Republic of the Philippines

FY2015 Ex-Post Evaluation of Japanese ODA Loan

"Metro Iligan Regional Infrastructure Development Project"

External Evaluator: Kenichi Inazawa, Octavia Japan Co., Ltd.

## 0. Summary

This project rehabilitated and widened existing roads in the Metro Iligan Regional Agri-Industrial Center (hereafter referred to as "MIRAIC") located in the province of Lanao del Norte in Mindanao Island, with a view to smoothing traffic flow. It is consistent with the regional economic development policy such as the Cagayan de Oro-Iligan Corridor Initiative and the Northern Mindanao Regional Development Plan. It is also in line with the development needs for extending road networks and with Japan's assistance policy. Thus, relevance is high. Regarding efficiency, the development of a small-scale hydropower facility which was part of original plan was deleted from the project scope. As a result, the actual project cost was lower than planned. It can be judged that scale of project's inputs related to road construction was appropriate considering the change in route during the project implementation. However, the project period was significantly longer than planned due to delays in budget allocation from the Philippine government as well as delays in construction caused by addressing higher security risks near project sites. Thus, efficiency is judged to be fair. Through field visits and interviews with Lanao del Norte District Engineering Offices and district engineering offices of the Department of Public Works and Highways (hereafter referred to as "DPWH") during this ex-post evaluation study, it was confirmed that the traffic volume increased and traffic access improved after the completion of the project as a result of the road rehabilitation and shortening the travel time to 15-20 minutes in all road sections. In addition, positive impacts were confirmed through a beneficiary survey, which showed beneficiaries' satisfaction with the roads, improvement of access and convenience, increase in transportation of agricultural products and employment opportunities. However, considering the fact that no private companies have yet invested in MIRAIC at the time of the ex-post evaluation, the effectiveness and impact are fair. No particular problems are observed in the institutional, technical and financial aspects of the operation and maintenance of this project; thus, sustainability of the project's effects is high.

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

## 1. Project Description


Project Location

Road Developed by this Project
(Kauswagan－Delabayan－Munai Section)

### 1.1 Background

The provinces of Lanao del Norte and Misamis Oriental in the northern part of Mindanao, the Philippines, are not only famous for agriculture and fishery but also an industrial complex known for food processing, the steel industry and the metal-processing industry. The government of the Philippines formulated the Cagayan de Oro-Iligan Corridor Initiative in 1991, which aimed for regional development of Cagayan de Oro City, Iligan City, which are located at the both provinces, and 19 surrounding towns. Before the start of this project, the Department of Trade and Industry (hereafter referred to as “DTI”) regarded MIRAIC as one of the industrial parks that represented the above-mentioned initiative in Linamon, a suburb of Iligan City, the province of Lanao del Norte, and it was expected to be developed by the private sector. In order to attract foreign and domestic investment which the region could be benefited from, there was a need to develop infrastructure such as roads and power-generating facilities in accordance with the development of MIRAIC.

### 1.2 Project Outline

The objective of this project is to realize smooth traffic flows, stabilize power supply and reduce electricity costs by rehabilitating and expanding existing provincial roads and constructing small-scale hydropower plant in and around MIRAIC, the province of Lanao del Norte, thereby contributing to the promotion of industry establishment in the industrial center (MIRAIC) and to the development of local economies in the Northern Mindanao.

| | |
|---|---|
| Loan Approved Amount/ Disbursed Amount | 4,328 million yen / 3,068 million yen |
| Exchange of Notes Date/ Loan Agreement Signing Date | September 1998 / September 1998 |
| Terms and Conditions | Construction: Interest Rate 2.2% / 0.75%<br>Repayment Period 30 years / 40 years<br>(Grace Period 10 years) / (Grace Period 10 years)<br>Conditions for Procurement: General Untied / Partial Untied<br>Consulting Service: Interest Rate 0.75%<br>Repayment Period 40 years<br>(Grace Period 10 years)<br>Conditions for Procurement Partial Untied |
| Borrower / Executing Agency(ies) | Guarantor: Government of the Republic of the Philippines / Provincial Government of Lanao del Norte |
| Final Disbursement Date | June 2010 |
| Main Contractor (Over 1 billion yen) | Hanjin Heavy Industries & Construction Co., Ltd. (South Korea) |
| Main Consultant (Over 100 million yen) | Oriental Consultants Co., Ltd. (Japan), Pacific Consultants Co., Ltd. (Japan) / Tokyo Electric Power Services Co., Ltd. (Japan) / DCCD Engineering Corporation (the Philippines) / Filipinas Dravo Corporation (the Philippines) (JV) |
| Feasibility Studies, etc. | Feasibility Study on North Lanao Road Development (World Bank, December 1993)<br>Feasibility Study on Small-Scale Hydropower Plant (USAID, March 1995) |
| Related Projects | None |

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Kenichi Inazawa, Octavia Japan Co., Ltd.

### 2.2 Duration of Evaluation Study

Duration of the Study: August 2015-September 2016

Duration of the Field Study: 31 October-14 November 2015 and
9 February-13 February 2016

### 2.3 Constraints during the Evaluation Study

As mentioned in Section 3.3.1 Quantitative Effects (Operation and Effect Indicators), quantitative indicators were not set during the appraisal and when the project scope was modified in this project. It should be noted that the project was evaluated based on in dicators developed during the ex-post evaluation.

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

### 3.1 Relevance (Rating: ③[2])

#### 3.1.1 Relevance to the Development Plan of the Philippines

Before the start of this project, the government of the Philippines formulated the Cagayan de Oro-Iligan Corridor Initiative in 1991. This initiative aimed for regional development through establishing industrial parks and developing infrastructures, targeting Cagayan de Oro City, Iligan City and 19 surrounding towns.

At the time of the ex-post evaluation, the Philippine government has identified Northern Mindanao－a logistic hub for agriculture and fishery－as a center for regional economic growth and has viewed MIRAIC as a major industrial area, which is stipulated in the Northern Mindanao Regional Development Plan (2010-2020), formulated in 2009. The Philippine central government and the provincial government of Lanao del Norte has identified the development of MIRAIC and surroundings as a major task in the Northern Mindanao Updated Regional Development Plan (2011-2016), aiming to make MIRAIC a gateway for agriculture and fishery in Mindanao.

As such, the central and the provincial governments of Lanao del Norte place importance on economic development of Northern Mindanao and promotion of MIRAIC at the time of the appraisal and also at the time of ex-post evaluation. Thus, this project was consistent with the national policies and sectoral plans at the time of appraisal and also at the time of ex-post evaluation.

#### 3.1.2 Relevance to the Development Needs of the Philippines

Before the start of this project, the DTI formulated a plan to develop MIRAIC in Linamon, a suburb of Iligan City, the province of Lanao del Norte, as a national project. At that time, MIRAIC was viewed as one of the industrial parks for the above-mentioned Cagayan de

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

Oro-Iligan Corridor Initiative. On the other hand, infrastructure such as roads, bridges and power-generating facilities were underdeveloped in MIRAIC. Thus, there was a need to pave and extend provincial roads and to stabilize power supplies through establishing power plants, thereby attracting local and foreign investment for economic benefits.

During the implementation of this project, the development of MIRAIC stagnated for political reasons[3], budget shortages of central government and deterioration of security in and around the project sites[4]. While it is difficult to say that MIRAIC is in fully fledged development at the time of the ex-post evaluation, the provincial government of Lanao del Norte has been gradually developing industrial facilities. For example, a corn drying facility (Photo 1 and Photo 2) is under construction, financed by the provincial government. This facility is expected to dry and merchandize corn produced by farmers in the surrounding areas with a view to increasing sales and profits at market places. In addition, DPWH-funded extension work is on-going for the roads constructed by this project[5]. Thus it is expected that access to other areas will further improve, promoting people's interactions and goods movement. Moreover, the provincial government of Lanao del Norte is planning to construct the hydropower plant, which was deleted from this project[6], in response to the pressing situation surrounding power supply and demand in the province[7]. The provincial government also formulated the Investment and Incentive Promotion Program in 2014 for the promotion of MIRAIC. Under this program, the introduction of privileges such as corporate tax exemption and provision of land for companies interested in setting up new businesses in MIRAIC are being considered.

