IX. ECONOMIC EVALUATION

STUDY
ON
ILOG-HILABANGAN RIVER BASIN FLOOD CONTROL PROJECT

SUPPORTING REPORT IX. ECONOMIC EVALUATON

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1. INTRODUCTION

1.1 Flood Damage and Flood Control Benefit

Flood damage in general consists of tangible and intangible damages, and the tangible damage is further classified into direct and indirect damages. Direct damages are defined as the monetary losses, compared with what would be expected without floods, and the monetary expenditure required, or which would be required, to restore the flood damaged assets/property to its pre-flood condition. Indirect damages include the net monetary cost of evacuation, relocation, lost wages, lost production, and lost sales. Intangible flood damages are defined as flood effects which cannot be measured in monetary terms. Table IX-1-1 presents the damage calssification applied in the Philippines, the source of which is Guide to Flood Damage Survey & Evaluation of Losses and Benefit, 1988, DPWH.

In the study area, the direct damage is to be inflicted on the agricultural crops of sugarcane and paddy, aquaculture crops of prawns and milkfish, residential houses and non-residential buildings together with their indoor movables, and infrastructure facilities such as roads and railways. Flood damage on other agricultural crops is not considered because it is negligibly small judging from their occupied areas and low productivity.

According to the above-said Guide, flood control benefit is also classified into tangible and intangible benefits. The former is evaluated in monetary terms while the latter is assessed only in the descriptive manner. Assumptions (in percentage) are applied for calculation of some items in the tangible benefit. (Refer to Table IX-1-2.) In this study, the benefits are obtained in the calculative manner without applying such assumptions because they cannot be duly justified due to inadequate back-data in the objective river basin and surrounding areas.

1.2 Fundamentals for Evaluation

The Master Plan was formulated to protect the flood prone area from a 100-year return period flood at the maximum, and its economic viability was assessed on the basis of annual average benefit and economic project cost. Basic conditions for project evaluation are summarized below.

(1) Annual average benefit or potential flood damage is calculated by the mesh unit (500 m x 500 m) in accordance with the flood inundation analysis.

(2) Target completion year is fixed at the year 2020, and project life is assumed to be until 2050, considering the durable life of facilities to be installed.

(3) Project benefit is estimated on the development stage in the target completion year of 2020.

(4) Price level for all the monetary calculations is November 1990, and the conversion rates of currencies are US$1.00 = ¥130 = ₱28.00 (₱1.00 = ¥4.64).

2. ANNUAL AVERAGE BENEFIT

Flood control benefit is defined as the reduction of potential flood damage attributed to the design works. The reduction is obtained as the difference between the estimated flood damages under the the with- and the without-the-project situations.

2.1 Mesh Data in the Flood Prone Area

The flood prone area or the beneficial area is limited to the lowest reaches of about 125 km^2, which is divided into 500 meshes. The land use and assets in each mesh were identified for the following items by examining the topographic map with a scale of 1:5,000 prepared by JICA in 1990. The detailed mesh data are presented in Table IX-2-1.

Item	Particulars	Total
Land Use	Sugarcane	56.6 km^2
	Wet paddy	15.6 km^2
	Fishpond	25.4 km^2
	Coco, Nipa	9.6 km^2
	Orchard	0.4 km^2
	Forest	0.5 km^2
	Residential	5.9 km^2
	River channel	5.6 km^2
	Unused	5.4 km^2
House/Building	Residential houses	9,771 units
	Non-residential bldgs.	1,482 units
Infrastructure	National road	44.3 km
	Provincial road	104.2 km
	Barangay road	91.8 km
	Railway (for sugarcane)	48.6 km
	Irrigation channel	134.3 km

2.2 Value of Properties Vulnerable to Flood Damage

All the properties in the flood prone area may be vulnerable to flood damage. Their economic value to be assigned for the monetary computation, referred to as "damagable value" is as discussed below.

(1) Agriculture and Aquaculture

The degree of damage on crops varies from month to month, depending on the cropping pattern and when flooding occurs. Therefore, the annual average damagable value of crops per hectare should be taken, and this is estimated as an aggregate of the expected net income and accumulated expenditure for the production spent until the time when flood takes place, where flood frequency and cultivated area in each month have to be taken into account, as expressed by the following formula:

$$DV = \sum_{i=Jan.}^{Dec.} CA_i \cdot FF_i \cdot \left(AC_i \cdot PC_i + NI\right)$$

where;

DV : damagable value (₱/ha)
CA : cultivated area (%)
FF : flood frequency (%)
AC : accumulated cost (%)
PC : production cost (₱/ha)
NI : net income (₱/ha)

The damagable values per hectare were thus estimated at 9,900 pesos for paddy, 28,600 pesos for sugarcane, and 32,500 pesos for aquacultural crops. Details of calculation process are set forth in Tables IX-2-2 to IX-2-4. Economic farm gate prices, as presented in Tables IX-2-5 and IX-2-6, were applied for the calculation of net income from paddy and sugarcane production.

(2) House and Building

The damagable value of house/building was estimated as the average value per unit; that is, 81,200 pesos for a residential house and 262,500 pesos for a non-residential building. This was calculated from the construction cost of a new house/building, floor area, distribution ratio and average depreciation ratio, as follows:

Class./ Quality	Const. Cost (₱/m²)	Floor Space (m²)	Depreci-ation	Distri-bution	Unit Value (₱/unit)
(Residential House)					
High Quality	4,500	100	50%	4%	9,000
Mid. Quality	3,500	60	50%	44%	46,200
Low Quality	2,500	40	50%	52%	26,000
Total				100%	81,200

Class./ Quality	Const. Cost (₱/m²)	Floor Space (m²)	Depreci-ation	Distri-bution	Unit Value (₱/unit)
(Non-residential Building)					
Mid. Quality	3,500	150	50%	100%	262,500

The basic data source for the above table is the Special Report No. 5, 1980 Census of Population and Housing, NCSO (data in Negros Occidental Province). The quality and its distribution was judged from the construction materials, and the average depreciation was calculated on the same data source as presented in Table IX-2-7.

The indoor movables or household effects are assumed to have a half value of their immovables; namely, 40,600 pesos for a residential house and 131,300 pesos for a non-residential building.

(3) Infrastructure

The unit damage value of infrastructures such as roads and railways was obtained in the same concept as the house and building, as tabulated below:

Item	Construction Cost (₱/m)	Depreciation	Unit Value (₱/m)
National Road	2,500	50%	1,250
Provincial Road	1,200	50%	600
Barangay Road	600	50%	300
Railway	1,000	50%	500
Irrigation Channel	200	50%	100

2.3 Damage Rate and Inundation Depth

The damage rates for each item vulnerable to flood damage have been determined in accordance with inundation depth, on the basis of interview at the site, flood damage records in the past and the technical standard for river and sabo works, Ministry of Construction, Japan. These rates are tabulated as follows:

Inundation Depth	Sugarcane	Paddy	Fishpond
less than 0.5 m	27%	21%	90%
0.5 m - 1.0 m	35%	24%	100%
more than 1.0 m	51%	37%	100%

Inundation Depth	House/ Building	Indoor Movables	Infra-structure
less than 0.5 m	5.3%	8.6%	1.0%
0.5 m - 1.0 m	7.2%	19.1%	3.0%
1.0 m - 2.0 m	10.9%	33.1%	5.0%
more than 2.0 m	15.2%	49.9%	10.0%

Inundation depth was calculated by the mesh unit for the floods of 2-, 5-, 10-, 25-, 50- and 100-year return periods as discussed in the Supporting Report V, Flood Control.

2.4 Estimate of Flood Damage

Flood Damage at the Current Development Level

Direct flood damage was calculated in the concept of [Direct Damage] = [Unit Value] x [Quantity] x [Damage Rate], which was applied for each mesh in six (6) cases of flooding conditions; 2-, 5-, 10-, 25-, 50- and 100-year return periods.

Indirect damage is considered to be loss of productivity of the affected people, which was calculated as: [Number of Affected People] x [Per Capita GDP] x [Affected Period]. (Affected period is assumed to be one week for all the flooding conditions.)

Flood damage thus calculated are summarized as follows together with the number of affected people, and the details are presented in Table IX-2-8.

Flooding in Return Period	Direct Damage (mil. ₱)	Indirect Damage (mil. ₱)	Total Damage (mil. ₱)	Affected People (person)
2-year	67.4	1.0	68.4	4,623
5-year	199.6	5.8	205.2	27,759
10-year	272.9	8.1	281.1	38,743
25-year	331.2	9.3	340.6	44,403
50-year	371.3	9.8	381.1	46,706
100-year	396.2	9.8	405.9	46,917

Note: Figures may not add up to totals due to rounding.

Flood Damage in the Future (Target Completion Year)

The present land use in the flood-prone area stands on the almost fully developed stage, so that no drastic change would be expected in the future. The most reliable data to estimate the future flood damage is the population, which reflects on direct damage on the house/building and also indirect damage estimated on the number of affected people.

The future population in the river basin is projected, as discussed in the Supporting Report I. Socio Economy, to be about 519.1 thousand in 2020, the target completion year of the Master Plan, which is about 1.497 times as much as the present population. Based on this figure and the estimated flood damage at the current development level, the flood damages in 2020 were estimated as follows, and the details are presented in Table IX-2-9.

Flooding in Return Period	Direct Damage (mil. ₱)	Indirect Damage (mil. ₱)	Total Damage (mil. ₱)	Affected People (person)
2-year	74.0	1.4	75.4	6,921
5-year	247.4	8.7	256.1	41,555
10-year	343.6	12.1	355.7	57,998
25-year	422.9	13.9	436.8	66,471
50-year	479.1	14.6	493.7	69,919
100-year	514.2	14.7	528.9	70,235

Note: Figures may not add up to totals due to rounding.

2.5 Estimate of Annual Average Benefit

Flood control benefit is defined as the damage reduction by the designed works, and its annual average has to be obtained to identify the economic viability, which is discussed in the following subsection. In calculating the annual average benefit, reference should be made to probability or frequency of flooding in such cases as mentioned above. Based on the estimated flood damages in 2020 for each probable discharge, the annual average benefit was calculated using the following formula:

$$B = \sum_{i=1}^{n} \frac{1}{2} \cdot [D(Q_{i-1}) + D(Q_i)] \cdot [P(Q_{i-1}) - P(Q_i)]$$

where;

B : annual average benefit

$D(Q_i\text{-}1), D(Q_i)$: flood damage caused by floods with Q_i-1 and Q_i discharge, respectively.

$P(Q_i\text{-}1), P(Q_i)$: probabilities of occurrence of Q_i-1 and Q_i discharges, respectively.

n : number of floods applied

The annual average benefit of the Master Plan is thus estimated at 126.6 million pesos. The calculation process is presented in Table IX-2-10.

3. ECONOMIC EVALUATION

The Master Plan has been evaluated from the economic viewpoint by figuring out the economic viability in terms of internal rate of return (IRR), benefit-cost ratio (B/C) and net present value (NPV), comparing the economic project cost and annual average benefit which may accrue in accordance with the expected cost-benefit flow in the project life.

3.1 Economic Project Cost

Economic costs of the project are nominal figures that duly reflect the true economic value of goods and services involved. These costs were used only for the economic evaluation of the project.

Transfer items such as taxes and duties imposed on construction materials and equipment, including government subsidy and contractor profit, were excluded from the elements of financial cost. It is assumed that about 20% of the financial construction cost is involved as the transfer items. The economic construction cost is thus estimated at 676.6 million pesos.

The estimated administration and engineering service costs are applied as the economic cost. Land will be acquired for project implementation, and its economic value is considered to correspond to the productivity foregone by the project, which is reflected by the estimated compensation cost. Price contingency, though physical contingency is included, is not considered in the economic cost.

