high-yielding paddy fields account for most of the agricultural production and have been an important source of people's food. However, when the river flooded in the rainy season, the paddy field was submerged and people lost most of their agricultural produce, and as a result, they became distressed. After the construction of the embankment under the project, the river has not flooded, and people are able to avoid this distressed situation.</p>
Reforestation	<p>Increase of income and expansion of marketing channels for products from economic forest</p> <p>Production of camellia oleifera (a kind of camellia from whose fruit oil is extracted) from economic forests will be fully scaled up in the coming years. Some of the villages visited have already experienced an increase in income from this project.</p> <ul style="list-style-type: none"> • In a village where 43 households planted trees in their own land of 320 mu in 2010, fruit was harvested in 2013 for the first time, and in 2017, with the production of approximately 100,000 kg of fruit, approximately 500,000 yuan was obtained from its sales, from which 10,000 yuan was distributed to each household. Before the project, the villagers gained little income from the land, as they were wastelands; however, their income has significantly increased after the project. A county-processing factory is being constructed, and it is expected that selling the product to the factory would further increase the income. • In another village, increased income includes (a) income from labor for maintenance of camellia oleifera, 5,000-10,000 yuan; and (b) dividends from a processing company supported by the World Bank in 2017, 1,000 yuan/household (3 persons on average). As a result, the number of poor households has decreased from 53 households before the project to 20 after the project. The company sells the processed product (food oil) through an antenna shop in Suzhou and through the internet.
Drinking water facilities	<p>Promotion of migration of those in inferior living environments to the center of counties/townships</p> <p>In order to improve the inferior living environments of those live in small villages with less than 30 households, the Government of China has promoted migration of those households in a group to the center of counties/townships. One of the conditions for accepting those groups is securing drinking water. After the development of drinking water facilities under the project, there is a township that accepted the migration of 20 poor households by meeting this condition. As a result, the living environment of the immigrants has improved a lot.</p>

Source: Interviews with residents and staff of counties and townships during the site surveys



A drinking water facility installed at home



Cooking using methane gas

(3) Decrease of workload of housework for women (collection of firewood and charcoal and fetching of water)

The installation of methane gas facilities and drinking water facilities in the farming villages significantly decreased the workload of collecting fuelwood and charcoal and fetching of water. In villages where the interviews were conducted, people used to spend 20-30 days per year for collecting fuelwood and charcoal; however, they only collect fuelwood during the break in farming nowadays. People also mentioned that the workload of housework such as collection of fuelwood and charcoal as well as fetching of water has been eased with the time spent decreasing from one hour per day to 10-20 minutes. In the areas where drinking water facilities were developed, the workload of fetching water was heavy. People used to go to a well to fetch water (once or twice per day with a tank for water), as there were no drinking water facilities or the quality was low even if they had facilities. The workload of these tasks was heavy in rural areas that turned grey; however, the workload was eased through the project. These household tasks do not necessarily have to be performed by women; however, since men usually work away from home, these tasks have been mainly undertaken by women and children. Thus, the project led to a decrease in the heavy workload of women and children. Also, provision of a stable water supply has improved the lives of rural people as they are now able to use showers and washing machines.

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the natural environment

No negative impacts on the natural environment have been observed. Monitoring using the existing equipment based on the environmental impact assessment has been carried out on the waste treatment and disposal facilities. Online monitoring on leachate, regular monitoring on the quality of water of the nearby rivers, etc., and unannounced inspections were carried out for the final disposal facility based on the national standard. As a result, no negative impacts have been observed.

(2) Resettlement and land acquisition

Land acquisition and resettlement did not occur, and no negative impacts on social aspects have been observed.

(3) Expansion of urban areas as a result of significant decrease in flood damage on account of the construction of an embankment

Among the other impacts, expansion of urban area as a result of significant decrease in flood damage on account of the construction of an embankment has been observed. In a village visited during the site surveys, a river that flows near the center of the county flooded once in several years and approximately 2,000 mu of farm land in the surrounding area were damaged previously. After the embankment was constructed under the project, even in a case where the village experienced its heaviest rainfall in a 100-year period (130 mm/day) in July 2014, the river did not flood and future concerns for damage by the flood was mitigated. The target county was in the mountain area and therefore the plain filled is very valuable. As a consequence of the increased safety in the area around the embankment, housing land development has shown progress since then. Thus, the development of the embankment has promoted the urban development.