The above confirms that there was a need to develop infrastructure such as roads and power facilities in MIRAIC and the province of Lanao del Norte at the time of the project appraisal and the ex-post evaluation. Therefore, it can be judged that this project is consistent with the development needs of the country both at the time of the appraisal and the ex-post evaluation.

[3] The government of Lanao del Norte Province recognizes that the central government's support for MIRAIC, which was viewed as a flagship regional development project promoting employment before the start of this project during the Ramos Administration (1992-1998), gradually weakened following the change in administration.
[4] This is elaborated on in Section 3.2.1 Project Outputs, under Efficiency.
[5] At the time of the ex-post evaluation, a road connecting to the province of Lanao del Sur is under construction.
[6] At the time of the ex-post evaluation, a Chinese company is interested in the small-scale hydroelectric power plant facility that was excluded from this project (refer to Project Outputs under Efficiency). At present, the provincial government of Lanao del Norte and this Chinese company are jointly working on the plan. The provincial government has indicated that it would operate the facility and supply power in public-private partnership (PPP) in the near future.
[7] Refer to Section 3.3.1 Quantitative Effects under Effectiveness for data on power demand and supply in the province of Lanao del Norte.

### 3.1.3 Relevance to Japan's ODA Policy

The ODA Charter approved by the Cabinet in 1992 before the start of this project said that urging "attention to recipient accomplishments in democratizing, establishing market-oriented economic systems, and assuring basic human rights and freedoms" was one of the principles. It also said that priority would be placed on assisting infrastructure improvement, as this is a prerequisite for socioeconomic development. Furthermore, it was said that Japan would aim to strengthen economic institutions and to overcome constraints for sustainable growth, focusing on the need to develop economic infrastructure and strengthen industrial structures in the Country Assistance Record 1991-1998 (the Philippines).

Since this project was aimed to attract foreign and domestic companies to MIRAIC through developing infrastructure such as provincial roads and power-generating facilities it can be said that the project was in line with Japan's assistance policy including the ODA Charter.

This project has been highly relevant to the development plan and development needs of the Philippines, as well as to Japan's ODA policy. Therefore, its relevance is high.


Photo 1: Corn Drying Facility inside MIRAIC (being constructed by the provincial government of Lanao del Norte)

Photo 2: Inside the Corn Drying Facility

### 3.2 Efficiency (Rating:②)

3.2.1 Project Outputs

Table 1 shows the planned and actual outputs of this project.

Table 1: Planned and Actual Outputs of this Project

| Plans at the Time of Appraisal | Actual at the Time of Ex-Post Evaluation |
|---|---|
| ① Paving and widening of provincial roads, renewal of a bridge (two-lane)<br>a. Patag－Tagoloan－Balo-i section (17.1km) (Segment 1)<br>b. Pantao Ragat－Balo-i section (10.9km) (Segment 2)<br>c. Kauswagan－Delabayan－Munai section (26.4km) (Segment 3) | ① Paving and widening of provincial and national roads, renewal of a bridge (two-lane)<br>a. Changed to Fatima－Tagoloan－Balo-i section (15.5km) (Segment 1)<br>b. Changed to Linamon－Matungao－Balo-i section (19.1km)→ (New Segment 2)<br>c. Kauswagan－Delabayan－Munai section (19.1km) (Segment 3) |
| ② Small-scale hydropower facility (Liangan)<br>a. In-flow type with the capacity of 11.9MW<br>b. Facilities: power-generating facilities, diversion weir, intake facility, water pipes, surge tank, headrace, transmission line, substation and access roads | ② Small-scale hydropower facility (Liangan)<br>a. and b. → Out of the project scope[8] |
| ③ Monitoring equipment<br>a. Vehicles and communication equipment | ③ Monitoring equipment<br>a. Cancelled[9] |
| ④ Consulting service<br>a. Review of the detailed design, assisting tendering processes and supervising construction concerning the provincial roads<br>b. Formulation of land use and development plans for the province of Lanao del Norte<br>c. Training in Japan for officials of the provincial government of Lanao del Norte and surrounding municipalities<br>d. Reviewing detail design for the small-scale hydropower facility, assisting tendering processes and supervising construction | ④ Consulting service<br>a. Implemented (M/M reduced)<br>b. Implemented (M/M reduced)<br>c. Implemented<br>d. Only detailed design was implemented |

Source: Document provided by JICA (plans at the time of appraisal), answers to the questionnaires (actual at the time of ex-post evaluation).

As shown in Table 1, the actual outputs were different from the plan at the time of the appraisal of this project. Below are the explanations of the differences for each project output:

① Paving and Widening of Provincial and National Roads, Renewal of a Bridge (Two-Lane)

[8] Although this component became out of the project scope, its implementation is being discussed under another project.

[9] Cancelled means this component was not implemented as part of this project.

One of the points of route a. (segment 1) changed from Patag to Fatima. This is because Patag, was the town of Tagoloan, and transferred to Fatima after the start of this project and the construction site changed slightly. Accordingly, the length of the road was reduced (it was approx. 1.6km shorter than planned).

Regarding b. the Pantao Ragat－Balo-i section, the plan at the time of the appraisal was changed due to: 1) this road was expected to connect to the eastern entrance of MIRAIC with a bridge, Balo-i Bridge. Although the DPWH planned to construct the bridge, it was not expected to start soon due to issues related to land acquisition along this section. 2) Observing significant dalay in MIRAIC development, the provincial government of Lanao del Norte requested the central government to prioritize the Alternative Fuel Investment Project (AFIP[10]) and received approval. Then, the provincial government put more importance on its development priority. As a result, the Linamon－Matungao－Balo-i section was judged to be a promising route because of its direct connections to AFIP site in addition to MIRAIC[11], as access roads were seen as important for AFIP promotion.

With regard to around 7km reduction in output of c. Kauswagan－Munai section, it is explained that the Philippine National Army and an anti-government armed group of Mindanao[12] began fighting around the project sites during the project implementation, which made it difficult to carry out construction. It was extremely difficult to implement the extension work beyond 19km. Thus, it excluded from the project scope. At the time of the ex-post evaluation, the DPWH is carrying out the construction of the out of the project scope's section (approx. 7km) with its own funds and the construction will complete soon.

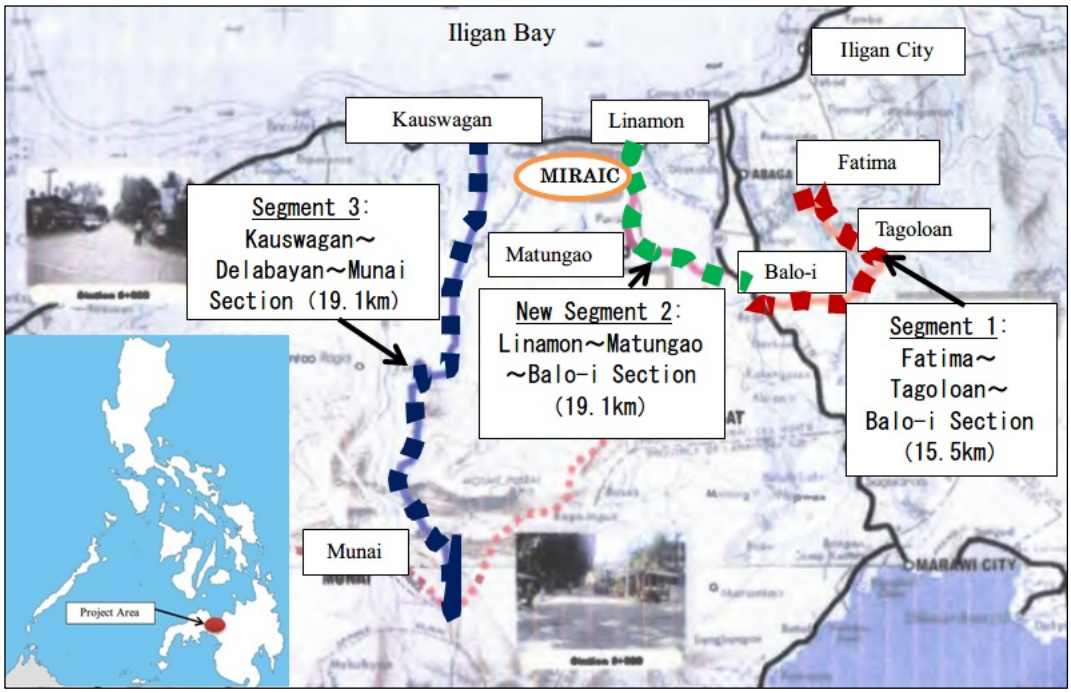
In terms of the total length of road under the project, there is not much difference between the plan at the time of the appraisal and the actual output at the time of the ex-post evaluation. (approx. 54km and 53km respectively.) Approximately 41km of road under the section a., b., and part of c., was recategorized from provincial roads to national roads before the completion