3.2 Economic Viability of Alternative Study Cases

The Master Plan is put into implementation in tow phases in the following manner: Flood control works for a 25-year return period flood will be completed in the first phase as the Urgent Project, and subsequently it is upgraded to the design scale of a 100-year return period until the target year 2020.

Herein studied is the economic viability of the Master Plan as well as the Urgent Project only by comparing other cases. Study cases are set up by varying the project scale in the Phase I;

namely, 50-, 25-, 10, and 5-year return periods. Annual cost-benefit flows were prepared basically in accordance wtih the implementation schedule or annual disbursement schedule, as shown in Tables IX-3-1 (for the Master Plan) and IX-3-2 (for the Phase I only).

The benefit is assumed to accrue during the construction period because some of the completed works may bring about flood control effect to a certain degree, and to increase gradually until the target year of 2020 and keep the same level until the end of project life. The estimated operation and maintenance cost is needed annually after project completion to keep duly the designed function.

The internal rate of return (IRR) of each alternative case is summarized as follows:

Case	IRR (%) Mater Plan	Phase I
1. 50-Year to 100-Year	11.4	12.5
2. 25-Year to 100-Year	12.6	15.2
3. 10-Year to 100-Year	12.7	16.1
4. 5-Year to 100-Year	11.1	13.3

Note : No.2 is the selected case.

Among the above cases, the Master Plan has the highest IRR, and the Phase I (Urgent Project) also shows a high enough economic viability of 15.2% in IRR.

3.3 Economic Viability of the Master Plan

The economic viability of the Master Plan was assessed by means of IRR, B/C and NPV as mentioned above, which were calculated on the annual cost-benefit flow. A discount rate of 10% was applied for the calculation of B/C and NPV. The economic viability was figured out as follows:

IRR	:	12.6%
B/C	:	1.266
NPV	:	68.55 million pesos

3.4 Sensitivity Analysis

Sensitivity analysis of the above-said economic viability was carried out on several cases of changes in both the project benefit and economic construction cost as summarized below.

Case	IRR (%)	B/C	NPV (mil. P)
1. Project benefit 10% down	11.4	1.139	35.90
2. Project benefit 20% down	10.1	1.013	3.25
3. Construction cost 10% up	11.6	1.161	45.20
4. Construction cost 20% up	10.7	1.072	21.85

4. PROJECT JUSTIFICATION

The IRR is the most reliable tool to economically justify a project and the borderlinein this kind of infrastructure project is generally around 10%. The economic viability analysis for the Master Plan shows an internal rate of return of 12.6%, and in any case of the sensitivity analysis, it is over 10% as presented above. The Master Plan is, therefore, evaluated to have an adequate economic viability.

Further, consideration is given to intangible benefits brought about by the project such as saving of invaluable human life that may possibly be lost by flooding, protection from possible injuries, and prevention of disease occurrence.

The number of people affected by a 100-year return period flood is estimated at as much as 70,000 in the year 2020, and all of them will be released from the menace of flooding by implementing the Master Plan. The Master Plan should then be put into implementation in the near future, considering the progress of development in the river basin.

TABLES

Table IX-1-1 CLASSIFICATION OF FLOOD DAMAGES IN THE PHILIPPINES

Classification			Brief Description
TANGIBLE	Direct	Class A	Destruction or damage to property caused by direct action the floodwaters and cost of clean-up.
		Class E	Expenditures caused by flood emergency such as cost of emergency flood fighting measures and the rescue, relief, care and rehabilitation of flood victims.
	Indirect	Class B	Loss of earning or loss of service due to interruption of agricultural, commercial, industrial, traffic, communications and other activities both within and outside the area subject to flooding.
		Class C	Increased expense of ususal operations.
		Class D	Depreciation of property values.
INTANGIBLE			Losses arising from interruption of normal, individual or collective social activity, mental and physical distress and to the personal risk of life and health endangered by floods, including loss of life, as well as wildlife.

Source : Guide to Flood Damage Survey & Evaluation of Losses and Benefits, 1988, DPWH

Table IX-1-2 CLASSIFICATION OF FLOOD CONTROL BENEFIT IN THE PHILIPPINES

Classification			Assumption for Calculation
TANGIBLE	Primary	Direct	(Estimation in the calculative manner)
		Indirect	5% to 20% of the direct benefit
		Land Enhancement	20% to 40% of the direct benefit
	Secondary	Secondary Stemming-From Secondary (Induced-By)	10% to 20% of the direct benefit
		Employment	15% to 20% of the construction cost
		Public	7% to 10% of the first cost of the project
INTANGIBLE			Impossible to be estimated. (Assessment in the descriptive manner)

Source : Guide to Flood Damage Survey & Evaluation of Losses and Benefits, 1988, DPWH

Table IX-2-1(1/6) DETAILED MESH DATA OF THE FLOOD PRONE AREA

NO.	X	Y	SC (ha)	WP (ha)	CN (ha)	OC (ha)	FR (ha)	RS (ha)	UU (ha)	RC (ha)	FP (ha)	HS (no.)	NB (no.)	NR (m)	PR (m)	BR (m)	RW (m)	IC (m)
1	2	13	0.3	1.2	2.8	0.0	0.0	13.0	3.2	0.2	4.3	165	33	240	530	1,180	0	0
2	3	12	2.2	0.0	11.0	0.0	0.0	0.6	10.5	0.0	0.7	49	7	0	500	0	0	0
3	3	13	0.0	0.0	5.6	0.0	0.0	0.0	2.0	2.1	14.3	19	3	0	0	0	0	0
4	3	14	1.5	2.1	6.2	0.0	0.0	0.5	1.2	0.0	13.5	7	2	0	550	0	0	0
5	3	15	0.0	0.0	5.1	0.0	0.0	1.8	0.4	0.0	17.7	5	3	0	520	0	0	400
6	4	10	0.0	0.0	0.8	0.0	0.0	0.0	17.2	0.0	7.0	0	0	0	0	0	0	0
7	4	11	0.0	0.0	5.8	0.0	0.0	0.0	4.4	11.2	3.6	24	4	0	0	0	0	0
8	4	12	0.0	0.0	10.9	0.0	0.0	0.0	0.7	0.0	13.4	31	12	0	0	0	0	0
9	4	13	0.0	0.0	0.7	0.0	0.0	0.0	1.2	0.9	22.2	0	2	0	0	0	0	0
10	4	14	0.0	0.0	6.2	0.0	0.0	0.0	0.0	1.9	16.9	8	1	0	0	0	0	0
11	4	15	0.9	0.5	13.1	0.0	0.0	1.2	0.0	0.0	9.3	10	5	0	0	260	0	240
12	4	16	15.9	4.0	2.9	0.0	0.0	1.5	0.0	0.0	0.7	21	13	0	0	1,240	0	0
13	4	17	0.0	24.1	0.0	0.0	0.0	0.2	0.0	0.0	0.7	12	4	520	430	0	0	0
14	4	18	1.8	23.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2	0	520	0	0	0	880
15	4	19	2.6	22.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9	0	510	0	0	0	180
16	5	9	0.0	0.0	0.5	0.0	0.0	0.0	20.0	0.0	4.5	0	0	0	0	0	0	0
17	5	10	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	21.1	2	1	0	0	0	0	0
18	5	11	0.0	0.0	9.0	0.0	0.0	0.0	0.0	7.4	8.6	0	0	0	0	0	0	0
19	5	12	0.0	0.0	13.8	0.0	0.0	0.0	0.3	0.0	10.9	2	0	0	0	0	0	0
20	5	13	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0	17.7	0	0	0	0	0	0	0
21	5	14	0.0	0.0	16.9	0.0	0.0	0.0	0.0	4.1	4.0	7	0	0	0	0	0	0
22	5	15	0.3	0.4	10.3	0.0	0.0	0.0	1.6	0.0	12.4	0	0	0	0	540	0	0
23	5	16	5.3	2.2	15.5	0.0	0.2	0.0	0.0	0.0	1.8	1	2	0	0	360	0	0
24	5	17	5.8	15.7	3.3	0.0	0.0	0.0	0.0	0.0	0.2	13	6	0	600	0	0	700
25	5	18	0.4	24.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2	0	0	0	0	0	660
26	5	19	8.5	15.9	0.0	0.0	0.0	0.6	0.0	0.0	0.0	7	0	0	0	140	0	620
27	5	20	5.8	12.9	0.2	0.0	0.0	6.1	0.0	0.0	0.0	97	19	520	0	280	0	880
28	6	9	0.0	0.0	3.1	0.0	0.0	0.0	0.0	4.7	17.2	0	0	0	0	0	0	0
29	6	10	0.0	0.0	2.1	0.0	0.0	0.0	0.1	2.0	20.8	1	2	0	0	0	0	0
30	6	11	0.0	0.0	10.1	0.0	0.0	0.0	1.3	8.3	5.3	0	0	0	0	0	0	0
31	6	12	0.0	0.0	17.4	0.0	0.0	0.0	0.0	6.3	1.3	4	0	0	0	0	0	0
32	6	13	0.0	0.0	11.6	0.0	0.0	0.0	0.0	1.5	11.9	16	1	0	0	0	0	0
33	6	14	0.0	0.0	18.3	0.0	0.0	0.0	0.0	3.2	3.5	9	0	0	0	0	0	0
34	6	15	0.0	0.0	21.2	0.0	0.0	0.0	0.0	3.8	0.0	0	0	0	0	0	0	0
35	6	16	8.7	1.1	12.8	0.0	0.0	1.8	0.0	0.0	0.6	34	5	0	0	740	0	0
36	6	17	6.7	13.3	1.1	0.0	0.0	3.9	0.0	0.0	0.0	52	20	0	580	0	0	220
37	6	18	0.0	23.7	1.1	0.0	0.0	0.2	0.0	0.0	0.0	6	0	0	0	0	0	1,040
38	6	19	11.0	12.2	0.0	0.0	0.0	1.8	0.0	0.0	0.0	40	2	0	0	0	0	1,660
39	6	20	1.4	0.4	0.4	0.0	0.0	22.8	0.0	0.0	0.0	258	41	940	0	0	0	0
40	7	8	0.0	0.0	0.0	0.0	0.0	0.0	8.8	0.0	16.2	0	0	0	0	0	0	0
41	7	9	0.0	0.0	0.9	0.0	0.0	0.0	0.7	3.6	19.8	0	0	0	0	0	0	0
42	7	10	0.0	0.0	1.9	0.0	0.0	0.0	1.6	1.9	19.6	0	0	0	0	0	0	0
43	7	11	0.0	0.0	14.6	0.0	0.0	0.0	0.0	2.2	8.2	0	2	0	0	0	0	0
44	7	12	0.0	0.0	17.0	0.0	0.0	0.0	0.0	7.9	0.1	13	1	0	0	0	0	0
45	7	13	0.0	0.0	19.8	0.0	0.0	0.0	0.5	3.0	1.7	15	0	0	0	0	0	0
46	7	14	0.0	0.0	6.6	0.0	0.0	0.0	0.0	0.4	18.0	0	0	0	0	0	0	0
47	7	15	0.0	0.0	10.7	0.0	0.0	0.0	0.0	0.0	14.3	3	0	0	0	0	0	0
48	7	16	6.4	0.0	15.5	0.0	0.0	0.0	0.0	1.1	2.0	5	0	0	0	700	0	0
49	7	17	3.2	7.7	11.5	0.0	0.0	2.6	0.0	0.0	0.0	51	14	0	360	300	0	0
50	7	18	1.7	18.6	0.0	0.0	0.0	3.3	0.0	1.4	0.0	59	5	700	0	0	0	300
51	7	19	19.2	0.0	0.0	0.0	0.0	4.7	0.0	1.1	0.0	37	5	620	360	280	0	0
52	7	20	23.5	1.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	4	0	0	540	0	0	760
53	7	21	9.4	1.7	0.0	0.0	2.8	0.0	11.1	0.0	0.0	0	0	0	0	0	0	100
54	8	6	0.0	0.0	0.0	0.0	0.0	0.0	15.8	0.0	9.2	0	0	0	0	0	0	0
55	8	7	0.0	0.0	1.9	0.0	0.0	0.0	1.6	0.0	21.5	0	0	0	0	0	0	0
56	8	8	0.0	0.0	3.7	0.0	0.0	0.0	1.8	0.0	19.5	0	0	0	0	0	0	0
57	8	9	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.9	21.5	0	0	0	0	0	0	0
58	8	10	0.0	0.0	1.3	0.0	0.0	0.0	0.2	0.0	23.5	0	0	0	0	0	0	0
59	8	11	0.0	0.0	4.0	0.0	0.0	0.0	7.9	0.0	13.1	3	0	0	0	0	0	0
60	8	12	0.8	0.0	5.8	0.0	0.0	0.0	0.4	5.7	12.3	25	0	0	0	0	0	0
61	8	13	4.5	0.0	13.2	0.0	0.0	2.2	0.0	5.1	0.0	31	8	0	0	560	0	0
62	8	14	0.0	0.0	11.9	0.0	0.0	0.7	0.0	4.4	8.0	29	5	0	0	500	0	0
63	8	15	0.0	0.0	11.4	0.0	0.0	0.0	1.4	1.5	10.7	8	0	0	0	0	0	0
64	8	1	3.3	0.0	14.4	0.0	1.3	0.0	3.8	1.8	0.4	1	0	0	0	200	0	0
65	8	17	10.3	8.0	5.8	0.0	0.0	0.9	0.0	0.0	0.0	23	2	100	160	640	0	0
66	8	18	7.0	15.9	0.0	0.0	0.0	1.6	0.0	0.5	0.0	18	0	0	0	180	0	540
67	8	19	13.6	10.5	0.0	0.0	0.0	0.0	0.4	0.5	0.0	9	0	0	0	0	0	440
68	8	20	23.7	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	7	0	0	500	0	0	0
69	8	21	17.6	0.0	0.6	0.0	0.0	0.0	6.8	0.0	0.0	5	0	0	540	0	0	0
70	9	6	0.0	0.0	0.2	0.0	0.0	0.0	1.5	3.2	20.1	2	3	0	0	0	0	0
71	9	7	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	24.1	0	0	0	0	0	0	0
72	9	8	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	24.1	0	0	0	0	0	0	0
73	9	9	0.0	1.6	0.0	0.0	0.0	0.0	0.7	3.3	19.4	0	0	0	0	0	0	0
74	9	10	4.4	0.0	0.0	0.0	0.0	0.0	6.9	0.6	13.1	1	0	0	0	0	0	0
75	9	11	11.7	0.0	0.0	0.0	0.0	0.0	8.9	0.0	4.4	0	0	0	0	0	0	0
76	9	12	14.2	0.0	0.5	0.0	0.0	0.0	0.2	2.1	8.0	6	0	0	0	660	0	140
77	9	13	22.1	0.0	2.4	0.0	0.0	0.0	0.1	0.0	0.4	0	0	0	0	960	0	0
78	9	14	12.5	0.0	6.7	0.0	0.0	1.1	0.4	4.3	0.0	24	3	0	220	280	0	0
79	9	15	5.5	12.2	4.8	0.0	0.0	2.2	0.0	0.3	0.0	11	5	0	280	0	0	420
80	9	16	11.1	5.8	6.0	0.0	0.0	0.0	0.6	0.8	0.7	7	1	0	180	0	0	0
81	9	17	14.1	0.0	6.7	0.0	0.0	3.6	0.0	0.6	0.0	0	0	540	660	340	0	0
82	9	18	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	360	340	0	120
83	9	19	13.4	9.9	0.5	0.0	0.0	0.0	1.2	0.0	0.0	0	0	0	360	0	0	140
84	9	20	4.0	20.6	0.0	0.0	0.0	0.0	0.4	0.0	0.0	7	0	0	0	0	0	460
85	10	5	0.0	0.0	0.0	0.0	0.0	0.0	12.2	0.0	12.8	0	0	0	0	0	0	0