(4) Human resource development for promoting poverty alleviation measures

Training for staff members of counties, townships, and villages who are responsible for the poverty alleviation measures was conducted under the project. The training especially provided them a chance to learn project operations based on fair rules and fund (for projects outsourced) management (procurement based on rules on use of funds). Thus, the project has contributed to human resource development for poverty alleviation measures. “Guizhou Rural Development Project”, which targets 16 counties in the province is currently implemented with the support of the World Bank. The target counties include five counties targeted under this project. According to the Guizhou Province, the implementing capacity of a county is one of the important criteria for county selection, and the counties under this project that demonstrated a high level of implementing capacity were selected preferentially.

Thus, this project has largely achieved its objectives. Therefore, effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional/Organizational Aspect of Operation and Maintenance

As the project covered multiple sectors in the national poverty-stricken counties, an organizational structure for operation and maintenance (O&M) in each sector was set at the time of appraisal. At the time of ex-post evaluation, O&M has been carried out mostly as planned, and no problems have been observed regarding the institutional/operational aspects. The organizational structure for O&M in each sector is as follows:

Table 10 Organizational structure for O&M

1. Activities to improve hygiene and the environment in local farming villages	
Methane gas facility	Under the guidance of county departments of agriculture and rural energy and agriculture stations in townships, residents who installed the facilities carry out maintenance. In some counties, as there are many households made up of senior people, village-level teams were set up to promote maintenance of the methane gas facilities.
Flood controls	<ul style="list-style-type: none"> Under the guidance of county water departments and water stations in townships, residents carry out maintenance (in case of large-scale facilities, county water departments are responsible). For small facilities, residents check the facilities (such as small cracks) regularly, and report to the village governments if needed. Then, village governments take action. As residents are highly aware that embankments are important facilities and they are motivated to safeguard them, no problems have been observed.
Reforestation	<ul style="list-style-type: none"> Under the guidance of county forest departments and forest stations in townships, participants in the project carry out maintenance. Also, forest protection workers hired by the forest stations are responsible for protection from damages from disease and harmful insects. No problems have been observed as people are very motivated because the economic forest is a source of income. It was anticipated that people would not be very motivated to carry out O&M of protection forest. Hence, species that do not need much care, or species that would produce some income were selected. Also, county forest departments regularly monitor the situation by collaborating with residents.
Roads for daily use	<ul style="list-style-type: none"> Residents carry out maintenance. In case of any damage, maintenance was conducted with materials provided by village governments and labor provided by residents. People cooperate well as they are aware that the roads are basic and important infrastructure.
Drinking water	Under the guidance of county water departments and water stations in townships, residents carry out maintenance
2. Activities to improve hygiene and the environment in suburban cities	
Water supply	Water supply companies are responsible for O&M.
Medical	Medical institutions are responsible for O&M.
Waste treatment and disposal	County construction departments carry out maintenance.
3. Education	
Senior high schools	Senior high schools are responsible for O&M.

Source: Documents provided by JICA, interviews and responses to questionnaires with/by the existing agency

and counties

At the time of ex-post evaluation, staff was allocated for this ODA loan project at the county and township government levels. As many similar projects have been implemented, O&M of each sector under this project have been conducted together with similar projects. The number of staff has increased in response to the recent increase of the social infrastructure projects in poor counties.

As to the sectors that need to involve residents for O&M, institutional setup to support residents has been arranged when necessary, and therefore, no problems have been observed.

