

CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

4-1 Project Effect

The direct beneficiaries of the Project are farmers in AMRIS district. The population of the farmer is about 19,000 as of the year 2000. It is considered that the other population of AMRIS district excluding farmers, and people in BLACAN province also benefit indirectly from the Project. The total population of AMRIS district and BLACAN province amounts to 1,270,000 and 2,600,000, respectively.

In addition, the following specific effects are expected from the Project.

(1) Stability of the Angat Regulator Dam

In case proper countermeasures are not taken for the damaged portions of the existing apron, the riverbed scouring in the downstream channel will be tremendously facilitated during the forthcoming flood, causing further damages on the upstream structures. As a result, the main dam structure might be in a critical condition in the near future. Provided that a comprehensive measure is urgently taken for the problem portions by the Project, such serious situation will be avoided and the dam safety will be secured.

(2) Stabilization of Water Intake for Irrigation from Angat River

If the dam body is damaged due to the erosion on the downstream structures, drastic measures might be taken to restore the structure to its original condition. In the mean time, the operation of intake facilities will be restricted, resulting in a difficulty of water intake from the Angat River. As a result, the irrigated area in AMRIS will be seriously affected. In order to prevent the damage caused by the suspension of irrigation, the dam and intake facilities have to be normally operated under any conditions. In this sense, implementation of the Project will be a grate contribution to AMRIS area.

(3) Cost Reduction Effect for Maintenance and Reconstruction

NIA has been implementing the rehabilitation and improvement works for the dam facilities using the roan from the World Bank and their own budget. However, effective measures to recover the original function of structure had not been taken because of the limitation of budget. It is expected that the costs required for rehabilitation and improvement works which would be repeated in the future, be saved if a permanent measure is taken through this Project. The saving of those costs

could be regarded as a kind of project benefit. Assuming the project facilities are used for the period of 30 years, the project benefit cost will be estimated as much as 8.0 billion Japanese Yen (refer to Table 4-1).

(4) Flood Control Effect

In case that the regulator dam was seriously damaged due to the collapse of the downstream structures, the dam would be of no flood control effect, bringing about flood damages in the up and downstream areas. With the implementation of the Project, the flood control effect can be maintained and flood damages in the area will be prevented.

Regarding the flood control in the downstream, the proposed stilling pool on the first and second aprons will play a key role in preventing the concentration of flood flow in the downstream channel and smoothing flood flow. Consequently, riverbed scouring will be reduced.

(5) Effective Dam Operation and Management

Efficiency and accuracy of gate operation will be improved by adopting the exclusive radio system connecting the dam operation rooms of right and left banks and the management office. Effective maintenance of the project facilities is also expected by using equipment such as a warning siren and search light, and a reservoir watching boat.

4-2 Recommendations

Recommendations for the smooth implementation of the Project are as follows:

(1) Before the Construction

(a) Land Acquisition

There exist some private lands in the downstream river area on the right bank. A part of the land is used for the construction site for the new groundsill and training dike. Before the construction, the target land should be acquired through the necessary compensation procedure.

(b) Spoil Band

The site for dumping of spoil material should be prepared before the construction. The river area downstream from the right bank training dike is proposed for the site.

(2) During Construction

(a) Gate Operation

During the construction of downstream groundsill, the site will be enclosed by temporary cofferdam. To make the site dried, the water coming from the upstream of construction site has to be kept away by means of proper rubber gate operation. The flow from the rubber dam should be allowed only for the opposite side of the construction site.

- (b) Control of Reservoir Water Level during Construction of Riverbank Protection In building the riverbank protection in the upstream of right intake gate, the lower the reservoir water level is kept, the safer and more reliable construction can be performed. A period during which the water level can be lowered is limited to a month of May. The reservoir water level should be lowered to EL.15.00 m in this month, so that the major works of riverbank protection be done. For this purpose, the proper measure regarding reservoir management including gate operation should be taken.

(c) Countermeasure against Flood during Construction

Since the major works are done in the river channel, construction for the works is carried out only in the period of dry season (November to May). However, there is a possibility of flood even during dry season. Appropriate countermeasures against flood should be taken in ahead.

(d) Construction and Environment

Having a good water quality, the riverfront areas in the upstream and downstream of the regulator dam are widely utilized as the river activities such as fishing, bathing, strolling, washing and so on. An effort should be made to prevent deterioration of river water quality during the construction works in the river channel.

(e) Layout Plan for Temporary Facilities for Construction

The area adjacent to the left riverbank of downstream could be the best site for concrete plants, concrete block production yard and other temporary facilities for construction. However, since a part of the area belongs to some private land owners, permission for use or compensation for the land will be required.