Note SC:Sugarcane WP:Wet Paddy CN:Coconut,Nipa OC:Orchard FR:Forest
RS:Residential UU:Unused RC:River Channel FP:Fishpond HS:House
NR:Non-residential Building NR:National Road NR:National Road PR:Provincial Road
BR:Barangay Road RW:Railway IC:Irrigation Channel

Table IX-2-1(2/6) DETAILED MESH DATA OF THE FLOOD PRONE AREA

NO.	X	Y	SC (ha)	WP (ha)	CN (ha)	OC (ha)	FR (ha)	RS (ha)	UU (ha)	RC (ha)	FP (ha)	HS (no.)	NB (no.)	NR (m)	PR (m)	BR (m)	RW (m)	IC (m)
86	10	6	0.0	0.0	4.3	0.0	0.0	0.0	1.3	3.8	15.6	4	2	0	0	0	0	0
87	10	7	0.0	0.0	2.1	0.0	0.0	0.0	8.2	4.5	10.2	5	3	0	0	0	0	0
88	10	8	0.2	3.8	11.4	0.0	0.0	0.0	1.5	2.7	5.4	27	4	0	0	0	0	0
89	10	9	4.5	3.0	5.8	0.0	0.0	0.0	5.6	0.0	6.1	17	4	0	0	0	0	0
90	10	10	22.5	0.0	1.0	0.0	0.0	0.0	1.5	0.0	0.0	14	6	0	960	0	0	0
91	10	11	18.7	0.0	3.6	0.0	0.0	0.0	1.5	1.2	0.0	1	1	0	760	0	0	0
92	10	12	12.0	0.0	6.2	0.0	0.0	0.0	0.2	4.7	1.9	4	0	0	0	0	0	0
93	10	13	10.7	0.8	9.0	0.0	0.0	0.0	0.0	2.1	2.4	15	2	0	500	0	0	0
94	10	14	18.8	0.0	3.7	0.0	0.0	1.1	0.0	1.4	0.0	19	3	0	0	1,080	0	0
95	10	15	15.1	7.5	1.4	0.0	0.0	0.0	0.0	1.0	0.0	5	0	0	900	0	0	0
96	10	16	14.1	6.3	2.8	0.0	0.0	1.8	0.0	0.0	0.0	34	4	0	890	0	0	100
97	10	17	17.4	0.0	2.6	0.0	0.0	4.4	0.0	0.6	0.0	42	22	560	400	0	0	0
98	10	18	24.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	9	3	0	0	640	900	600
99	10	19	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27	0	0	0	480	580	140
100	10	20	20.2	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4	0	0	0	680	0	500
101	11	4	0.0	0.0	0.0	0.0	0.0	0.0	15.2	0.0	9.8	0	0	0	0	0	0	0
102	11	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
103	11	6	0.0	0.0	0.8	0.0	0.0	0.0	1.0	1.8	21.4	0	0	0	0	0	0	0
104	11	7	0.0	0.0	1.9	0.0	0.9	0.0	0.1	0.0	22.1	3	0	0	0	0	0	0
105	11	8	4.5	0.0	14.1	0.0	0.0	0.0	0.0	0.8	5.6	21	3	0	0	620	0	0
106	11	9	0.0	0.0	23.4	0.0	0.0	0.0	0.1	1.5	0.0	32	10	0	0	680	0	0
107	11	10	0.0	0.0	16.7	0.0	0.0	0.0	3.6	1.8	2.9	52	11	0	0	840	0	0
108	11	11	8.9	0.0	0.0	0.0	0.0	0.0	0.7	0.3	15.1	12	0	0	0	740	0	0
109	11	12	19.9	0.0	2.4	0.0	0.0	0.0	0.6	2.1	0.0	5	0	0	0	0	0	0
110	11	13	21.8	0.0	0.3	0.0	0.0	2.4	0.0	0.5	0.0	59	7	0	500	260	0	0
111	11	14	22.5	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	40	3	0	740	320	540	0
112	11	15	16.7	5.0	1.3	0.0	0.0	0.0	0.2	1.8	0.0	5	0	0	150	700	0	0
113	11	16	22.3	2.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	12	3	0	240	980	0	0
114	11	17	24.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	8	2	280	80	660	460	0
115	11	18	15.8	8.7	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0	0	0	0	520	180	0
116	11	19	15.5	6.0	0.4	0.0	0.0	3.1	0.0	0.0	0.0	27	0	0	0	880	0	0
117	11	20	24.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5	0	0	0	1,700	0	0
118	12	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	20.7	0	0	0	0	0	0	0
119	12	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	21.6	0	0	0	0	0	0	0
120	12	6	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.1	23.4	0	0	0	0	0	0	0
121	12	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
122	12	8	8.0	1.3	3.9	0.0	0.0	0.0	1.4	0.0	10.4	1	0	0	0	160	0	0
123	12	9	1.6	0.0	0.0	0.0	0.0	2.4	1.4	1.9	17.7	92	18	0	0	1,100	0	0
124	12	10	0.0	0.0	8.4	0.0	0.0	13.3	0.2	3.1	0.0	232	71	0	1,760	0	0	0
125	12	11	1.0	0.0	10.0	0.0	0.0	13.8	0.2	0.0	0.0	115	54	0	1,540	0	0	0
126	12	12	8.3	0.0	11.3	0.0	0.0	0.0	2.1	3.3	0.0	13	1	0	20	1,100	0	0
127	12	13	23.2	0.0	1.5	0.0	0.0	0.3	0.0	0.0	0.0	9	0	0	30	400	340	0
128	12	14	24.6	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	160	220	360
129	12	15	21.4	2.5	0.8	0.0	0.0	0.0	0.3	0.0	0.0	14	1	0	0	600	0	0
130	12	16	11.7	5.7	3.1	0.0	0.0	4.1	0.4	0.0	0.0	68	10	550	0	0	940	320
131	12	17	20.0	3.3	1.0	0.0	0.0	0.6	0.1	0.0	0.0	4	4	0	0	580	360	0
132	12	18	21.6	2.7	0.0	0.0	0.0	0.7	0.0	0.0	0.0	11	0	0	570	0	0	0
133	12	19	23.6	0.5	0.0	0.0	0.0	0.0	0.7	0.2	0.0	23	0	0	380	400	0	0
134	12	20	22.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7	0	0	0	200	0	600
135	12	21	12.5	9.5	0.6	0.0	0.0	0.0	2.4	0.0	0.0	21	0	0	0	580	0	200
136	13	4	0.0	0.0	2.3	0.0	0.0	0.0	0.0	1.9	20.8	0	0	0	0	0	0	0
137	13	5	0.0	0.0	3.9	0.0	0.0	0.0	0.0	6.4	14.7	0	0	0	0	0	0	0
138	13	6	0.0	0.0	2.3	0.0	0.0	0.0	0.1	2.5	20.1	0	0	0	0	0	0	0
139	13	7	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8	24.0	0	0	0	0	0	0	0
140	13	8	12.9	0.0	0.0	0.0	0.0	0.0	1.2	0.0	10.9	0	0	0	0	0	0	0
141	13	9	14.4	0.0	9.0	0.0	0.0	1.1	0.5	0.0	0.0	32	6	380	560	0	0	0
142	13	10	13.3	0.0	2.8	0.0	0.0	7.6	0.0	1.3	0.0	49	22	280	0	0	0	0
143	13	11	11.7	0.0	10.4	0.0	0.0	1.6	0.0	1.3	0.0	46	3	0	160	0	0	0
144	13	12	23.5	0.0	0.3	0.0	0.0	0.0	0.0	1.2	0.0	13	1	0	540	600	0	0
145	13	13	24.6	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	14	2	0	540	0	1,200	100
146	13	14	24.8	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0	9	0	240	940	0	650
147	13	15	22.4	0.0	0.0	0.0	0.0	0.0	1.5	1.1	0.0	29	0	0	0	480	600	0
148	13	16	19.4	0.0	1.0	0.0	0.0	4.6	0.0	0.0	0.0	54	9	520	400	0	0	0
149	13	17	24.0	0.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0	17	2	540	0	0	620	0
150	13	18	23.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	18	3	0	0	520	360	0
151	13	19	23.0	0.0	0.4	0.0	0.0	1.3	0.0	0.3	0.0	27	0	0	360	440	0	0
152	13	20	24.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	10	0	0	0	860	0	0
153	13	21	5.8	19.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2	0	0	0	160	0	1,180
154	13	22	0.0	20.1	1.2	0.0	0.0	0.0	3.7	0.0	0.0	16	0	0	0	0	0	1,040
155	13	23	5.1	17.1	1.2	0.0	0.0	0.6	1.0	0.0	0.0	17	0	0	0	970	0	500
156	13	24	15.1	4.0	0.4	0.4	5.1	0.0	0.0	0.0	0.0	13	0	0	0	500	0	1,080
157	14	3	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	15.0	0	0	0	0	0	0	0
158	14	4	0.0	0.0	0.4	0.0	0.0	0.0	0.0	1.5	23.1	0	0	0	0	0	0	0
159	14	5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	24.7	0	0	0	0	0	0	0
160	14	6	0.0	0.0	5.6	0.0	0.0	0.0	0.0	1.8	17.6	0	0	0	0	0	0	0
161	14	7	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.1	23.4	0	0	0	0	0	0	0
162	14	8	5.6	0.0	4.3	0.0	0.0	0.1	0.0	0.0	15.0	6	0	0	120	0	0	0
163	14	9	0.0	0.0	2.6	0.0	0.0	0.6	0.2	0.0	21.6	10	2	100	480	400	0	0
164	14	10	18.0	0.0	5.1	0.0	0.0	1.2	0.0	0.7	0.0	30	3	480	0	520	0	0
165	14	11	20.5	0.0	2.6	0.0	0.0	0.0	1.2	0.7	0.0	19	1	0	0	1,340	0	0
166	14	12	23.4	0.0	0.1	0.0	0.0	0.0	0.2	1.3	0.0	3	0	0	0	0	140	0
167	14	13	20.6	0.0	2.9	0.0	0.0	0.7	0.0	0.8	0.0	13	2	0	0	380	350	0
168	14	14	13.5	0.0	6.1	0.0	0.0	4.2	0.0	1.2	0.0	79	5	0	180	780	180	0
169	14	15	20.2	0.0	1.3	0.0	0.0	3.5	0.0	0.0	0.0	47	18	0	1,100	0	0	480
170	14	16	1.8	22.0	0.8	0.0	0.0	0.4	0.0	0.0	0.0	4	0	500	540	0	0	580

