

Ex-Ante Evaluation (for Japanese ODA Loan)**1. Name of the Project**

Country: Independent State of Papua New Guinea

Project: Nadzab Airport Redevelopment Project

Loan Agreement: October 14, 2015

Loan amount: 26,942 million yen

Borrower: Government of the Independent State of Papua New Guinea

2. Background and Necessity of the Project**(1) Current State and Issues of the Aviation Sector in Papua New Guinea**

The air transport plays its vital role in transportation of people in Papua New Guinea since the country is comprised of over 600 small and large islands, the Island of New Guinea, where the country's capital, Lae, and other major cities are located, has 3,000-meter mountains, and more than 80% of the entire population (7.3 million) lives in rural areas. The project site, Lae City, has the second largest population (about 120,000) following the country's capital, Port Moresby, and serves as a collection point for crops harvested in Morobe Province and the Highland area. As Lae City is home to the Port of Lae, that boasts the country's largest volume of cargo, and is connected to the Highland area where a number of natural resource development projects are taking place, it functions as a base of local industry and distribution. The Nadzab Airport (Runway length: 2,438 m) located on the outskirts of the Lae City, handles the country's second-largest number of domestic passengers and serves as a domestic hub airport for the northern area.

The passenger demand over a five-year period (2008-2012) at Nadzab Airport showed high annual growth at nearly 13%. In 2012, the number of domestic passengers reached 330,000, which is considered the capacity limit for the existing passenger terminal building. However, because carry-on luggage and security inspections are done manually, there is huge confusion during peak times. In addition to the insufficient airport equipment, such as aeronautical lights and fire engines, the airport has an obsolete fire extinguishing system and passenger terminal building that are over 40 years old and cause problems in carrying out effective airport operation. Moreover, at the baggage claim area in the corner of the passenger terminal, the passenger flow line interacts with the cargo flow line, resulting in additional congestion.

Under the current circumstances, passenger demand at Nadzab Airport is expected to reach about 740,000 in 2026, including domestic and international passengers. As a result, the airport is expected to handle far more than the number of visitors that the existing facility can take, making further deterioration in services due to excess congestion and interacting flow lines a major concern. As the airport does not fully comply with the safety and security standards of the International Civil Aviation Organization (ICAO), new procurement of fire engines and safety inspection instruments is required, as well as upgrades to the runway, apron, and aeronautical lights.

(2) Development Policies for the Aviation Sector in Papua New Guinea and the Priority of the Project

In the Papua New Guinea Development Strategic Plan 2010-2013, and the Medium Term Development Plan 2011-2015 establishes domestic airports improvements to meet international safety standards as an urgent priority and emphasizes the need to strengthen airport functionality particularly in the Lae/Nadzab region, which is a hub for industry in the country and is undergoing growth. In addition, the National Transport Strategy 2011-2030, which is a long-term strategy for transport sector, specifies making improvements to Nadzab Airport as a nearby airport that aircraft using the Port Moresby International Airport (PMIA) can use as an alternative. .

This project upgrades the functions of the Nadzab Airport to satisfy international standards and revitalize the Lae/Nadzab district, while making the airport an alternative airport for the

PMIA, and is thus highly relevant to Papua New Guinea's development policy.

(3) Japan and JICA's Policy and Operations in the Aviation Sector

Japan also defines the aviation sector as a priority area in "strengthening the economic growth platform", a key factor in Japan's Country Assistance Policies for the Independent State of Papua New Guinea. The Country Report for Papua New Guinea determined that social and economic infrastructure development is essential. Therefore, JICA's support in implementing the Project is highly relevant to these analyses and policies. So far, JICA has provided assistance for the following projects: Port Moresby International Airport Redevelopment Project (I) and (II) (1988 and 1996; loan assistance projects), the Upgrade Project for the New Rabaul Airport (Tokua) (1995; loan assistance project), the Local Airport Development Project (2011; technical assistance related to an ODA loan), and the Airport Development Plan Formulation Assistance (2013), among others.

(4) Other Donors' Activity

The Asian Development Bank (ADB) is currently implementing the Civil Aviation Development Investment Program (CADIP) (2011–), for 21 major airports in the country, excluding Nadzab Airport. This program includes facility renovations, such as fixing runways to satisfy safety and security standards specified by ICAO, and improving operation and maintenance systems. Australia supports the improvement of aviation safety equipment at PMIA.