(f) Reuse of Stones in Existing Gabions

A large amount of stones in the existing gabions should be reused as much as possible for the Project.

(3) After the Construction

(a) Operation and Maintenance

Operation and maintenance after completion of the Project is indispensable in order to assure the beneficial effects/functions of project facilities for a long time. The major maintenance works are periodical and routine inspection over the project facilities, removal of sediment and aquatic plant, periodical survey of downstream channel and so on. In case any damages on facilities are found, repair should be made promptly.

(b) Memorandum of Agreement on Dam Safety

To safeguard the Angat Afterbay Regulator Dam from any damages brought about by natural and man-made disaster and calamities, a memorandum of agreement (MOA) was exchanged among NIA, the Department of Environment and Natural Resources (DENR), the Philippine National Police (PNP) and the Municipal Government of Bulacan. The contents of the MOA should be strictly implemented from now on.

(c) Operation and Management of

The current gate operation is performed based only on the water level gauge installed at the reservoir of Angat Afterbay Regulator Dam by NPC. Water level data observed at Angat Dam and Norzagaray stations are not transmitted to the Angat Afterbay Regulator Dam. If those data are used at the Angat Afterbay Regulator Dam, an effective gate operation can be performed. It is desirable that the data transmission system connecting the above three stations should be established.

Table 4-1 ECONOMIC ANALYSIS OF THE PROJECT

Unit : 1000 peso

No.	No. of Year	Year	Investment cost	Project Benefit				Cash Flow	EIRR(%)	Present Value	
				Decreased OM cost	Decreased Restoration Cost	Decreased reconstruction Cost	Total			Cost	Benefit
0		2001	123,370					-26,739		123,370	0
1		2002	318,846					-318,846		268,728	0
2	1	2003	59,085	67,142	21,411	8,078	96,631	37,546		41,970	68,641
3	2	2004		67,142	21,411	8,078	96,631	96,631		0	57,851
4	3	2005		67,142	21,411	8,078	96,631	96,631		0	48,758
5	4	2006		67,142	21,411	8,078	96,631	96,631		0	41,094
6	5	2007		67,142	21,411	8,078	96,631	96,631		0	34,635
7	6	2008		67,142	21,411	8,078	96,631	96,631		0	29,191
8	7	2009		67,142	21,411	8,078	96,631	96,631		0	24,602
9	8	2010		67,142	21,411	8,078	96,631	96,631		0	20,735
10	9	2011		67,142	21,411	8,078	96,631	96,631		0	17,476
11	10	2012		67,142	21,411	8,078	96,631	96,631		0	14,729
12	11	2013		67,142	21,411	8,078	96,631	96,631		0	12,414
13	12	2014		67,142	21,411	8,078	96,631	96,631		0	10,463
14	13	2015		67,142	21,411	8,078	96,631	96,631		0	8,818
15	14	2016		67,142	21,411	8,078	96,631	96,631		0	7,432
16	15	2017		67,142	21,411	8,078	96,631	96,631		0	6,264
17	16	2018		67,142	21,411	8,078	96,631	96,631		0	5,279
18	17	2019		67,142	21,411	8,078	96,631	96,631		0	4,449
19	18	2020		67,142	21,411	8,078	96,631	96,631		0	3,750
20	19	2021		67,142	21,411	8,078	96,631	96,631		0	3,161
21	20	2022		67,142	21,411	8,078	96,631	96,631		0	2,664
22	21	2023		67,142	21,411	8,078	96,631	96,631		0	2,245
23	22	2024		67,142	21,411	8,078	96,631	96,631		0	1,892
24	23	2025		67,142	21,411	8,078	96,631	96,631		0	1,595
25	24	2026		67,142	21,411	8,078	96,631	96,631		0	1,344
26	25	2027		67,142	21,411	8,078	96,631	96,631		0	1,133
27	26	2028		67,142	21,411	8,078	96,631	96,631		0	955
28	27	2029		67,142	21,411	8,078	96,631	96,631		0	805
29	28	2030		67,142	21,411	8,078	96,631	96,631		0	678
30	29	2031		67,142	21,411	8,078	96,631	96,631		0	572
31	30	2032		67,142	21,411	8,078	96,631	96,631		0	482
Total			501,301	2,014,261	642,334	242,334	2,898,929	2,494,259	0	434,068	434,103

*/ Costs and benefits above excluded tax for economic prices.

=8,001 Million JPY