Note SC:Sugarcane WP:Wet Paddy CN:Coconut,Nipa OC:Orchard FR:Forest
RS:Residential UU:Unused RC:River Channel FP:Fish Pond HS:House
NR:Non-residential Building NR:National Road NR:National Road PR:Provincial Road
BR:Barangay Road RW:Railway IC:Irrigation Channel

Table IX-2-1(3/6) DETAILED MESH DATA OF THE FLOOD PRONE AREA

NO.	X	Y	SC (ha)	WP (ha)	CN (ha)	OC (ha)	FR (ha)	RS (ha)	UU (ha)	RC (ha)	FP (ha)	HS (no.)	NB (no.)	NR (m)	PR (m)	BR (m)	RW (m)	IC (m)
171	14	17	17.7	3.9	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
172	14	18	20.1	1.5	0.0	0.0	0.0	3.4	0.0	0.0	0.0	48	8	0	280	600	0	0
173	14	19	23.7	0.6	0.0	0.0	0.0	0.5	0.0	0.2	0.0	17	0	0	540	180	0	0
174	14	20	13.1	10.0	0.5	0.0	0.0	0.0	0.0	1.4	0.0	36	0	0	420	0	0	240
175	14	21	11.9	11.5	0.0	0.0	0.0	0.0	0.0	1.6	0.0	10	0	0	280	0	0	540
176	14	22	12.1	12.6	0.0	0.0	0.0	0.3	0.0	0.0	0.0	7	0	0	420	0	0	680
177	14	23	19.5	2.1	0.2	0.0	0.0	3.2	0.0	0.0	0.0	38	6	1,040	0	0	0	1,000
178	14	24	13.8	0.0	0.0	2.2	0.0	2.7	4.6	1.7	0.0	56	3	0	1,220	260	0	0
179	15	2	0.0	0.0	0.8	0.0	0.0	0.0	17.5	0.0	6.7	0	0	0	0	0	0	0
180	15	3	0.0	0.0	0.5	0.0	0.0	0.0	0.0	2.1	22.4	0	0	0		0	0	0
181	15	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
182	15	5	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.8	22.6	0	0	0	0	0	0	0
183	15	6	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.2	24.1	1	1	0	0	0	0	0
184	15	7	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	24.1	0	0	0	0	0	0	0
185	15	8	4.3	0.0	5.9	0.0	0.0	0.0	1.0	0.0	13.8	0	0	0	0	0	0	0
186	15	9	0.0	0.0	3.7	0.0	0.0	0.0	0.1	0.0	21.2	7	0	0	160	0	0	0
187	15	10	23.4	0.0	1.1	0.0	0.0	0.0	0.5	0.0	0.0	1	0	504	520	540	0	0
188	15	11	19.0	0.0	1.3	0.0	0.0	0.0	0.0	4.7	0.0	6	0	0	860	0	0	0
189	15	12	21.0	0.0	0.0	0.0	0.0	0.5	2.0	1.5	0.0	11	3	0	0	440	0	0
190	15	13	23.0	0.0	1.1	0.0	0.0	0.7	0.0	0.2	0.0	17	2	0	0	920	0	440
191	15	14	24.0	0.0	0.2	0.0	0.0	0.8	0.0	0.0	0.0	15	0	0	0	700	540	0
192	15	15	22.6	0.0	0.5	0.0	0.0	1.9	0.0	0.0	0.0	31	2	300	140	440	0	300
193	15	16	11.9	12.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0	0	22	0	340	0	160
194	15	17	22.2	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4	0	0	560	540	0	0
195	15	18	21.3	2.2	0.0	0.0	0.0	1.5	0.0	0.0	0.0	33	0	0	880	0	0	0
196	15	19	11.6	13.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	11	0	0	0	0	0	0
197	15	20	3.3	21.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	140	0	0	1,360
198	15	21	3.8	20.9	0.0	0.0	0.0	0.2	0.0	0.1	0.0	11	0	0	550	0	0	900
199	15	22	11.7	8.4	2.9	0.0	0.0	0.7	0.0	1.3	0.0	20	0	0	440	450	0	0
200	15	23	19.7	0.0	1.2	0.0	0.0	2.9	0.0	1.2	0.0	54	9	450	0	0	0	0
201	15	24	6.9	2.4	2.5	2.0	0.0	9.3	0.8	1.1	0.0	84	18	0	1,040	640	0	620
202	16	1	0.0	0.0	1.7	0.0	0.0	0.0	16.2	0.0	7.1	0	0	0	0	0	0	0
203	16	2	0.0	0.0	3.0	0.0	0.0	0.0	0.0	3.1	18.9	0	0	0	0	0	0	0
204	16	3	0.0	0.0	4.1	0.0	0.0	0.0	0.0	7.4	13.5	1	0	0	0	0	0	0
205	16	4	0.0	0.0	7.5	0.0	0.0	0.0	0.0	13.0	4.5	0	0	0	0	0	0	0
206	16	5	0.0	0.0	14.7	0.0	0.0	0.0	0.0	7.1	3.2	0	0	0	0	0	0	0
207	16	6	1.8	0.0	4.5	0.0	0.0	0.0	0.2	6.7	11.8	0	0	0	0	0	0	0
208	16	7	0.5	0.0	3.8	0.0	0.0	0.0	0.5	7.9	12.3	9	0	0	0	0	0	0
209	16	8	1.8	0.0	2.3	0.0	0.0	0.0	0.4	7.5	13.0	3	1	0	0	0	0	0
210	16	9	16.4	0.0	3.4	0.0	0.0	0.0	0.2	0.9	4.1	6	0	0	0	340	0	0
211	16	10	0.0	0.0	1.6	0.0	0.0	1.3	0.4	2.9	18.8	25	6	280	140	640	0	0
212	16	11	14.6	0.0	1.7	0.0	0.0	2.7	0.8	5.2	0.0	49	15	380	160	280	0	0
213	16	12	15.8	0.0	0.4	0.0	0.0	2.2	0.2	6.4	0.0	36	6	0	0	740	0	0
214	16	13	24.8	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0	0	0	0	840	160	440
215	16	14	24.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0	0	0	0	660	460	960
216	16	15	22.1	0.9	2.0	0.0	0.0	0.0	0.0	0.0	0.0	6	0	500	0	460	0	440
217	16	16	20.7	4.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	1	0	0	0	400	0	940
218	16	17	23.4	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0	0	0	500	0	240
219	16	18	20.9	2.4	1.3	0.0	0.0	0.4	0.0	0.0	0.0	14	4	0	520	540	140	0
220	16	19	6.7	14.0	2.3	0.0	0.0	2.0	0.0	0.0	0.0	23	2	0	400	0	0	0
221	16	20	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
222	16	21	9.5	15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7	0	0	90	0	0	340
223	16	22	8.3	16.1	0.0	0.0	0.0	0.0	0.6	0.0	0.0	11	0	0	480	0	0	560
224	16	23	12.0	8.1	0.0	0.0	0.0	4.9	0.0	0.0	0.0	37	6	840	0	0	0	720
225	16	24	5.4	14.1	2.1	0.0	0.0	3.3	0.1	0.0	0.0	27	1	200	540	340	0	580
226	17	1	0.0	0.0	0.0	0.0	0.0	0.0	22.0	0.0	3.0	0	0	0	0	0	0	0
227	17	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	1	0	0	0	0	0	0
228	17	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
229	17	4	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	23.9	0	0	0	0	0	0	0
230	17	5	0.0	0.0	3.5	0.0	0.0	0.0	1.3	4.3	15.9	0	0	0	0	0	0	0
231	17	6	0.0	0.0	0.5	0.0	0.0	0.0	0.5	0.0	24.0	4	0	0	0	0	0	0
232	17	7	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24.8	0	0	0	0	0	0	0
233	17	8	2.6	0.0	0.0	0.0	0.0	0.0	0.3	0.4	21.7	0	0	0	0	0	0	0
234	17	9	16.5	0.0	0.5	0.0	0.0	0.6	0.1	6.1	1.2	11	5	0	200	580	0	0
235	17	10	20.0	0.0	3.0	0.0	0.0	0.0	0.0	2.0	0.0	19	1	0	485	100	0	0
236	17	11	21.4	0.0	3.2	0.0	0.0	0.0	0.4	0.0	0.0	8	2	530	0	300	0	0
237	17	12	19.2	0.0	0.2	0.0	0.0	0.0	0.2	5.4	0.0	3	0	0	0	0	120	480
238	17	13	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	360	520	340
239	17	14	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	1,100	580
240	17	15	24.6	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	1	0	530	0	0	0	640
241	17	16	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	500	0	1,300
242	17	17	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	260	0	1,040
243	17	18	24.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	500	360	340	500	640
244	17	19	16.9	3.7	0.3	0.0	0.0	4.1	0.0	0.0	0.0	48	4	0	640	160	0	720
245	17	20	9.7	14.9	0.0	0.0	0.0	0.4	0.0	0.0	0.0	7	0	0	0	0	0	0
246	17	21	17.9	1.7	0.5	0.0	0.0	4.9	0.0	0.0	0.0	32	4	0	660	0	0	0
247	17	22	20.3	1.7	0.7	0.0	0.0	2.3	0.0	0.0	0.0	37	10	480	300	0	0	0
248	17	23	16.4	8.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	11	1	140	440	0	480	970
249	17	24	0.8	24.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1	0	0	0	0	0	1,600
250	17	25	1.5	18.5	2.8	0.0	0.0	2.0	0.2	0.0	0.0	30	0	0	380	180	0	700
251	18	1	0.0	0.0	0.0	0.0	0.0	0.0	16.8	0.0	8.2	0	0	0	0	0	0	0
252	18	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	24.4	0	0	0	0	0	0	0
253	18	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
254	18	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	23.0	0	0	0	0	0	0	0
255	18	5	0.0	0.0	0.3	0.0	0.0	0.0	0.5	0.0	24.2	1	1	0	0	0	0	0