[10] While the development of MIRAIC was delayed, decisions were made to promote AFIP (in 2007) because Congress passed the Biofuel Act and the Renewable Energy Act while energy prices were shooting up. More specifically, as situations surrounding fossil fuel security were not stable in the Philippines, the need was recognized to utilize renewable and sustainable energy sources available in the country, thereby becoming less dependent on oil imports, reduce greenhouse effect gas, increase employment and improve livelihoods in the region, and to introduce alternative and/or renewable energies that do not affect ecosystems and food supply. Plantation of Jatropha (Jatropha curcas) as a biofuel material was then planned. However, at the time of the ex-post evaluation, the priority given to AFIP within the provincial government of Lanao del Norte was not as high as before. This is because energy prices gradually came down after 2007, when AFIP was very much talked about (e.g., the diesel price of 2007 was about 50 pesos per liter, which was about 30 pesos per liter at the time of the ex-post evaluation), and stable supply of fuel has become possible without planting Jatropha through the purchase of low-price fuels.

[11] When the project scope changed, it was expected that surrounding areas would benefit from further economic effects had MIRAIC and AFIP materialized.

[12] More specifically, it is the Moro Islamic Liberation Front (MILF).

of this project (June 2010). Accordingly, the operation and maintenance for the relevant roads were being managed by the DPWH and not by the provincial government of Lanao del Norte after the completion of this project. The remaining section under c (approx. 12km) is categorized as a provincial road, and the provincial government of Lanao del Norte continued to be responsible for the operation and maintenance. This arrangement was a result of discussion and mutual understanding between the provincial government of Lanao del Norte and the DPWH. It was agreed that the DPWH, having more staff and financial resources, should take on more responsibility for the necessary and timely operation and maintenance of the completed sections[13] .




Source: The provincial government of Lanao del Norte.

Figure 1: Locations of Project Sites

② Small-Scale Hydropower Facility (Liangan)

The small-scale hydropower facility became out of the project scope based on the agreement between Japanese and Philippine governments in March 2006. The reasons were as follows: 1) although its detailed design was completed in January 2006, it took longer than expected to finalize necessary documentation at the Philippine side and to build consensus among relevant

[13] According to the DPWH and the provincial government of Lanao del Norte, there was no problem with the transfer of responsibility for the 41km section and that the process went smoothly.

institutions; and 2) the Philippine government faced financial difficulty at that time and was unable to allocate necessary budget in a timely manner to complete the construction of this facility within the loan disbursement period.

③ Monitoring Equipment

This component was cancelled because the provincial government of Lanao del Norte faced financial difficulty and needed to prioritize road construction over procurement of monitoring equipment.

④ Consulting Services

As a result of the changes and reduction of the project scope described above, the inputs became less than the initial plan.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Cost

While the total project cost was estimated to be 5,567 million yen at the time of the project appraisal (of which Japanese ODA Loan was 4,333 million yen), the actual total project cost was 3,650 million yen (of which Japanese ODA Loan was 3,068 million yen); thus the actual cost was 66% of the plan[14]. As mentioned earlier, the construction of small-scale hydropower facility was out of the project scope. Monitoring equipment were cancelled from this project, while the road component was partially changed and input for the consulting service was reduced. Although the road scope changed its routes during the implementation period, the output is almost as planned. Therefore, it can be said that efficiency in terms of project cost is high, considering the inputs (project cost) versus the outputs[15].

#### 3.2.2.2 Project Period

At the time of the appraisal, the project period was planned as six years and 10 months (82 months) from September 1998 to June 2005. The actual project period was 11 years and 10

[14] Since actual land acquisition and administration cost are not clear, the total of main contract amount and consulting services fee is compared only.

[15] Since total project planned cost was not revised at the time of scope change, comparison was made between the originally planned project cost and the actual cost. The attempted calculation of planned project cost based on the revised scope is 4,333 million yen. Even in this case, the actual project cost became within the planned project cost. (84% as of plan)

months (142 months) from September 1998 to June 2010[16], which was longer than planned (173% of the plan). The main reasons for the delay are: 1) the Asian financial crisis began right after the start of this project and affected the budget approvals within the Philippine government, causing delays in selecting consultants and procurement processes; 2) the security situation of some road project sites deteriorated due to the conflict between the Philippine National Army and a guerrilla organization, which delayed construction; and 3) negotiations with landowners near the road project sites were prolonged, causing delays in land acquisition. Although the project was influenced by unpredictable factors such as revisions in the project scope, it can be said that the project lacked efficiency in terms of project period considering the outputs, particularly, in the situation that there is no major changes in total length of road under the project.

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

Economic Internal Rate of Return (EIRR)

At the time of the project appraisal, 1) the economic internal rate of return (EIRR) for the provincial road paving and widening was calculated as 16.1%, taking the reduction in automobile driving costs and the increase in agricultural production as benefits, and construction cost and maintenance cost as costs, with a project life of 20 years. 2) The financial internal rate of return (FIRR) of the small-scale hydropower facility was calculated as 16.4%, taking sales of electricity as a benefit and construction cost and maintenance cost as costs, with the project life of 50 years. At the time of ex-post evaluation, internal rates of return were not re-calculated for the following reasons: 1) the project scope significantly changed during the project implementation and EIRR is not calculated thus comparison with original and actual EIRR is meaningless, for no initial rate exists for the newly identified section; and 2) the small-scale hydropower facility became out of the project scope.

Although the project cost was within the plan, the project period exceeded it. Therefore, efficiency of the project is fair.

### 3.3 Effectiveness[17] (Rating:②)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

[16] The completion of the project was defined as the date of completion of road construction (June 2010).
[17] Sub-rating for effectiveness is to be put with the consideration of impact.

1) Annual Average Daily Traffic Volume

Since no baseline and target were set at the time of the project appraisal, it is not possible to conduct comparative analysis of target and outcome[18]. On the other hand, Table 2 shows data on annual average daily traffic volume for the sections targeted by this project. Actual figures are available from 2012 as measured by the Lanao del Norte Provincial Engineering Office (PEO) from the provincial government of Lanao del Norte and the DPWH's District Engineering Offices, responsible for the operation and maintenance of these sections.

Table 2: Baseline, Target and Actual for Annual Average Daily Traffic Volume

(Unit: No. of vehicles per day)

| Target Section | Baseline | Target | Actual | | |
|---|---|---|---|---|---|
| | 1998 | | 2012 | 2013 | 2015 |
| a. Fatima － Tagoloan － Balo-i section (15.5km) | No data | Not set | 15,114* | 12,478* | N/A |
| b. Linamon － Matungao －Balo-i section (19.1km) | No data | Not set | 1,615** | 1,655** | N/A |
| c. Kauswagan － Delabayan － Munai section (19.1km) | No data | Not set | 1,851 | N/A | 2,018 *** |

Source: Lanao del Norte Provincial Engineering Office (PEO), the DPWH's First and Second Lanao del Norte District Engineering Offices.
Note*: The point at which traffic volume was measured by the DPWH intersects with the national road near Balo-i (which is not targeted by this project and where traffic volume is large); thus these figures may not accurately reflect the traffic volumes of the sections targeted by this project.
Note**: Traffic data for the 10.8km out of this section.
Note***: Traffic data measured only for this section in 2015.There is no data for 2014.