(5) Necessity of the Project

Therefore, the aim of the project satisfies the issues and development policies of the Papua New Guinea government as well as the assistance policies of the Government of Japan and JICA. Consequently, necessity and relevancy in implementing this project are high.

3. Project Description

(1) Project Objective(s)

The Project is to meet the future demands of air transportation at Nadzab Airport and to establish as an alternate airport for of Port Moresby (Jacksons) International Airport by accommodating large wide body jet aircrafts, constructing an international and domestic new passenger terminal building, and upgrading associated facilities. This will improve facilitation of air transportation and contribute to economic growth in Papua New Guinea.

(2) Project Site/Target Area

Lae City, Morobe Province

(3) Project Component(s)

- 1) Improving airport facilities
 - i. Civil engineering works: runway (widening and strengthening), taxiways (new construction, widening, and strengthening), apron (new construction and strengthening), roads within the airport (new construction), car park (new construction), perimeter fence and gates (new construction), and more.
 - ii. Construction works: passenger terminal building (one-story building, partially two-story; 9,900 m², new construction), administration building (new construction), cargo terminal building (refurbishment of existing passenger terminal building), fire extinguishing system (new construction), control tower (refurbishment), supply and disposal facility (power supply), drinking and sewage water facilities, and more.
 - iii. Aeronautical lights: approach lights (new construction), runway lights (upgrade), taxiway lights (new construction), and apron flood lights (upgrade), and more.
 - iv. Vehicles: chemical fire engines for airport (purchase)
- 2) Consulting services: detailed design (D/D), bidding support, construction supervision, environmental management and monitoring, and more.

(4) Estimated Project Cost (Loan Amount): 32.246 billion yen (Loan Amount: 26.942 billion yen)

(5) Schedule

Planned from October 2015 and November 2021 (74 months in total); Project completion is defined as the commencement of the service of the facilities (November 2020)

(6) Project Implementation Structure

- 1) Borrower: Government of Independent State of Papua New Guinea
- 2) Executing Agency: National Airports Corporation (NAC)
- 3) Operation and Maintenance System: NAC operates and maintains facilities within the airport (except control tower facilities). PNG Air Services Limited (PNGASL) operates the control tower facilities.

(7) Environmental and Social Considerations/Poverty Reduction/Social Development

- 1) Environmental and Social Consideration
 - i. Category: B
 - ii. Reason for Categorization: The project is neither considered to be a large-scale airport project, nor located in a sensitive area, and has none of the sensitive characteristics under the JICA guidelines for environmental and social considerations (April 2010). It is not likely to have a significant adverse impact on the environment.
 - iii. Environmental Permit: Preparation of an Environmental Impact Assessment (EIA) report is not required under domestic law. However, it is necessary to acquire an environmental permit issued by the Conservation and Environment Protection Authority (CEPA). It will be acquired before effectuation of L/A.
 - iv. Anti-Pollution Measures: No environment-related criteria is established in Papua New Guinea. However, relevant measures will be taken to address air quality, water quality, noise, vibration, and similar factors in order to satisfy the criteria of WHO and IFC by contractors during construction. Measures will include spraying water, installing machines to prevent the spread of pollution, and adopting construction methods to mitigate noise and vibration. After the handover, NAC will endeavor to take various measures to mitigate environmental impact. To maintain air quality, gas exhaust from vehicles used at airport facilities will be reduced. To maintain water quality, septic tanks will be installed in airport facilities. To mitigate noise and vibration, measures will be taken such as encouraging aviation companies to introduce low-noise aviation instruments, despite the airport being located apart from housing clusters.
 - v. Natural Environment: The project site is not located in or around sensitive areas such as national parks, and adverse impact on the natural environment is assumed to be minimal.
 - vi. Social Environment: The Project requires no land acquisition or resettlement, since new construction and renovation work will take place within the existing airport.
 - vii. Other/Monitoring: The environment will be monitored based on environmental management and environmental monitoring plans by NAC together with CEPA during the construction and after commencement of service. During the construction period, the contractor will monitor air and water quality, noise, and waste materials. After the handover, NAC will carry out monitoring.
 - viii. Other: The project site may still have unexploded ordnances (UXO) buried during World War II. Therefore, to implement construction, NAC will take responsibility to request the Ministry of Defense to cooperate in detection and clearance of UXO. If any UXO are found, it is agreed to organize an explanatory meeting for local residents and airport users.
- 2) Promotion of Poverty Reduction: NAC actively hires local residents for airport construction work and airport operation. Therefore, it is expected that this project will create jobs in this kind.
- 3) Promotion of Social Development (e.g. Gender Perspective, Measures for Infectious Diseases Including HIV/AIDS, Participatory Development, Consideration for the Person with Disability, etc.): When designing passenger terminal building, opinions from women and disabled persons will be collected as representatives of facility users