Note SC:Sugarcane WP:Wet Paddy CN:Coconut,Nipa OC:Orchard FR:Forest
RS:Residential UU:Unused RC:River Channel FP:Fish Pond HS:House
NR:Non-residential Building NR:National Road NR:National Road PR:Provincial Road
BR:Barangay Road RW:Railway IC:Irrigation Channel

Table IX-2-1(4/6) DETAILED MESH DATA OF THE FLOOD PRONE AREA

NO.	X	Y	SC (ha)	WP (ha)	CN (ha)	OC (ha)	FR (ha)	RS (ha)	UU (ha)	RC (ha)	FP (ha)	HS (no.)	NB (no.)	NR (m)	PR (m)	BR (m)	RW (m)	IC (m)
256	18	6	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	23.9	2	2	0	0	0	0	0
257	18	7	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	24.0	0	0	0	0	0	0	0
258	18	8	0.2	2.0	0.0	0.0	0.0	0.0	1.1	0.0	21.7	1	0	0	560	0	0	0
259	18	9	17.1	0.0	5.1	0.0	0.0	0.0	0.0	0.0	2.8	41	10	0	1,000	0	0	0
260	18	10	6.3	0.0	18.6	0.0	0.0	0.0	0.1	0.0	0.0	3	3	0	320	0	0	0
261	18	11	24.8	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0	0	600	460	0	0	420
262	18	12	17.4	0.0	0.4	0.0	0.0	0.0	0.0	7.2	0.0	0	0	430	0	140	0	260
263	18	13	22.7	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0	0	0	0	120	0	0
264	18	14	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	680	500	180
265	18	15	24.7	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0	0	660	0	0	0	840
266	18	16	24.2	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0	0	0	480	0	1,020	500
267	18	17	15.4	0.0	0.0	9.5	0.0	0.0	0.0	0.1	0.0	0	0	0	0	280	500	0
268	18	18	14.7	0.0	0.0	4.9	0.0	2.7	0.0	2.7	0.0	17	4	520	420	0	910	0
269	18	19	15.5	0.8	0.5	4.2	0.0	4.0	0.0	0.0	0.0	42	14	300	500	230	260	0
270	18	20	18.7	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	81	15	0	500	300	0	0
271	18	21	24.3	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	23	1	0	500	200	0	640
272	18	22	24.4	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	7	0	0	360	400	780	0
273	18	23	22.9	1.1	0.0	0.0	0.0	1.0	0.0	0.0	0.0	7	0	0	0	740	0	1,340
274	18	24	4.5	20.2	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0	0	0	0	60	0	1,520
275	18	25	0.0	24.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3	0	0	0	0	0	1,160
276	18	26	0.0	24.8	0.1	0.0	0.0	0.0	0.1	0.0	0.0	4	0	0	0	0	0	1,960
277	19	1	0.0	0.0	0.0	0.0	0.0	0.0	20.6	0.0	4.4	0	0	0	0	0	0	0
278	19	2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	24.4	0	0	0	0	0	0	0
279	19	3	0.0	0.0	0.0	0.0	0.0	0.0	2.4	5.7	16.9	0	0	0	0	0	0	0
280	19	4	0.0	0.0	0.0	0.0	0.0	0.0	2.8	6.5	15.7	1	0	0	0	0	0	0
281	19	5	0.0	0.0	0.0	0.0	0.0	0.0	1.6	6.5	16.9	1	0	0	0	0	0	0
282	19	6	0.0	0.0	0.0	0.0	0.0	0.0	3.8	2.7	18.5	4	1	0	0	0	0	0
283	19	7	0.0	0.0	0.5	0.0	0.0	0.0	0.9	2.6	21.0	0	0	0	0	0	0	0
284	19	8	1.6	2.1	0.0	0.0	0.0	0.0	1.7	0.0	19.6	1	0	0	0	0	0	0
285	19	9	23.8	0.0	0.6	0.0	0.0	0.5	0.1	0.0	0.0	10	3	0	500	100	0	0
286	19	10	24.0	0.0	0.9	0.0	0.0	0.0	0.1	0.0	0.0	3	5	0	410	0	0	0
287	19	11	23.9	0.0	0.1	0.0	0.0	0.0	1.0	0.0	0.0	0	0	500	460	0	0	760
288	19	12	24.7	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0	2	240	460	0	380	1,300
289	19	13	15.3	0.0	0.0	0.0	0.0	2.8	0.0	6.9	0.0	28	6	500	240	180	0	80
290	19	14	20.1	0.0	0.0	0.0	0.0	3.1	0.4	1.4	0.0	24	5	540	0	480	660	0
291	19	15	18.1	0.0	0.0	0.0	0.0	0.0	1.1	5.8	0.0	0	0	0	0	0	580	0
292	19	16	17.1	0.0	0.8	0.0	0.0	0.0	1.0	6.1	0.0	0	0	0	0	0	160	0
293	19	17	14.6	0.0	2.6	2.0	0.0	0.9	0.0	4.9	0.0	15	0	0	0	240	120	0
294	19	18	13.6	0.0	1.1	0.0	0.0	0.3	4.6	5.4	0.0	5	0	0	0	0	0	0
295	19	19	7.6	0.0	0.7	11.5	0.0	0.7	0.0	4.5	0.0	1	2	360	0	380	360	980
296	19	20	21.2	0.0	0.2	2.3	0.0	1.3	0.0	0.0	0.0	29	0	580	310	0	1,100	0
297	19	21	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	100	500	0	0	1,100
298	19	22	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	480	0	900	1,280
299	19	23	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4	0	0	900	0	440	1,140
300	19	24	20.3	4.6	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0	0	0	0	570	0	1,360
301	19	25	3.9	21.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	21	0	0	0	0	0	1,100
302	19	26	0.0	24.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3	0	0	0	0	0	1,620
303	19	27	5.9	13.0	0.0	0.0	0.0	6.0	0.1	0.0	0.0	64	14	0	540	220	0	1,070
304	20	2	0.0	0.0	0.0	0.0	0.0	0.0	15.5	0.0	9.5	0	0	0	0	0	0	0
305	20	3	0.0	0.0	0.0	0.0	0.0	0.0	1.7	7.8	15.5	0	0	0	0	0	0	0
306	20	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
307	20	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
308	20	6	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	24.5	0	0	0	0	0	0	0
309	20	7	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	21.5	0	0	0	0	0	0	0
310	20	8	0.0	5.1	2.5	0.0	0.0	0.0	0.0	0.0	17.4	5	0	0	0	0	0	0
311	20	9	11.2	10.2	1.1	0.0	0.0	2.0	0.2	0.0	0.3	38	9	0	860	0	0	0
312	20	10	24.8	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0	0	0	760	500	0	1,120
313	20	11	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24.8	0	0	500	380	0	0	1,320
314	20	12	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	660	0	520	900
315	20	13	24.2	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	44	0	140	0	0	0	1,100
316	20	14	12.5	0.0	1.3	0.0	0.0	6.2	0.0	5.0	0.0	94	16	640	240	160	280	360
317	20	15	18.1	1.1	0.0	0.0	0.0	5.5	0.0	0.3	0.0	61	7	0	1,050	0	0	0
318	20	16	24.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	580	0	470	0
319	20	17	21.8	0.0	2.6	0.0	0.0	0.5	0.0	0.0	0.0	12	0	0	180	0	0	0
320	20	18	17.7	0.0	0.0	0.0	0.0	0.0	1.8	5.5	0.0	13	0	0	0	180	0	0
321	20	19	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5	0	0	0	1,020	0	1,720
322	20	20	24.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0	0	0	0	1,090	440	1,440
323	20	21	24.0	0.0	0.0	0.0	0.0	0.6	0.4	0.0	0.0	9	1	520	720	340	560	510
324	20	22	23.8	0.0	0.0	0.0	0.0	0.6	0.6	0.0	0.0	11	0	520	240	0	740	1,250
325	20	23	24.4	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0	0	500	100	840	970	840
326	20	24	5.9	0.0	0.0	0.0	0.0	17.7	1.4	0.0	0.0	140	6	500	430	0	0	410
327	20	25	3.9	1.8	0.4	0.0	0.0	18.9	0.0	0.0	0.0	33	19	500	0	0	0	220
328	20	26	9.8	4.2	0.0	0.0	0.0	11.0	0.0	0.0	0.0	10	0	360	500	0	0	1,340
329	20	27	23.0	0.6	0.0	0.0	0.0	1.3	0.1	0.0	0.0	21	0	0	500	0	0	1,660
330	20	28	13.5	4.0	0.0	0.0	0.0	2.8	4.7	0.0	0.0	56	2	0	300	280	0	540
331	21	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
332	21	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	2	0	0	0	0	0	0
333	21	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
334	21	6	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24.8	2	0	0	410	0	0	0
335	21	7	0.0	2.9	1.7	0.0	0.0	2.3	0.0	0.0	18.1	77	6	0	200	160	0	0
336	21	8	11.0	3.9	3.5	0.0	0.0	1.0	0.1	0.0	5.5	41	9	0	540	0	0	0
337	21	9	12.5	3.5	7.5	0.0	0.0	1.5	0.0	0.0	0.0	24	6	0	420	380	0	0
338	21	10	22.1	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	6	0	0	1,100	0	0	580
339	21	11	24.4	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	1	0	400	660	0	0	200
340	21	12	24.8	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	600	660	660

Note SC:Sugarcane WP:Wet Paddy CN:Coconut,Nipa OC:Orchard FR:Forest
RS:Residential UU:Unused RC:River Channel FP:Fish Pond HS:House
NR:Non-residential Building NR:National Road NR:National Road PR:Provincial Road
BR:Barangay Road RW:Railway IC:Irrigation Channel