Out of the three sections targeted by this project, it was impossible for vehicles to pass Section a. and Section c. before the start of the project. According to the DPWH's Lanao del Norte District Engineering Offices responsible for these sections, the roads were narrow, unpaved and muddy, and not like standard roads; they were mainly used by horses and cattle for transporting goods with not many vehicles seen. On the other hand, through the interviews with the provincial government of Lanao del Norte and the DPWH's District Engineering Offices and a beneficiary survey, which is discussed later in this report, it was confirmed that traffic volumes increased on all of these sections after the completion of the project in 2010.

The traffic volume of the section a. (actual) was measured where it intersects a national trunk road[19] near Balo-i; thus strictly speaking, it cannot be taken as a traffic volume of this project. Traffic volumes were not measured in the project sites. According to the DPWH's District

[18] Meanwhile, substitute data such as "changes in the number of registered vehicles" was utilized as indicators to be analyzed.
[19] National trunk road was not covered by this project. The section has relatively heavy traffic.

Engineering Office, the traffic volume reduced from 15,114 vehicles per day in 2012 to 12,478 vehicles per day in 2013 because construction was underway along the surrounding roads that connected to the national trunk road and vehicles were making a detour. Although traffic volume was not measured in 2014, the DPWH's District Engineering Office observed a 10-15% increase in traffic volume compared to 2012. According to the Office the traffic volume will continue to increase, in accordance with the population increase and economy growth in the surrounding areas.

It was confirmed through interviews with the above-mentioned offices that traffic volumes have also been increasing every year in sections b. and c. As described in Section 3.4.2.3 under Impacts, the population has been gradually increasing in the areas near the targeted sections since the completion of this project, as with more people who wished to engage in agriculture. Interviews with residents and drivers also confirmed that freight transportation of daily goods as well as agricultural products was improving, as was the access to public facilities; thus traffic volumes is expected to keep increasing.

Table 3 shows changes in the number of registered vehicles (total) and industrial trucks in the Northern Mindanao (Region X), which includes the province of Lanao del Norte, after the completion of this project. The number of registered vehicles has increased every year, and it can be presumed that the number of passing vehicles also increases. Considering the fact that the figures and trends shown in Table 3 include the number of registered vehicles in the areas targeted by this project, traffic volumes of the targeted roads are also thought to be increasing. Furthermore, taking account of the fact that the number of registered industrial trucks has also increased according to the same table, it can be presumed that an increase in traffic volumes will vitalize the social economy of the region, thereby supporting the improvement of productivity in agriculture, as one of the main industries.

Table 3: Changes in the Number of Registered Vehicles in Northern Mindanao (Region X)

(Unit: No. of vehicles)

| | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|
| Registered Automobiles (Total) | 219,946 | 226,354 | 246,880 | 264,139 |
| Of which, Industrial Trucks | 16,499 | 17,354 | 19,016 | 19,802 |

Source: The Land Transportation Office, Northern Mindanao (Region X), the Department of Transportation and Communications.

2) Travel Time

No baselines and targets were set regarding the travel time. The actual values at the time of the ex-post evaluation are shown in Table 4. Before the start of this project, it was not possible for vehicles to pass along a. Fatima－Tagoloan－Balo-i section. After the completion of the project, vehicles could travel the section in 15 minutes. As for b. Linamon－Matungao－Balo-i section, although vehicles were able to pass this road before the project, it used to take about two hours. After project completion, vehicles could travel the section in 20 minutes. Regarding c. Kauswagan－Delabayan－Munai section, it took two hours to travel from Kauswagan to Delabayan, and it was not possible for vehicles to pass along the Delabayan－Munai section. At the time of the ex-post evaluation, vehicles could travel the entire section in 15 minutes. Therefore, it can be said that vehicle accessibility has significantly improved by the road construction of the Project. All in all, it can be judged that travel time has significantly reduced in each of the targeted sections.

Table 4: Baseline, Target and Actual

(Unit: Minutes)

| Targeted Section | Baseline | Target | Actual |
|---|---|---|---|
| | 1998 | | After 2011 |
| a. Fatima － Tagoloan － Balo-i section (15.5km) | No data. | Not set. | 15 |
| b. Linamon － Matungao － Balo-i section (19.1km) | No data. | Not set. | 20 |
| c. Kauswagan － Delabayan － Munai (19.1km) | No data. | Not set. | 15 |

Source: Answers to the questionnaires, actual measurements during the field survey.

Photo 3: Fatima － Tagoloan － Balo-i Section

Photo 4: Linamon－Matungao－Balo-i Section

3) (Reference) Small-Scale Hydropower Facility

The effects of the small-scale hydropower facility construction were not measured in this evaluation study because it became out of project scope. For reference purposes only, data on power supply in the province of Lanao del Norte for the period of the completion of the project through the ex-post evaluation are provided.

Table 5: Data on Power Supply in the Province of Lanao del Norte

(Unit: MW)

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Peak Power Demand | 12.52 | 12.09 | 12.86 | 13.51 | 14.25 | 15.09 | 15.57 |
| Power Supply Capacity | 7.63 | 7.93 | 11.57 | 9.06 | 8.94 | 5.30 | 5.30 |

Source: Lanao del Norte Electric Cooperative, Inc. (LANECO).

In the province of Lanao del Norte, power supply is in a difficult situation because power demand (peak time) exceeds the power supply capacity. Meanwhile, the existing hydropower facilities are old.[20] In order to bridge the gap, the province relies on electricity purchased from other regions. Constructing the power facility that had excluded from the project scope would address the issue of stable power supply and promotion of MIRAIC[21], and therefore considered an urgent task for the province.

3.3.2 Qualitative Effects

1) Comfort of Travel through Road Construction

Through the road construction of this project, comfort of road travel has also been improved with shorter travel time. Several drivers of the three sections commented when interviewed: “It is comfortable to travel this road. I can travel to places in a short time. Transportation of goods has also become smooth.” The DPWH’s District Engineering Offices and the provincial government of Lanao del Norte were also interviewed and pointed out that it had become easy to travel within and outside of the region. Therefore, it can be presumed that road construction of this project has contributed to the improvement in terms of travel comfort within and outside the area.

[20] At the time of the ex-post evaluation, the province of Lanao del Norte mainly relied on electricity supplied by hydropower facilities along the Agus River. More specifically, hydropower stations owned by the National Power Corporation (NAPOCOR) are supplying power to this province. However, most of these facilities were constructed in 1950s to 1970s and are quite old.

[21] According to the provincial government of Lanao del Norte, introduction of such hydropower facility will enable companies and residents to benefit from cheaper electricity supply.

As part of this evaluation study, drivers and people living near the three sections targeted by this project (Fatima－Tagoloan－Balo-i, Linamon－Matungao－Balo-i and Kauswagan－Delabayan－Munai) were interviewed by using questionnaire. Drivers who have been driving in this area for more than five years and residents who have lived near the project sites for more than five years were targeted[22]. The results concerning the level of satisfaction with this project, reduction in travel time and increase in traffic volumes are shown and analyzed in Figures 2–4.