to ensure opportunities to reflect their opinions to the building design such as installation of nursing rooms, diaper changing stations, and wheelchair-accessible toilets. Hiring local women's groups for construction work and airport operation is also planned. Since the recipient government formulated a plan to make an area near the airport into an industrial park, it is planned to construct a first-aid facilities within the airport to secure space for patients to wait for ambulance transport.

During the construction, external labor forces other than local residents are likely to come to the project site. To mitigate the risk of HIV/AIDS at the project site, the project will include preventative measures in the bidding documents to urge contractors to provide prevention programs for employees.

(8) Collaboration with Other Donors: None

(9) Other Important Issues

1) Using advanced Japanese technologies

This project will effectively utilize advanced Japanese technologies to mitigate the environmental impact of airport operation and maintenance. For example, energy-saving air conditioning systems, LED lights, and eco-friendly drinking and sewage water systems will be introduced.

2) Benefits of mitigating impacts due to climate change

As stated above, in addition to the effective use of eco-friendly technologies, this project allows international aviation companies to reduce fuel loaded in their aircrafts by selecting Nadzab Airport as an alternative airport to PMIA, thereby improving fuel efficiency and reducing CO₂. Since emissions vary according to aviation companies and aircrafts used, calculating the quantitative effects of emission reduction is difficult. However, this project will likely make a significant contribution to mitigating climate change by reducing emissions together with the use of Japanese technologies.

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicator)

| Indicator | Baseline (Actual Value in 2012) | Target (2023) Expected value 3 years after project completion* |
|-------------------------------------|---------------------------------------|--|
| Annual Number of Passengers | 328,000 (domestic passengers only) | 666,000 (Including domestic and international passengers) |
| Annual Cargo Volume (Metric Ton) | 2,900 (Domestic cargo only) | 5,142 (Including domestic and international cargo) |

Note: Because services are expected to begin in November 2020, statistical data for three full years will become available only after April 2023.

2) Internal Rate of Return (IRR)

Based on the conditions indicated below, the Economic Internal Rate of Return (EIRR) of this project was calculated as 15.4%, while Financial Internal Rate of Return (FIRR) was -20.1%.

【EIRR】

- Cost: project cost (excluding amount of price rise, interests during construction, and taxes) and operation and maintenance cost
- Benefit: relief of loss in terms of; business opportunities for Papua New Guinea nationals, consumption by foreign travelers, airport revenues, domestic and international cargo trade opportunities, diversion flights operated by local airlines.
- Project Life: 30 years after commencement of operation

【FIRR】

- Cost: project cost, operation and maintenance cost

- Benefit: airport revenue (landing fees, terminal facility charges, airport security fees, etc.), revenue from non-aviation activities (other sales revenue)
- Project Life: 30 years after commencement of operation

(2) Qualitative Effects

Upgrading of service and safety level of airport, Promotion of business activities in Morobe region, Improvement of energy consumption from aircrafts using PMIA.

5. External Factors and Risk Control

None

6. Lessons Learned from Past Projects

ODA loan assistance program, Port Moresby International Airport Redevelopment Project (I) and (II) resulted about 50% in excess of the project cost initially estimated. The reasons are reviewed budget estimates in the course of detailed design after establishment of the first loan agreement and a price escalation by nearly 40%. The risk of a price escalation increases in the case of project delays. Therefore, the project includes a 10% reserve fund to account.

7. Plans for Future Evaluation

(1) Indicators to be Used:

- 1) Annual Number of Passengers
- 2) Annual Cargo Volume
- 3) EIRR (%)
- 4) FIRR (%)

(2) Timing:

Three years after project completion