Table IX-2-1(5/6) DETAILED MESH DATA OF THE FLOOD PRONE AREA

NO.	X	Y	SC (ha)	WP (ha)	CN (ha)	OC (ha)	FR (ha)	RS (ha)	WU (ha)	RC (ha)	FP (ha)	HS (no.)	NB (no.)	NR (m)	PR (m)	BR (m)	RW (m)	IC (m)
341	21	13	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	540	600
342	21	14	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0	20	500	0	510	360
343	21	15	16.2	0.0	2.1	0.0	0.0	6.4	0.3	0.0	0.0	74	13	680	1,200	0	430	500
344	21	16	24.7	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	6	1	70	220	0	720	0
345	21	17	20.0	0.0	2.1	0.0	0.0	2.9	0.0	0.0	0.0	15	6	0	840	0	0	0
346	21	18	9.3	0.0	0.0	0.0	0.0	7.8	0.4	7.5	0.0	106	24	400	280	0	0	0
347	21	19	19.5	0.0	0.0	0.0	0.0	5.5	0.0	0.0	0.0	62	16	0	520	60	0	0
348	21	20	24.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0	0	0	540	500	0	0
349	21	21	22.7	0.8	0.0	0.0	0.0	1.5	0.0	0.0	0.0	12	2	0	0	370	520	0
350	21	22	23.5	0.0	0.2	0.0	0.0	0.0	0.0	1.3	0.0	9	1	0	900	0	0	0
351	21	23	15.8	0.0	0.1	0.0	0.0	0.0	4.9	4.2	0.0	0	0	0	0	540	0	0
352	21	24	14.8	0.0	0.0	0.2	0.0	5.6	1.8	2.6	0.0	180	15	0	0	840	0	0
353	21	25	24.4	0.0	0.2	0.0	0.0	0.0	0.4	0.0	0.0	2	0	0	0	140	0	0
354	21	26	24.8	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	3	0	420	940	0	0	640
355	21	27	24.8	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	1	0	380	1,100	0	0	1,940
356	21	28	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	1,150	0	0	540
357	22	2	0.0	0.0	0.0	0.0	0.0	0.0	16.2	0.0	8.8	0	0	0	0	0	0	0
358	22	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
359	22	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
360	22	5	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0	18.4	0	0	0	0	0	0	0
361	22	6	0.0	17.5	0.0	0.0	0.0	0.0	0.5	0.0	7.0	6	1	0	200	0	0	0
362	22	7	12.6	10.0	1.7	0.0	0.0	0.0	0.2	0.0	0.5	26	2	0	580	0	0	0
363	22	8	8.8	6.2	9.0	0.0	0.0	0.0	0.0	0.0	1.0	24	2	0	380	0	0	0
364	22	9	14.5	6.9	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	820	0	0	0
365	22	10	23.7	0.0	1.1	0.0	0.0	0.0	0.2	0.0	0.0	2	1	0	1,320	0	0	500
366	22	11	0.0	24.4	0.2	0.0	0.0	0.3	0.1	0.0	0.0	6	5	220	200	0	0	400
367	22	12	22.4	0.0	1.4	0.0	0.0	1.0	0.0	0.2	0.0	27	0	0	260	0	760	460
368	22	13	24.6	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	7	0	0	0	620	190	520
369	22	14	24.4	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	3	2	0	0	590	0	1,780
370	22	15	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	220	1,540
371	22	16	18.2	0.0	0.0	0.0	0.0	6.8	0.0	0.0	0.0	93	20	600	760	0	380	330
372	22	17	10.8	0.0	0.1	0.0	0.0	14.1	0.0	0.0	0.0	195	41	440	1,580	580	0	0
373	22	18	3.8	0.0	2.6	0.0	0.0	16.9	0.0	1.7	0.0	401	45	640	500	0	0	0
374	22	19	7.5	0.0	1.8	0.0	0.0	9.0	0.0	6.7	0.0	179	11	0	700	0	0	0
375	22	20	24.8	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0	0	0	680	800	0	0
376	22	21	21.3	0.0	0.0	0.0	0.0	0.2	0.0	3.5	0.0	6	0	200	640	0	0	0
377	22	22	21.2	0.0	0.4	0.0	0.0	0.0	0.2	3.2	0.0	13	0	0	340	160	0	0
378	22	23	24.0	0.0	0.0	0.0	0.0	0.0	0.4	0.6	0.0	0	0	0	600	900	0	0
379	22	24	20.5	0.0	0.0	0.0	0.0	0.0	0.6	3.9	0.0	0	0	0	1,200	0	360	340
380	22	25	18.7	0.0	0.0	0.0	0.0	0.9	0.4	5.0	0.0	23	0	0	360	340	0	0
381	22	26	14.8	0.0	0.0	0.0	0.0	0.0	0.6	9.6	0.0	0	0	0	700	0	0	0
382	22	27	23.0	0.0	0.0	0.0	0.4	1.5	0.1	0.0	0.0	10	9	740	260	140	540	1,320
383	22	28	22.2	0.0	0.0	0.0	0.0	2.2	0.0	0.6	0.0	11	4	0	1,470	0	130	620
384	22	29	20.5	0.0	0.0	0.0	0.0	0.0	4.0	0.5	0.0	0	0	0	0	450	0	200
385	23	2	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	10.0	4	0	0	0	0	0	0
386	23	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
387	23	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
388	23	5	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	19.7	0	0	0	0	0	0	0
389	23	6	0.0	21.5	0.9	0.0	0.0	1.0	0.0	0.0	1.6	48	8	0	400	0	0	0
390	23	7	0.6	21.1	0.0	0.0	0.0	3.3	0.0	0.0	0.0	39	9	0	500	140	0	0
391	23	8	2.2	8.0	7.5	0.0	0.0	3.8	1.5	0.0	2.0	86	8	440	980	0	0	0
392	23	9	22.7	1.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1	1	300	500	600	0	0
393	23	10	24.2	0.7	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3	1	0	220	0	0	90
394	23	11	22.4	0.0	1.8	0.0	0.0	0.8	0.0	0.0	0.0	6	4	500	320	0	0	0
395	23	12	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	580	0	1,240
396	23	13	24.1	0.0	0.3	0.0	0.0	0.6	0.0	0.0	0.0	34	0	0	0	60	500	900
397	23	14	24.2	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	14	0	200	0	940	0	1,200
398	23	15	20.7	0.3	0.2	0.0	0.0	3.6	0.2	0.0	0.0	60	8	540	0	580	100	720
399	23	16	12.0	1.1	0.0	0.0	0.0	11.9	0.0	0.0	0.0	124	28	600	0	0	500	640
400	23	17	0.9	0.4	0.1	0.0	0.0	23.6	0.0	0.0	0.0	374	62	1,000	0	0	580	0
401	23	18	2.2	0.9	0.0	0.0	0.0	21.9	0.0	0.0	0.0	412	32	0	0	0	0	0
402	23	19	3.7	0.0	0.0	0.0	0.0	19.7	0.0	1.6	0.0	339	30	0	0	0	0	0
403	23	20	16.8	0.0	0.0	0.0	0.0	0.0	1.3	6.9	0.0	9	0	0	400	100	0	0
404	23	21	20.6	0.0	0.2	0.0	0.0	0.0	1.3	2.9	0.0	1	0	0	0	860	0	260
405	23	22	24.0	0.0	0.2	0.4	0.0	0.0	0.0	0.4	0.0	11	1	0	0	800	0	440
406	23	23	24.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0	0	0	500	520	0	600
407	23	24	24.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0	0	0	0	740	560	600
408	23	25	23.0	0.0	0.0	0.0	0.0	0.8	0.0	1.2	0.0	23	1	0	460	160	0	700
409	23	26	16.8	0.0	0.0	0.0	0.0	0.0	3.3	4.9	0.0	0	0	0	0	0	0	0
410	23	27	17.2	0.0	0.0	0.0	0.0	0.0	0.9	6.9	0.0	0	0	0	300	420	0	300
411	23	28	22.0	0.0	0.0	0.0	0.0	0.0	0.5	2.5	0.0	2	0	0	620	0	90	500
412	23	29	23.5	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	5	0	0	0	250	320	0
413	24	2	0.0	0.0	0.0	0.0	0.0	0.0	13.5	0.0	11.5	1	0	0	0	0	0	0
414	24	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0	0	0	0	0	0	0
415	24	4	0.0	0.8	0.0	0.0	0.0	0.0	0.3	0.0	23.9	1	0	0	0	0	0	0
416	24	5	0.0	13.7	0.0	0.0	0.0	0.0	2.2	0.0	9.1	18	1	0	0	0	0	80
417	24	6	0.0	20.4	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0	0	0	0	0	0	0
418	24	7	5.6	11.2	1.5	0.6	0.0	3.1	0.0	0.3	3.5	62	5	0	0	0	0	0
419	24	8	4.4	0.0	3.8	0.0	0.0	0.9	1.1	3.2	11.6	12	1	0	0	120	0	0
420	24	9	16.8	0.0	1.1	0.0	0.0	0.0	0.0	4.0	3.1	12	5	0	260	840	0	200
421	24	10	9.4	3.0	3.9	0.0	0.0	1.0	0.2	0.0	7.5	16	1	0	520	0	0	0
422	24	11	3.5	1.9	3.8	0.0	0.0	15.8	0.0	0.0	0.0	178	69	80	820	0	0	0
423	24	12	12.2	12.1	0.5	0.0	0.0	0.0	0.2	0.0	0.0	21	2	0	540	0	0	0
424	24	13	22.8	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	25	4	540	340	0	870	0
425	24	14	19.9	2.9	0.0	0.0	0.0	1.9	0.3	0.0	0.0	16	3	240	500	0	530	820

Note SC:Sugarcane WP:Wet Paddy CN:Coconut,Nipa OC:Orchard FR:Forest
RS:Residential WU:Unused RC:River Channel FP:Fish Pond HS:House
NR:Non-residential Building NR:National Road NR:National Road PR:Provincial Road
BR:Barangay Road RW:Railway IC:Irrigation Channel