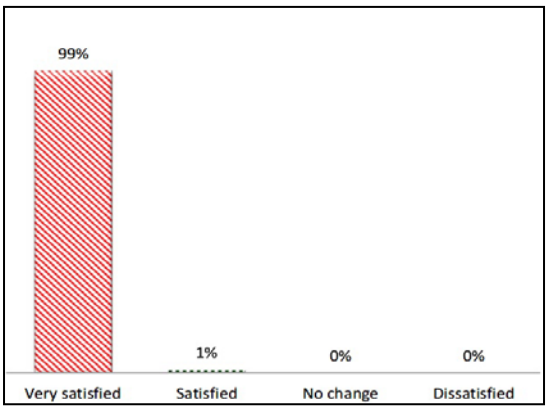



Figure 2: Are You Satisfied with this Project? (107 valid responses, residents and drivers)

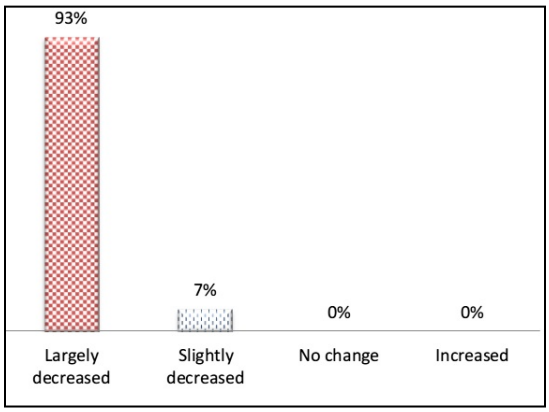



Figure 3: Do You Think Travel Time has Reduced for this Section? (107 valid responses, residents and drivers)

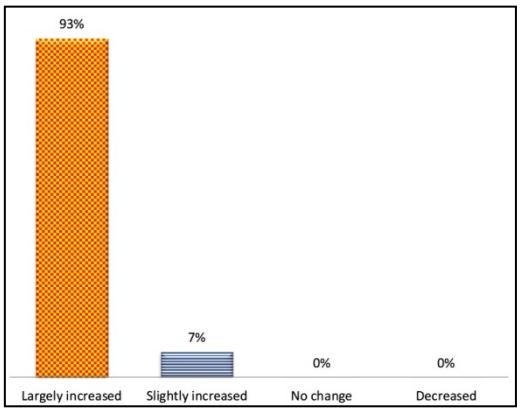



Figure 4: Do You Think that Traffic Volume has Increased in this Section after this Project? (107 valid responses, residents and drivers)

[22] The intention was to measure effects and impacts by interviewing those who would know the difference between before and after the project. The target respondents of 107 were selected from the surrounding seven Barangays (local village) of the three sections of the project. The respondents were: (1) residents: (sex) 27% male, 73% female; (age) 32% were 15-30 years old, 34% were 31-45 years old, 24% were 46-60 years old, and 10% were 61 or older; (occupation) 48% agriculture, 27% housewife, 11% public servant, 7% business owners, and 7% unemployed; (residency period) average 25.6 years. (2) Drivers: (sex) 100% male, 0% female; (age) 18% were 15-25 years old, 31% were 26-35 years old, 22% were 36-45 years old, 9% were 46-55 years old, and 20% were 56 or older; (driving experience) on average 14.6 years of driving experience. Samples were targeted to residents and drivers of the three sections, and respondents were interviewed using a questionnaire at local Barangay's community centers. Residents and drivers do not overlap.

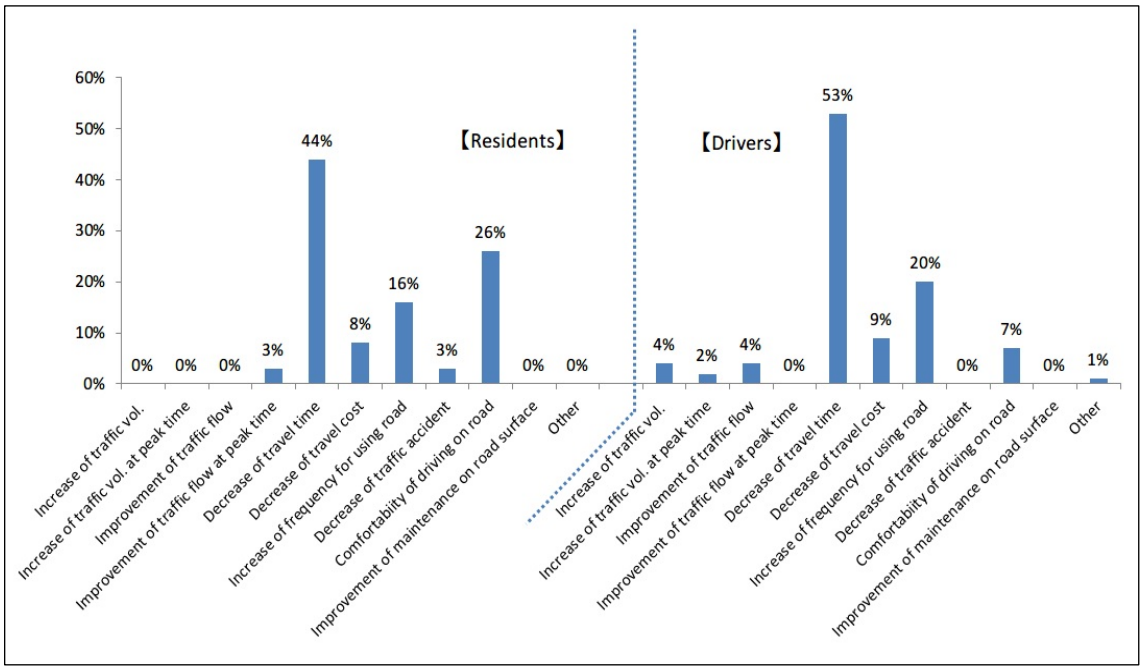



Figure 5: What is the Most Prominent Effect of this Project?
(Number of valid responses: 62 residents and 45 drivers)

As shown in Figure 2, the levels of satisfaction with this project were generally high among the residents and drivers. Furthermore, as shown in Figure 3 and Figure 4, the majority said that traffic volumes have increased and travel time has reduced, suggesting that effects that were intended by this project through road construction have been achieved. Figure 5 shows the most prominent effect observed in relation to road construction. Many respondents pointed out the reduction in travel time and more frequent use of the road. Based on these answers, it can be judged that convenience of transportation has been high and accessibility around the project sites has also improved.

2) Training in Japan (as part of Consulting Services)

Training was organized in Japan for the provincial government staff of Lanao del Norte as part of the consulting services of this project. The training was planned just after the project started, and five people from the provincial government of Lanao del Norte participated in 2002. The training was for two months. It covered tendering processes and the management procedure concerning road construction, the promotion of local products (publicizing locally produced products, such as the One Village, One Product movement), business matching and field visits to road construction sites. Interviews were conducted with the people who participated in the training. There were a few comments such as: “There are opportunities to utilize the experiences

we gained through this training in relevant divisions, including public relations and industrial development. We hope to contribute to promoting MIRAIC and attracting companies to MIRAIC in the future." Based on these comments, it can be judged that the staff members promoted better understanding of road projects and promotion of local products through participation of this training, and it can be presumed that the experience will be utilized for the progress of MIRAIC.

### 3.4 Impacts

3.4.1 Intended Impacts

3.4.1.1 Contribution to the Regional Economy and Social Development

① Qualitative Effects

Using the method described in Section 3.3.2 Qualitative Effects, a beneficiary survey was conducted to assess the impact of this project. In this survey questions were asked in relation to improvements in transportation of agricultural products, public transportation services, employment opportunities and living conditions through this project. The results are shown in Figures 6-9.

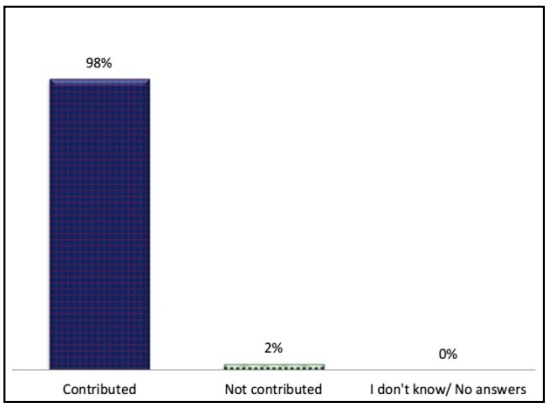



Figure 6: Do You Think this Project Contributes to Increase Transportation of Agricultural Products? (45 valid responses, only drivers)