3.4.2 Technical Aspect of Operation and Maintenance

No major problems have been observed regarding the technical aspect of O&M. As envisaged at the time of appraisal, at the provincial, prefectural, county, and township levels, the government sectors of agriculture and rural energy, forestry, water resources, education, and health have conducted maintenance activities directly or provided technical guidance and monitoring. As described above, many similar projects utilizing domestic funds have been implemented, and no sophisticated skills have been required in the case of most of the subprojects; thus, there have been no technical issues on O&M under each governmental sector. Operation of equipment items that require sophisticated skills have been outsourced to expertise companies, and also staff has acquired skills through training by expertise institutes. As for the sectors that need to involve residents for O&M, no problems have been observed either, as they do not require sophisticated skills, and necessary information sharing and guidance have been given. In the case of methane gas, manuals for use of methane gas facilities have been distributed, and in the case of reforestation, regular checkups have been carried out by residents with the collaboration of county departments of forestry.

3.4.3 Financial Aspect of Operation and Maintenance

No problems have been observed regarding the financial aspects of O&M to sustain the effects produced by the project. Support from the central and provincial governments toward the poverty-stricken counties, the target of this project, have been strengthened in order to achieve a policy goal of realizing a moderately prosperous society. Especially, financial support has further increased after the State Council issued “Opinion on further promoting sound and rapid economic and social development” (2012) (regulation by the State Council).

The budget of the provincial government for poverty alleviation increased from 3 billion yuan in 2006 to 13.5 billion yuan or more in 2017 (60% from the central government and 40% from the provincial government). Also, a special fund of 86.1 billion yuan

(approximately 14 trillion yen) was allocated in the budget proposal of 2017, which was 30% higher than the previous year. According to interviews with the target governments, financial support for poverty alleviation rapidly increased from 10-30 million yuan in 2006 (at the beginning of this project) to 100 million yuan or more in recent years, though the figures vary depending on counties. O&M budget has been secured at the village level and necessary materials have been purchased.

Among the costs to be borne by residents, the water rates have been in the range of 1-3.5 yuan/t depending on counties. As there has been a system in place whereby poor households are exempted, there have been no problems. Operation of methane gas facilities has been affected by the price of pigs to some extent; however, even in the period of low prices, there have been no problems in the continuous use of the facilities, as (i) farmers do not have to spend money for purchasing animal feed, as they usually raise one pig that can be fed with the scraps, (ii) the farmers obtain sufficient gas from one pig, and (iii) use of methane gas is free and the farmers experience a benefit in terms of cost.

3.4.4 Status of Operation and Maintenance

No problems have been observed in the status of O&M, as O&M has been carried out appropriately based on O&M rules of facilities and equipment under each sector.

The utilization rates of the facilities and equipment constructed/installed under the project have been high as most of them are basic essential infrastructures. The conditions of main facilities and equipment has been generally good, and they have been repaired promptly in case of any breakdown. The facilities and equipment that require the involvement of residents have been managed well with support from the governments when needed, and a clear demarcation among the governments and residents has been in place.

Personal computers purchased at education facilities and some of the equipment installed at medical institutions have become outdated; however, they continue to be used and will be replaced when needed. According to interviews, there have been no problems with the purchase and stocks of consumables as long as they are in production. As for education, there have been some adjustments in the use of the school buildings. For example, there is a case where some of the buildings have been converted to vocational training schools after the target schools constructed and moved their campus to other locations.

No major problems have been observed in the institutional, technical, financial aspects, and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1.1 Conclusion

The project aimed to improve environment and hygiene, and to develop human resources in local farming villages and suburban cities in 12 national poverty-stricken counties in Guizhou Province by constructing or improving facilities for (i) environmental measures such as methane gas facilities, waste and disposal facilities, and reforestation; (ii) hygiene measures such as roads for daily use, water supply, and medical services; and (iii) senior high school buildings. The project has been consistent with China's development plans and development needs as well as with Japan's ODA policy. Therefore, the relevance of the project is high. Although the project cost was within the plan, the project period significantly exceeded it. Therefore, the efficiency of the project is low. The effectiveness/impact is high. Indicators set to measure quantitative effects such as culling of forests, flooded area, volume of soil erosion, percentage of population served water, number of patients, volume and percentage of waste disposed, and senior high school enrollment rate have largely achieved targets or improved. As to qualitative effects, improvements in the environment (including living environment) such as the decrease in the collection of firewood and charcoal, improvement of medical services, improvement of hygiene as well as effects of education have been observed. As for impacts, a decrease in the population of rural poverty, regional economic development, sustainable environmental and social development, and a reduction in the women's household workload have been observed. The sustainability is high, as no major problems have been observed in the institutional, technical, and financial aspects of the operation and maintenance systems, as well as in the status of operation and maintenance.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