Table IX-2-1(6/6) DETAILED MESH DATA OF THE FLOOD PRONE AREA

NO.	X	Y	SC (ha)	WP (ha)	CN (ha)	OC (ha)	FR (ha)	RS (ha)	UU (ha)	RC (ha)	FP (ha)	HS (no.)	NB (no.)	NR (m)	PR (m)	BR (m)	RW (m)	IC (m)
426	24	15	24.2	0.0	0.2	0.0	0.0	0.4	0.0	0.2	0.0	12	0	0	820	0	440	1,940
427	24	16	23.5	0.0	0.3	0.0	0.0	0.3	0.0	0.9	0.0	12	0	420	0	380	0	1,100
428	24	17	10.6	2.7	0.4	0.0	0.0	9.9	0.3	1.1	0.0	49	11	520	0	2,520	0	960
429	24	18	20.7	0.4	0.0	0.0	0.0	3.5	0.4	0.0	0.0	96	7	470	360	0	460	0
430	24	19	22.2	1.8	0.0	0.0	0.0	1.0	0.0	0.0	0.0	31	0	980	460	0	500	0
431	24	20	24.3	0.3	0.0	0.4	0.0	0.0	0.0	0.0	0.0	2	0	660	360	0	500	480
432	24	21	24.8	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0	0	520	540	0	520	240
433	24	22	24.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0	0	560	440	0	540	200
434	24	23	24.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0	0	0	1,020	320	520	780
435	24	24	20.7	3.0	0.0	0.0	0.0	1.2	0.1	0.0	0.0	2	2	0	660	0	660	820
436	24	25	19.5	0.2	0.0	0.0	0.0	0.0	3.3	2.0	0.0	8	0	0	0	640	0	0
437	24	26	23.4	0.0	0.0	0.0	0.0	0.0	1.3	0.3	0.0	0	0	0	0	860	0	0
438	24	27	21.7	0.0	0.0	0.0	0.0	0.0	0.3	3.0	0.0	0	0	0	0	1,110	0	0
439	24	28	0.0	15.8	0.0	0.0	0.0	0.0	5.2	4.0	0.0	0	0	0	0	0	0	0
440	24	29	19.5	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0	0	0	0	310	310	0
441	24	30	15.4	0.0	0.0	0.0	3.3	0.0	4.9	1.4	0.0	3	0	0	0	540	510	0
442	25	3	0.0	0.0	0.7	0.0	0.0	0.0	0.7	7.3	16.3	7	0	0	0	0	0	0
443	25	4	0.0	2.3	0.0	0.0	0.0	0.0	1.4	2.6	18.7	7	3	0	0	0	0	0
444	25	5	0.0	11.4	0.0	0.0	0.0	1.2	0.0	3.2	9.2	42	8	0	0	0	0	0
445	25	6	12.2	11.8	1.0	0.0	0.0	0.0	0.0	0.0	0.0	5	2	0	0	800	0	0
446	25	7	5.5	0.0	1.5	0.0	0.0	1.9	0.5	4.6	11.0	41	3	0	0	420	0	0
447	25	8	11.2	0.0	3.5	0.0	0.0	0.0	0.2	1.2	8.9	8	1	0	0	0	0	0
448	25	9	3.7	2.5	0.0	0.0	0.0	0.0	0.0	1.5	17.3	5	0	0	0	0	0	0
449	25	10	6.2	0.0	3.3	0.0	0.0	2.5	0.0	1.9	11.1	26	3	0	0	0	0	0
450	25	11	12.6	0.0	1.3	0.0	0.0	10.6	0.5	0.0	0.0	172	16	650	80	240	0	900
451	25	12	11.8	4.0	5.5	0.0	0.0	2.5	0.0	0.0	1.2	34	0	0	0	0	0	0
452	25	13	15.2	0.9	6.1	0.0	0.0	2.6	0.2	0.0	0.0	35	2	0	0	680	540	490
453	25	14	24.5	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0	0	0	420	0	0	360
454	25	15	12.1	11.8	0.0	0.0	0.0	0.3	0.0	0.9	0.0	10	0	0	0	0	0	920
455	25	16	13.2	10.8	0.8	0.0	0.0	0.2	0.0	0.0	0.0	14	0	560	180	0	0	820
456	25	17	7.9	13.7	2.4	0.0	0.0	0.0	0.1	0.9	0.0	12	2	0	300	0	0	440
457	25	18	3.1	20.7	0.9	0.0	0.0	0.0	0.0	0.3	0.0	5	0	0	0	80	0	0
458	25	19	4.8	20.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3	0	0	0	220	0	820
459	25	20	2.4	22.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	19	0	0	480	320	0	680
460	25	21	22.1	2.8	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0	0	0	530	0	0	1,500
461	25	22	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	500	0	0	800
462	25	23	24.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0	0	540	500	0	0	980
463	25	24	20.4	0.6	0.2	0.4	0.0	3.0	0.4	0.0	0.0	34	3	0	900	420	1,510	960
464	25	25	12.3	0.0	0.4	0.0	0.0	0.0	7.8	4.5	0.0	0	0	0	0	180	0	0
465	25	26	24.3	0.0	0.2	0.0	0.0	0.0	0.2	0.3	0.0	1	0	0	1,580	0	0	200
466	25	27	21.2	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	3	0	0	0	800	130	900
467	25	28	0.0	17.6	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
468	25	29	23.4	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	23	0	0	0	0	0	0
469	25	30	17.5	0.0	0.0	0.0	1.7	0.2	0.7	4.9	0.0	2	0	0	0	0	160	0
470	26	10	8.4	0.6	1.5	0.0	0.0	0.9	1.3	1.9	10.4	27	8	560	0	0	0	0
471	26	11	12.4	0.4	3.5	0.0	0.0	1.3	0.9	1.3	5.2	26	10	220	0	0	0	0
472	26	12	5.0	5.3	11.1	0.0	0.0	0.0	0.4	1.8	1.4	1	0	0	0	0	0	0
473	26	13	13.5	6.6	2.3	0.0	0.0	1.6	0.9	0.1	0.0	33	2	0	0	0	740	540
474	26	14	8.4	16.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0	0	0	0	0	520	1,460
475	26	15	4.4	19.6	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0	0	150	0	0	0	2,580
476	26	16	5.5	15.4	3.0	0.0	0.0	1.0	0.1	0.0	0.0	11	3	0	420	0	0	1,250
477	26	17	5.0	18.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	7	0	0	0	0	0	180
478	26	18	2.4	17.8	1.6	0.0	0.0	0.0	0.4	2.8	0.0	24	0	0	300	0	0	0
479	26	19	3.0	20.5	0.0	0.7	0.8	0.0	0.0	0.0	0.0	0	0	0	0	0	0	420
480	26	20	5.4	16.3	0.0	0.3	0.0	0.0	3.0	0.0	0.0	12	2	0	420	0	0	520
481	26	21	5.5	15.6	1.0	0.0	2.5	0.4	0.0	0.0	0.0	25	0	0	300	560	0	520
482	26	22	10.0	4.3	0.0	0.0	10.1	0.0	0.6	0.0	0.0	21	0	0	0	1,260	0	680
483	26	23	16.3	0.6	0.4	0.0	6.5	0.0	0.0	1.2	0.0	40	0	540	300	0	0	220
484	26	24	24.0	0.0	0.2	0.0	0.0	0.0	0.8	0.0	0.0	7	0	0	500	300	540	520
485	26	25	11.7	0.0	1.0	0.0	0.0	0.0	6.7	5.6	0.0	0	0	0	0	0	0	1,280
486	26	26	22.8	0.0	0.5	0.0	0.0	0.0	0.5	1.2	0.0	0	0	0	520	0	340	540
487	26	27	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	670	710	1,440
488	26	28	0.0	23.6	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	1,040
489	26	29	22.7	1.4	0.0	0.0	0.0	0.9	0.0	0.0	0.0	18	0	0	0	0	0	0
490	26	30	19.7	0.6	0.0	0.0	0.5	3.5	0.7	0.0	0.0	27	4	0	0	0	0	0
491	27	12	6.5	10.1	7.0	0.0	0.0	0.0	0.6	0.8	0.0	8	0	0	0	0	600	200
492	27	13	4.9	15.6	3.3	0.0	0.0	1.2	0.0	0.0	0.0	27	0	0	350	0	480	1,900
493	27	14	1.0	17.3	0.2	0.0	0.0	1.0	5.5	0.0	0.0	14	0	0	0	0	0	620
494	27	24	9.5	0.0	0.4	0.0	0.0	1.9	6.8	6.4	0.0	62	4	280	1,020	0	660	0
495	27	25	19.0	0.0	0.0	0.0	0.0	0.0	1.5	4.5	0.0	0	0	0	540	1,000	0	0
496	27	26	20.8	0.0	0.2	0.8	0.0	3.0	0.0	0.2	0.0	27	8	0	640	340	540	1,220
497	27	27	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	260	0	0	260	0
498	27	28	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0	550	0	0	550	1,430
499	27	29	23.2	0.0	0.0	0.0	0.0	1.5	0.3	0.0	0.0	29	2	580	0	0	680	0
500	27	30	8.8	6.6	0.0	0.0	9.6	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0

Note SC:Sugarcane WP:Wet Paddy CN:Coconut,Nipa OC:Orchard FR:Forest
RS:Residential UU:Unused RC:River Channel FP:Fish Pond HS:House
NR:Non-residential Building NR:National Road NR:National Road PR:Provincial Road
BR:Barangay Road RW:Railway IC:Irrigation Channel

Table IX-2-2 AVERAGE DAMAGEABLE VALUE OF PADDY

Item		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1. Cropping Pattern		********** * * * **********				********** * * * **********					********** * * * **********		
2. Planted Area	1st Crop					25%	75%	100%	100%	75%	25%		
	2nd Crop	100%	75%	25%							25%	75%	100%
3. Accum. Cost	1st Crop					16%	38%	54%	74%	85%	100%		
	2nd Crop	74%	85%	100%							16%	38%	54%
4. Flood Frequency	(%)					4%	8%	25%	29%	13%	13%	8%	
5. 2 x 4	1st Crop	0%	0%	0%	0%	1%	6%	25%	29%	10%	3%	0%	0%
	2nd Crop	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	6%	0%
6. Damageable Value* (P/ha)	1st CROP	0	0	0	0	86	611	2,832	3,703	1,322	476	0	0
	2nd CROP	0	0	0	0	0	0	0	0	0	279	611	0

Average Damageable Value (P/ha) = 9,919 (9,900)

Remarks :

a. Production Cost (P/ha) = 7,200
b. Yield (ton/ha) = 3.0
c. Economic Price (P/ton) = 4,880
d. Net Income (P/ha) = 7,440
(b. x c. - a.)

Note * : 5 x (3 x a + d)

Basic Source of Data :
- Price Prospects for Major Primary Commodities, 1988-2000, The World Bank
- Updated Costs and Returns 1985-1989, AEADIS, AASID
- Policy Implication of a Five Peso Support Price of Palay to Farmers' Incentives, Profitability and Economic Efficiency Under an Import Substitution Trade Regime: A Preliminary Analysis, L.A. Gonzales, International Food Policy Research Institute
- Interim Report for Study of Agno River Basin Flood Control, JICA

Table IX-2-3 AVERAGE DAMAGEABLE VALUE OF SUGARCANE

Item	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1. Cropping Pattern	**********											
2. Planted Area	---	---	---	---	---	---	---	---	---	10%	30%	50%
	70%	90%	100%	100%	100%	100%	100%	100%	100%	90%	70%	50%
	30%	10%	---	---	---	---	---	---	---	---	---	---
3. Accum. Cost	---	---	---	---	---	---	---	---	---	5%	11%	18%
	26%	36%	46%	52%	59%	65%	71%	78%	84%	89%	94%	97%
	99%	100%	---	---	---	---	---	---	---	---	---	---
4. Flood Frequency (%)					4%	8%	25%	29%	13%	13%	8%	
5. 2 x 4	---	---	---	---	---	---	---	---	---	1%	2%	0%
	0%	0%	0%	0%	4%	8%	25%	29%	13%	12%	6%	0%
	0%	0%	---	---	---	---	---	---	---	---	---	---
6. Damageable Value*	---	---	---	---	---	---	---	---	---	190	379	0
(P/ha)	0	0	0	0	1,016	2,128	6,950	8,468	3,952	3,674	1,814	0
	0	0	---	---	---	---	---	---	---	---	---	---

Average Damageable Value (P/ha) = 28,571 (= 28,600)

Remarks :

a. Production Cost (P/ha) = 20,000
b. Yield (ton/ha) = 70.0
c. Economic Price (P/ton) = 480
d. Net Income (P/ha) = 13,600
(b x c - a)

Note * : 5 x (3 x a + d)

Basic Source of Data : - Price Prospects for Major Primary Commodities, 1988-2000, The World Bank
- Updated Costs and Returns 1985-1989, AEADIS, AASID

Table IX-2-4 AVERAGE DAMAGEABLE VALUE OF FISHPOND

I t e m		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1. Cultivation Calender		**********					**********						**********
2. Cultivated Area	Bangus	85%	85%	85%	43%	---	43%	85%	85%	85%	43%	---	43%
	Prawn	15%	15%	15%	8%	---	8%	15%	15%	15%	8%	---	8%
3. Accum. Cost	Bangus	50%	70%	90%	100%	---	20%	50%	70%	90%	100%	---	20%
	Prawn	50%	70%	90%	100%	---	20%	50%	70%	90%	100%	---	20%
4. Flood Frequency	(%)					4%	8%	25%	29%	13%	13%	8%	
5. 2 x 4	Bangus	0%	0%	0%	0%	0%	3%	21%	25%	11%	6%	0%	0%
	Prawn	0%	0%	0%	0%	0%	1%	4%	4%	2%	1%	0%	0%
6. Damageable Value* (P/ha)	Bangus	0	0	0	0	0	0	3	4	2	1	0	0
	Prawn	0	0	0	0	0	1	6	8	4	2	0	0

Average Damageable Value (P/ha) = 32,497 (= 32,500)

Remarks :

	Bangus	Prawn
a. Production Cost (P.1000/ha) =	15.0	135.0
b. Yield (ton/ha) =	0.75	1.50
c. Unit Price (P1000/ton) =	30.0	150.0
d. Net Income (P.1000/ha) = (b x c - a)	7.5	90.0

Note * : 5 x (3 x a + d)

Basic Source of Data : - The Resource Base for Agrarian Reform and Development in Negros Occidental, Social Research Center, Bacolod
- Interview at the Site.