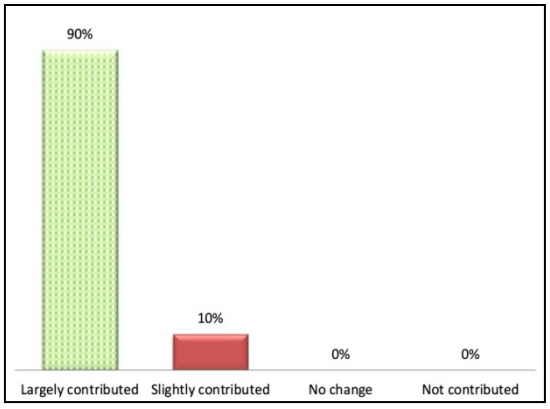



Figure 7: Do You Think this Project Contributes to the Improvements of Public Transport Service (e.g., Public Buses) in Terms of Frequency and More Routes? (62 valid responses, only residents)

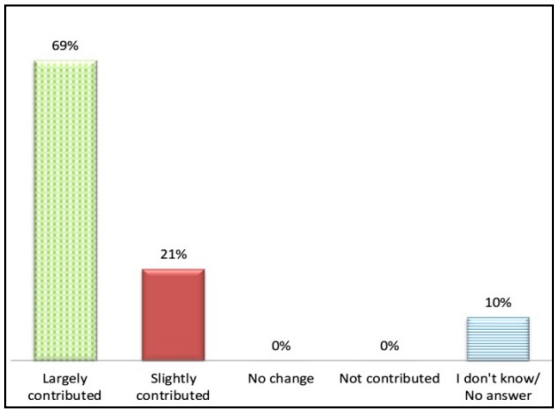



Figure 8: Do You Think this Project Contributes to the Increase in Employment Opportunities?
(62 valid responses, only residents)

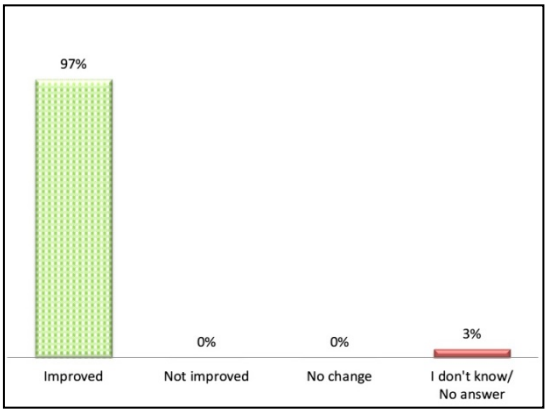



Figure 9: Do You Think the Quality of Life Improved After the Completion of this Project Compared to Before?
(62 valid responses, only residents)

As shown in Figures 6-8, impacts of road construction include the project's contribution to the increase in transportation of agricultural crops, more frequent and better routes for public transport services (e.g., public buses), and an increase in employment opportunities. Furthermore, as shown in Figure 9, a high percentage of local residents felt their quality of life improved after the completion of this project. More specifically, household income and security have improved and that interactions between neighbors have been promoted; thus, it can be presumed that the road construction of this project has contributed to such improvements.

② Quantitative Effects

Table 6 shows data on main agricultural production in Northern Mindanao from the completion of this project until the ex-post evaluation. The main agricultural crops of the Northern Mindanao (Region X), including the province of Lanao del Norte, are corn, coconuts, rice and coffee beans. The production of all of these crops has increased during the period except for coffee beans in 2012 and rice and corn in 2013[23]. Although it is difficult to prove if this project directly caused such changes, it is possible to think that it made the transportation of agricultural inputs such as seeds, seedlings and fertilizer easier, reduced the cost of transporting agricultural products, and supported gradual improvements in agricultural productivity.

[23] The reason for the drop between 2012 and 2013 can be a super typhoon (BOPHA or Pablo), which directly hit Mindanao at the end of 2012.

Table 6: Production Amount about Main Agricultural Crops of Northern Mindanao (Region X)

(Unit: tons)

| Agricultural Crop | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Rice | 583,297 | 586,442 | 610,990 | 637,348 | 490,367 | 713,764 |
| Corn | 1,170,624 | 1,153,239 | 1,212,208 | 1,228,754 | 1,185,036 | 1,196,542 |
| Coconuts | 1,743,338 | 1,757,165 | 1,745,950 | 1,816,570 | 1,816,577 | 1,838,405 |
| Coffee Beans | 6,016 | 5,857 | 5,858 | 5,225 | 5,335 | 5,415 |

Source: The Bureau of Agricultural Statistics (BAS).

Table 7 shows average annual household income[24] in the Northern Mindanao (Region X), including the province of Lanao del Norte, for reference purposes. It can be observed that the income has increased over the last 10 years. It can be presumed that the road construction of this project has improved access to markets, thereby contributing to the improvement of residents' and household incomes.

(Reference) Table 7: Average Annual Household Income in the Northern Mindanao (Region X)

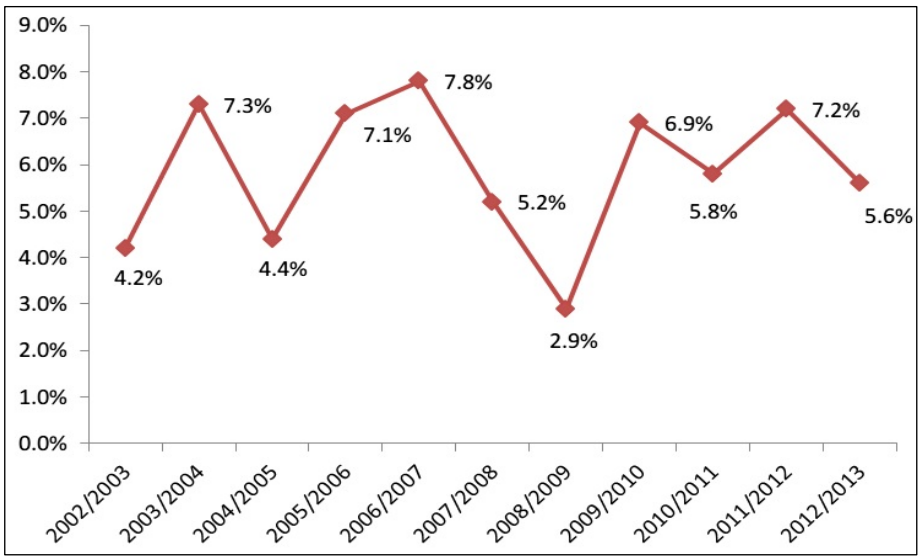
(Unit: Philippine peso)

| 2003 | 2006 | 2009 | 2012 |
|---|---|---|---|
| 80,397 | 142,000 | 167,000 | 190,000 |

Source: The Philippine Statistics Authority (PSA)[25].

Figure 10 shows the changes in gross regional domestic product (GRDP) growth in the Northern Mindanao (Region X). It has been more or less higher than 5% for the last 10 years. Although it is difficult to prove if this project directly caused it, it can be presumed that the project contributed to the vitalization of the regional economy.

[24] The main industry of the Northern Mindanao, including the areas targeted by this project, is agriculture.
[25] PSA conducts survey on average household income every three years.




Source: The Philippine Statistics Authority (PSA).

Figure 10: Gross Regional Domestic Product (GRDP) Growth Rate of the Northern Mindanao (Region X)[26]

(Progress of MIRAIC and the Relationship with this Project)

The corn drying facility mentioned in Section 3.1.2 (Relevance to the Development Needs of the Philippines) is being constructed at the time of the ex-post evaluation, using funds from the provincial government of Lanao del Norte. The provincial government expects the construction and operation of this facility, which addresses the needs of farmers, will lead to the promotion of MIRAIC and attract private companies to the region. According to the DTI Iligan Office, there is a wood processing (furniture) factory and a coconut cake factory near MIRAIC, which are both expanding. If they grow further, it is possible these factories may move to MIRAIC in the future. Considering the trends of recent years, while the roads constructed under this project have not directly affected the number of companies doing businesses in MIRAIC at the time of the ex-post evaluation, it is possible the markets for agricultural products will expand and the number of companies in MIRAIC will increase, thereby vitalizing the economy of the province of Lanao del Norte.

### 3.4.2 Other Impacts

#### 3.4.2.1 Impacts on the Natural Environment

It has been confirmed through the questionnaires and interviews with the provincial government of Lanao del Norte and the DPWH's District Engineering Offices that there were no

[26] The drops during 2007-2009 are presumably due to the global financial crisis.

negative impacts on the natural environment, including air pollution, noise and vibrations during project implementation and after the completion of this project[27].