None

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Importance of setting an appropriate implementation structure for a poverty alleviation project that consists of numerous multi-sector subprojects in various sites

In response to the feature of this poverty alleviation project that consists of numerous multi-sector subprojects in various sites, measures such as setting up an implementing

mechanism through SAPI and providing training to government officials have been conducted, which were effective for the implementation of the project to some extent. On the other hand, the project was not necessarily implemented efficiently, as stakeholders did not have experience of implementing projects supported by development partners, and therefore, a full understanding of the procedure of the Japanese ODA loan project was not obtained. In addition, an agreement to hire a consultant was not reached. As a result, there were problems such as delays in selection of a tender/procurement management company, in opening of bank accounts necessary for procurement, and in the disbursement procedure of the ODA loan, which affected the efficient implementation of the project (delay in the project period).

As implementation of a poverty alleviation project that consists of multi-sectoral small subprojects in various locations is very complicated, and in many cases, stakeholders have some problems in implementing capacity, it is important to pay attention to the implementation structure. Capacity development and setting up of an institutional structure by utilizing SAPI and training are effective. In addition, providing frequent guidance and prompt responses when a problem occurs are essential during the project implementation. According to the executing agency, communication with JICA has been smooth, as JICA provides the executing agency frequent advice and guidance. However, the communication has been mainly on an ad hoc basis and through e-mail and verbal communication, instead of being continuous and regular. Conducting regular operation monitoring and guidance and confirming the content of the guidance using minutes would have led to more prompt identification and solution of problems with issues such as delays in procedures as mentioned above. Therefore, at the implementation stage, it is necessary to fully examine whether it is effective to allocate a consultant with an additional budget, to conduct operation monitoring and guidance, as well as setting up a necessary institutional structure for operation monitoring and guidance.

END

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs		
(1) Activities to improve hygiene and the environment in local farming villages		
a. methane gas facility	58,664 sites (Portion from 11 of 12 counties: 53,704 sites)	50,369 sites (Portion from 11 of 12 counties)
b. flood controls	41 sites	23 sites
c. reforestation	46,000 ha (Portion from 11 of 12 counties: 42,047ha)	38,736ha (Portion from 11 of 12 counties)
d. roads for daily use	Total extension 3,547km (Portion from 11 of 12 counties: 3,212km)	Total extension 2,952km (Portion from 11 of 12 counties)
e. drinking water facilities	86 sites (Portion from 11 of 12 counties: 70 sites)	73 sites (Portion from 11 of 12 counties)
(2) Activities to improve hygiene and the environment in suburban cities		
a. water supply facility	24 sites	16 sites
b. medical facility	27 sites	12 sites
c. waste treatment and disposal facility	3 sites	2 sites
(3) Education	47 sites	31 sites
(4) Training	Domestic training: 420,800 persons Overseas training: 48 persons	Domestic training: 376,204 persons Overseas training : 19 persons
2. Project Period	June 2006–May 2011 (60 months)	June 2006–December 2015 (115 months)
3. Project Cost		
Amount Paid in Foreign Currency	426 million yen	9,149 million yen
Amount Paid in Local Currency	12,790 million yen (933 million yuan)	1,160 million yen (77 million yuan)
Total	13,216 million yen	10,309 million yen
ODA Loan Portion	9,173 million yen	9,149 million yen
Exchange Rate	1 yuan=13.7 yen (As of September 2005)	1 yuan =14.9 yen (Averages between June 2006 to December 2015)
4. Final Disbursement	December 2015	