#### 3.4.2.2 Land Acquisition and Resettlement

There was no resettlement in this project. Land acquisition was necessary for the Linamon－Matungao－Balo-i section (New Segment 2). As per the law of the Philippines, the provincial government of Lanao del Norte and the municipalities were responsible in the land acquisition. More specifically, 70 people received compensation for the Fatima－Tagoloan－Balo-i section, 132 people for the Linamon－Matungao－Balo-i section, and 135 people for the Kauswagan－Delabayan－Munai section[28]. Although the land acquisition took time, it was confirmed through the questionnaires and interviews with the above-mentioned government offices that the process had finished by the time this project was completed.

#### 3.4.2.3 Other Positive and Negative Impacts (Increase of the Resident Population near Project Sites)

Table 8 shows the actual (2000 and 2010) and estimated (2018) populations of different municipalities near the sites of this project. It can be seen from the table that population growth rate of the municipalities related to this project is generally higher than the others in the province of Lanao del Norte. The Barangay head of Balo-i commented in an interview during the field survey: “In our Barangay the population has increased at least by 30-40% after completion of the road in 2010. Many people came from other areas to settle here, acquired land and started agriculture.” It is thus presumed that this project has contributed to the increase in number of settlers and the number of people engaged in agriculture.

[27] Barangay heads near the project sites were also interviewed during the field visits. It was confirmed through these interviews that there had been no negative environmental impacts during the project implementation nor after project completion and that there had been no negative comments from the local residents.

[28] It was difficult to capture the amount of compensation (in some cases compensation was paid, and in other cases taxes were exempt. Furthermore, there were cases where residents provided the municipality with land free of charge. There were also smaller cases where compensation was paid for crops, trees in gardens and fences. Thus, it is extremely difficult to capture the entire picture, and data provided by the municipalities were also limited.)

Table 8: Populations of Municipalities around the Project site,
The Province of Lanao del Norte and Other Municipalities (Total)

(Unit: No. of people)

| Municipality | 2000 (Actual) | 2010 (Actual) | 2018 (Estimated) |
|---|---|---|---|
| Balo-i | 38,534 | 50,387 (30.7%) | 62,445 (62.0%) |
| Kauswagan | 15,364 | 24,006 (56.2%) | 34,306 (123.2%) |
| Linamon | 14,959 | 17,484 (16.8%) | 19,808 (32.4%) |
| Matungao | 9,266 | 12,217 (31.8%) | 15,241 (64.4%) |
| Munai | 15,972 | 27,600 (72.8%) | 42,751 (167.6%) |
| Tagoloan | 8,233 | 11,674 (41.7%) | 15,437 (87.5%) |
| Others (total) | 655,795 | 787,370 (20.0%) | 901,557 (37.4%) |
| The Province of Lanao del Norte (total) | 758,123 | 930,738 (22.7%) | 1,091,725 (44.0%) |

Source: The National Statistics Office (NSO).
Note: Figures in brackets indicate the rate of increase (actual for 2010 and estimate for 2018) from 2000.

In addition, an official from the Philippine National Army based near the project sites commented, “I think the security situation improved in the surrounding areas due to the road opening. Mindanao anti-government armed groups used to clash with the National Army frequently before the completion of this project. However, the group’s activities became limited with the road opening, and they stepped back to the mountains. We do not know the exact number, but some of the members have left the armed group and become farmers. As the Mindanao peace process progresses, fighters are beginning to lose their motives to fight.” Based on such a comment, it can be thought that this project has made a contribution toward security improvements, promotion of discharge from the armed group and engagement in agriculture.

【Summary of Effectiveness and Impacts】

In terms of quantitative effect data, such as annual average daily traffic volumes, a comparative analysis cannot be run on actual values as baselines and targets were not set at the time of appraisal and the time of the scope change. However, through the interviews with the provincial government of Lanao del Norte and the DPWH’s District Engineering Offices, it was confirmed that traffic volumes have increased in all sections since the completion of this project

in 2010. The travel time for each section has also reduced to 15-20 minutes. Accessibility has dramatically improved, with more convenient routes and a smooth traffic flow. It was also confirmed that traffic volumes have increased and travel time has reduced through the beneficiary survey. In addition, there is an increase in transport of agricultural products and employment opportunities, the improved access and convenience. Furthermore, this project has contributed to the increase in the number of settlers, security improvements and the peace process. Nevertheless, no new companies have yet established business in MIRAIC at the time of the ex-post evaluation, which was the initial objective of the project. In other words, there is no progress in attracting private investment in MIRAIC, which is an issue that the provincial government of Lanao del Norte should continue to work on. Thus, this project has to some extent achieved its objectives. Therefore, the effectiveness and impact of the project are fair.

### 3.5 Sustainability (Rating: ③)

#### 3.5.1 Institutional Aspects of Operation and Maintenance

The executing agency of this project is the provincial government of Lanao del Norte. Main component of this project was paving and widening roads. The DPWH is responsible for the operation and maintenance of the national roads and the provincial government of Lanao del Norte is responsible for the provincial roads. The DPWH's First and Second Lanao del Norte District Engineering Offices operate and maintain national road of 41km under the project, while the Lanao del Norte Provincial Engineering Office operates and maintains provincial road of 12km under the project.

At the time of the ex-post evaluation, the DPWH's First and Second Lanao del Norte District Engineering Offices have 119 staff members, while the Lanao del Norte Provincial Engineering Office has 96 staff members[29]. Through questionnaires and interviews with the DPWH's First and Second Lanao del Norte District Engineering Offices and the Lanao del Norte Provincial Engineering Office, it was confirmed that sufficient numbers of operation and maintenance personnel, including engineers, supervisors and workers, have been allocated. The number of staff has been increasing every year because of the increase in road construction and rehabilitation projects in the province of Lanao del Norte in recent years[30].

[29] This number includes the people responsible for the operation and maintenance of roads and bridges not targeted by this project.
[30] At the time of the ex-post evaluation, demands for road development were high and road construction is being undertaken in many places, not just in the province of Lanao del Norte but across Mindanao.

Operation and maintenance works by the above-mentioned offices include cleaning and fixing paved roads and bridges, repairing dents, removing weeds, retaining walls and slope protection and maintaining traffic signs. It was confirmed through site inspections and interviews that the offices own their machinery and properly utilize them (e.g., loaders, trucks etc.).

The reasons why the part of provincial roads under the project were categorized to national roads are as described above, and no concerns were observed in terms of operation and maintenance through interviews with the DPWH and the provincial government of Lanao del Norte. Furthermore, the DPWH's First and Second Lanao del Norte District Engineering Offices and Lanao del Norte Provincial Engineering Office share information and collaborate with one another. For example, they borrow and lend maintenance machinery such as loaders and backhoes as needed each other.

Based on the above, it is thought there are no problems in the institutional aspects of operation and maintenance.

### 3.5.2 Technical Aspects of Operation and Maintenance

The DPWH's First and Second Lanao del Norte District Engineering Offices and Lanao del Norte Provincial Engineering Office, which are responsible for the roads and bridges constructed by the Project, have experienced members of staff. It was confirmed that these staff members are fully aware of how to operate heavy machinery and vehicles[31].

With regard to training, a variety of courses are provided in both organizations. For example, annual training courses are held on topics such as technical inspections of bridges, maintenance, road repair, maintenance of retaining walls of roads, prevention of accidents caused by slippery road conditions and detailed engineering design. In addition, on-the-job training is implemented at each organization. Whenever a worker is recruited, on-the-job training is given so that the knowledge, skills and information about maintenance are shared in a consistent manner. Furthermore, it was confirmed through interviews with both of these organizations that maintenance manuals are in place and utilized as needed.

Based on the above, it is thought that there are no major problems in the technical aspects of the operation and maintenance of this project.

[31] Regarding the work experience of operation and maintenance staff, at Lanao del Norte Provincial Engineering Office more than 75% of its staff have experience of 10 years or more, while at the DPWH's First and Second Lanao del Norte District Engineering Offices more than 50% of the staff members have experience of 15 years or more. Therefore, it can be said the operation and maintenance is carried out by experienced staff.

### 3.5.3 Financial Aspects of Operation and Maintenance

The operation and maintenance budgets of the DPWH's First and Second Lanao del Norte District Engineering Offices as well as the Lanao del Norte Provincial Engineering Office are shown in Table 9.

Table 9: Operation and Maintenance Budgets for this Project (last four years)

(Unit: Thousand Philippine peso)

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| The DPWH's First Lanao del Norte District Engineering Office | 17,039 | 17,092 | 31,236 | 31,259 |
| The DPWH's Second Lanao del Norte District Engineering Office | 6,000 | 16,368 | 47,527 | 45,325 |
| Lanao del Norte Provincial Engineering Office | 417 | 417 | 668 | 584 |

Source: Answers of the organizations listed above.
*Note: The operation and maintenance budgets of the DPWH's First and Second Lanao del Norte District Engineering Offices indicated above are for the entire operations, while the budget of Lanao del Norte Provincial Engineering Office is only for the targeted 12km.

Management of the DPWH's First and Second Lanao del Norte District Engineering Offices and the Lanao del Norte Provincial Engineering Office commented in interviews: "Taking account of the number of road extensions and bridges, our budgets of recent years are enough for the needed work. There were some years when a smaller amount was allocated[32]; however, we do not feel that there is any particular shortage." This is presumably because sufficient budgets were recently allocated to operation and maintenance, given the high demand for road development in the province of Lanao del Norte. As discussed in Section 3.5.1 Institutional Aspects of Operation and Maintenance, the numbers of staff are increasing and according to the interviews the budgets are not of particular concern.

Therefore, it can be considered that there are no major problems in the financial aspects of the operation and maintenance of this project.

[32] The DPWH's operation and maintenance budgets are calculated by multiplying the equivalent maintenance kilometer (EMK) indicator, determined by the type of paving, status, width, traffic volumes and so on, by the EMK basic cost. Road-related budgets of the province of Lanao del Norte are also calculated yearly, based on the DPWH's EMK.

### 3.5.4 Current Status of Operation and Maintenance

The DPWH's First and Second Lanao del Norte District Engineering Offices and the Lanao del Norte Provincial Engineering Office carry out similar tasks related to operation and maintenance. As described above, tasks such as protection of road surface and shoulders, pavement, retaining wall and slope, maintenance of traffic signs, cleaning and weed removal are carried out daily or regularly. Both the offices develop maintenance plans and carry out their work based on the plans. It was confirmed by interviewing maintenance staff that there are no major problems at the time of the ex-post evaluation.

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

## 4. Conclusion, Lessons Learned and Recommendations

### 4.1 Conclusion

This project rehabilitated and widened existing roads in MIRAIC located in the province of Lanao del Norte in Mindanao Island, with a view to smoothing traffic flow. It is consistent with the regional economic development policy such as the Cagayan de Oro-Iligan Corridor Initiative and the Northern Mindanao Regional Development Plan. It is also in line with the development needs for extending road networks and with Japan's assistance policy. Thus, relevance is high. Regarding efficiency, the development of a small-scale hydropower facility which was part of original plan was deleted from the project scope. As a result, the actual project cost was lower than planned. It can be judged that scale of project's inputs related to road construction was appropriate considering the change in route during the project implementation. However, the project period was significantly longer than planned due to delays in budget allocation from the Philippine government as well as delays in construction caused by addressing higher security risks near project sites. Thus, efficiency is judged to be fair. Through field visits and interviews with Lanao del Norte District Engineering Offices and district engineering offices of the DPWH during this ex-post evaluation study, it was confirmed that the traffic volume increased and traffic access improved after the completion of the project as a result of the road rehabilitation and shortening the travel time to 15-20 minutes in all road sections. In addition, positive impacts were confirmed through a beneficiary survey, which showed beneficiaries' satisfaction with the

roads, improvement of access and convenience, increase in transportation of agricultural products and employment opportunities. However, considering the fact that no private companies have yet invested in MIRAIC at the time of the ex-post evaluation, the effectiveness and impact are fair. No particular problems are observed in the institutional, technical and financial aspects of the operation and maintenance of this project; thus, sustainability of the project's effects is high.

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

## 4.2 Recommendations

### 4.2.1 Recommendations to the Executing Agency

・As progress of MIRAIC is limited for, the provincial government of Lanao del Norte is making efforts to attract private companies by providing incentives to potential investors. It is recommended that such efforts will be continued by providing information, publicizing, promoting in collaboration with other organizations like the DTI.

・Data on traffic volumes is not collected every year for the road sections targeted by this project. It is suggested that the DPWH's First and Second Lanao del Norte District Engineering Offices as well as the Lanao del Norte Provincial Engineering Office should regularly measure and keep the record of traffic volumes, thereby capturing the project's effects and impacts.

## 4.3 Lessons Learned

Necessity of Setting Quantitative Effect Indicators at Appraisal and at the Time of Project Scope Change

At the time of the appraisal and scope change, quantitative indicators and targets were not set. With a view to properly measuring project effects, it would have been necessary for JICA and the executing agency to set indicators, including baselines and targets, for the core components such as road sections and the small-scale hydropower facility (e.g., annual average daily traffic volume after project completion, travel time, net electric energy production, etc.) as much as possible, thereby making efforts to monitor the project effect based on the agreed indicators, through the mutual agreements throughout the project implementation.

Comparison of the Original and Actual Scope of the Project

| Item | Plan | Actual |
|---|---|---|
| 1.Project Outputs | 1) Paving and widening of provincial roads, renewal of a bridge (two-lane)<br>a. Patag － Tagoloan － Balo-i section (17.1km) (Segment 1)<br>b. Pantao Ragat－Balo-i section (10.9km) (Segment 2)<br>c. Kauswagan － Delabayan － Munai section (26.4km) (Segment 3) | 1) Paving and widening of provincial and national roads, renewal of a bridge (two-lane)<br>a. Changed to Fatima－Tagoloan －Balo-i section (15.5km) (Segment 1)<br>b. Changed to Linamon － Matungao － Balo-i section (19.1km)→(New Segment 2)<br>c. Kauswagan － Delabayan － Munai section (19.1km) (Segment 3) |
| | 2) Small-Scale Hydropower Facility (Liangan)<br>a. In-flow type with the capacity of 11.9MW<br>b. Facilities: power generating facilities, diversion weir, intake facility, water pipes, surge tank, headrace, transmission line, substation and access roads | 2) Small-Scale Hydropower Facility (Liangan)<br>a. and b. Out of project scope[33] |
| | 3) Monitoring Equipment<br>a. Vehicles and communication equipment | 3) Monitoring Equipment<br>a. Cancelled[34] |
| | 4) Consulting Service<br>a. Review of the detailed design, assisting tendering processes and supervising construction concerning the provincial roads.<br>b. Formulation of land use and development plans for the province of Lanao del Norte.<br>c. Training in Japan for officials of the provincial government of Lanao del Norte and surrounding municipalities.<br>d. Reviewing detail design for the small-scale hydropower facility, assisting tendering processes and supervising construction | 4) Consulting Service<br>a. Implemented (M/M reduced)<br>b. Implemented (M/M reduced)<br>c. Implemented<br>d. Only the detailed design was conducted. |
| 2.Project Period | September 1998 - June 2005 (82 months) | September 1998 - June 2010 (142 months) |

[33] Same as footnote 8, page 7.
[34] Same as footnote 9, page 7.

| | | |
|---|---|---|
| 3.Project Cost<br>Amount Paid in Foreign Currency | 3,771 million yen | 357 million yen |
| Amount Paid in Local Currency | 1,999 million yen | 3,293 million yen |
| Total | 5,770 million yen | 3,650 million yen |
| Japanese ODA Loan Portion<br>Exchange Rate | 4,328 million yen<br>1 PHP=3.5JPY<br>I USD=121 JPY<br>(As of September 1998) | 3,068 million yen<br>1 PHP=2.19JPY<br>I USD=110JPY<br>(Average during the project implementation. Source: International Financial Statistics, IMF) |