Table IX-2-5 ECONOMIC FARMGATE PRICE OF PADDY
(Import Substitute)

(per ton)

Item	Financial Cost	Economic Cost
1. FOB, Bangkok, 5% broken milled rice *1	$ 285.0	$ 285.0
2. Quality Discount (30%) [1 x 0.7]	$ 199.5	$ 199.5
3. Transportation Cost, Bangkok - Pulupandan	$ 12.0	$ 12.0
Sub-total [2+3]	$ 211.5	$ 211.5
Peso Equivalent *2	P 5,922	P 6,768
4. Port Handling & Warehouse Charge, etc. *3	P 1,270	P 1,361
Ex-warehouse Cost	P 7,192	P 8,129
5. Inland Transport, Pulupadan - Kabankalan *3	P 210	P 225
Price of Rice at Kabankalan	P 7,402	P 8,354
6. Milling Cost, etc. *3	P (720)	P (771)
Sub-total	P 6,682	P 7,582
7. Paddy Equivalent (65%)	P 4,343	P 4,928
8. Trasport Cost Farm to Mill	P (43)	P (43)
9. Economic Farmgate Paddy Price	P 4,300	P 4,885 (= 4,880)

Basic Source of Data : - Price Prospects for Major Primary Commodities 1988-2000 Updated, Including Quarterly Review of Commodity Markets, Fourth Quarter 1989, World Bank
- Policy Implication of a Five Peso Support Price of Palay to Farmers' Incentives, Profitability and Economic Efficiency Under an Import Substitution Trade Regime: A Preliminary Analysis, L.A. Gonzales, International Food Policy Research Institute
- Interview at the Site.

Note *1 : International price in 1990 in current Dollars.
*2 : Conversion rates are $1.00=P28.00 for the financial cost and $1.00=P32.00 for the economic cost.
*3 : Assuming a foreign exchange component of 50%.

Table IX-2-6 ECONOMIC FARMGATE PRICE OF SUGARCANE

(per ton)

Item	Financial Cost	Economic Cost
1. Export Price *1	$ 391	391
Peso Equivalent *2	P 10,948	12,512
2. Port Handling & Warehouse Charge, etc. *3	P (3,000)	(3,214)
Ex-warehouse Cost	P 7,948	9,298
3. Milling Cost, etc. *3	P (2,950)	(3,161)
Ex-mill Price	P 4,998	6,137
4. Allowance for Mollases (5%)	P (250)	(307)
Sub-total	P 4,748	5,830
5. Cane Price at Mill Gate (9%)	P 427	525
6. Trasport Cost Farm to Mill	P (43)	(43)
7. Economic Farmgate Cane Price	P 384 (= 380)	482 (= 480)

Basic Source of Data : - Price Prospects for Major Primary Commodities 1988-2000 Updated, Including Quarterly Review of Commodity Markets, Fourth Quarter 1989, World Bank
- Linkages and Alternatives: The Philippine Sugar Industry in the 1990s, Joop Theunissen, Tilburg, July 1989
- Interview at the Site.

Note *1 : International price in 1990 in current Dollars.
*2 : Conversion rates are $1.00=P28.00 for the financial cost and $1.00=P32.00 for the economic cost.
*3 : Assuming a foreign exchange component of 50%.

Table IX-2-7 AVERAGE DEPRECIATION OF DWELLING UNITS

Period	Dwelling Unit	Distributuion (%)	Depreciation * (%)	(3)x(4) (%)
(1)	(2)	(3)	(4)	(5)
1941 or earlier	4,595	1.2%	10.0%	0.1%
1942 - 1950	9,608	2.4%	10.0%	0.2%
1951 - 1960	31,986	8.1%	10.0%	0.8%
1961 - 1970	76,123	19.2%	25.0%	4.8%
1971 - 1975	84,524	21.3%	49.0%	10.4%
1976 - 1980	116,552	29.4%	64.0%	18.8%
1981 - 1990	73,300	18.5%	85.0%	15.7%
Total	396,688	100.0%		50.9% (= 50%)

Source : Special Report No.5, 1980 Census of Population and Housing: Housing Characteristics of Occupied Dwelling Units by Region, Province, City and Municipality, Philippines, NCSO

Note * : Assuming a durable life of 30 years and a salvage value of 10%.

Table IX-2-8 POTENTIAL FLOOD DAMAGE AT CURRENT DEVELOPMENT LEVEL

Unit : Million Peso

Items Vulnerable to Flood Damage	Flooding Scale in Return Period					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
1. Direct Damage	67.4	199.6	272.9	331.2	371.3	396.2
1.1 Agri-/Aquacultural Crops	54.1	100.8	126.7	141.1	147.7	151.0
- Sugarcane	2.9	30.7	45.7	55.4	61.1	63.9
- Paddy	0.4	2.0	3.8	4.4	4.8	5.0
- Prawn/Bangus (Milk Fish)	50.8	68.1	77.2	81.3	81.8	82.1
1.2 House/Building	13.2	96.2	142.3	184.5	216.9	237.4
- Residential Houses	8.2	66.4	99.2	127.7	149.4	163.5
- Non-residential Buildings	5.0	29.8	43.1	56.8	67.5	73.9
1.3 Infrastructure	0.1	2.6	3.9	5.6	6.7	7.8
- National Road	0.0	0.6	0.9	1.4	1.7	2.0
- Provincial Road	0.1	1.0	1.4	2.0	2.4	2.8
- Barangay Road	0.0	0.5	0.8	1.1	1.3	1.4
- Railway	0.0	0.3	0.4	0.6	0.7	0.9
- Irrigation Channel	0.0	0.2	0.4	0.5	0.6	0.7
2. Indirect Damage	1.0	5.8	8.1	9.3	9.8	9.8
Total Damage	68.4	205.2	281.1	340.6	381.1	405.9

Note : Figures may not add up to totals due to rounding.

Table IX-2-9 POTENTIAL FLOOD DAMAGE IN THE TARGET YEAR 2020

Unit : Million Peso

Items Vulnerable to Flood Damage	Flooding Scale in Return Period					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
1. Direct Damage	74.0	247.4	343.6	422.9	479.1	514.2
1.1 Agri-/Aquacultural Crops	54.1	100.8	126.7	141.1	147.7	151.0
- Sugarcane	2.9	30.7	45.7	55.4	61.1	63.9
- Paddy	0.4	2.0	3.8	4.4	4.8	5.0
- Prawn/Bangus (Milk Fish)	50.8	68.1	77.2	81.3	81.8	82.1
1.2 House/Building	19.8	144.0	213.0	276.2	324.7	355.4
- Residential Houses	12.3	99.4	148.5	191.2	223.7	244.8
- Non-residential Buildings	7.5	44.6	64.5	85.0	101.0	110.6
1.3 Infrastructure	0.1	2.6	3.9	5.6	6.7	7.8
- National Road	0.0	0.6	0.9	1.4	1.7	2.0
- Provincial Road	0.1	1.0	1.4	2.0	2.4	2.8
- Barangay Road	0.0	0.5	0.8	1.1	1.3	1.4
- Railway	0.0	0.3	0.4	0.6	0.7	0.9
- Irrigation Channel	0.0	0.2	0.4	0.5	0.6	0.7
2. Indirect Damage	1.4	8.7	12.1	13.9	14.6	14.7
Total Damage	75.4	256.1	355.7	436.8	493.7	528.9

Table IX-2-10 CALCULATION OF ANNUAL AVERAGE BENEFIT OF THE MASTER PLAN

Unit : Million Peso

Return Period	Flood Damage		Damage Reduction	Average Damage Reduction	Expectation	Benefit
	w/o Project	w/ Project				
1.4 *	0.0	0.0	0.0			
				37.70	0.2143	8.08
2	75.4	0.0	75.4			
				165.75	0.3000	49.73
5	256.1	0.0	256.1			
				305.90	0.1000	30.59
10	355.7	0.0	355.7			
				396.25	0.0600	23.78
25	436.8	0.0	436.8			
				465.25	0.0200	9.31
50	493.7	0.0	493.7			
				511.30	0.0100	5.11
100	528.9	0.0	528.9			
			Total (Annual Average Benefit)			126.59

Note * : Corresponds to the existing flow capacity.

Table IX-3-1(1/4) ANNUAL COST AND BENEFIT FLOW OF ALTERNATIVE CASES FOR THE MASTER PLAN

Case I : Safety degree of Phase I = 50-year return period Unit : Million Peso

Year	Economic Cost							Benefit	Balance
	Const.	Admin.	E/S	Phy. Conti.	Land Acq.	O&M	Total		
1993				0.00			0.00	0.00	0.00
1994				0.00			0.00	0.00	0.00
1995			26.49	2.65			29.14	0.00	(29.14)
1996			26.49	2.65			29.14	0.00	(29.14)
1997				0.00			0.00	0.00	0.00
1998				0.00			0.00	0.00	0.00
1999				0.00			0.00	0.00	0.00
2000				0.00	8.05		8.05	0.00	(8.05)
2001	35.99	2.25	4.50	4.27	8.05		55.06	0.00	(55.06)
2002	35.99	2.25	4.50	4.27	8.05		55.06	8.26	(46.79)
2003	35.99	2.25	4.50	4.27	8.05		55.06	16.53	(38.53)
2004	35.99	2.25	4.50	4.27	8.05		55.06	24.79	(30.27)
2005	35.99	2.25	4.50	4.27	8.05		55.06	33.05	(22.01)
2006	35.99	2.25	4.50	4.27	8.05		55.06	41.31	(13.74)
2007	35.99	2.25	4.50	4.27	8.05		55.06	49.58	(5.48)
2008	35.99	2.25	4.50	4.27			47.01	57.84	10.83
2009	35.99	2.25	4.50	4.27			47.01	66.10	19.09
2010	35.99	2.25	4.50	4.27			47.01	74.36	27.36
2011	35.99	2.25	4.50	4.27			47.01	82.63	35.62
2012	35.99	2.25	4.50	4.27			47.01	90.89	43.88
2013	35.99	2.25	4.50	4.27			47.01	99.15	52.15
2014	35.99	2.25	4.50	4.27			47.01	107.41	60.41
2015	35.99	2.25	4.50	4.27			47.01	115.68	68.67
2016	33.33	2.08	4.17	3.96		2.97	46.51	123.94	77.43
2017	33.33	2.08	4.17	3.96		2.97	46.51	124.47	77.96
2018	33.33	2.08	4.17	3.96		2.97	46.51	125.00	78.49
2019	33.33	2.08	4.17	3.96		2.97	46.51	125.53	79.02
2020	33.33	2.08	4.17	3.96		2.97	46.51	126.06	79.55
2021						3.72	3.72	126.59	122.87
2022						3.72	3.72	126.59	122.87
2023						3.72	3.72	126.59	122.87
2024						3.72	3.72	126.59	122.87
2025						3.72	3.72	126.59	122.87
2026						3.72	3.72	126.59	122.87
2027						3.72	3.72	126.59	122.87
2028						3.72	3.72	126.59	122.87
2029						3.72	3.72	126.59	122.87
2030						3.72	3.72	126.59	122.87
2031						3.72	3.72	126.59	122.87
2032						3.72	3.72	126.59	122.87
2033						3.72	3.72	126.59	122.87
2034						3.72	3.72	126.59	122.87
2035						3.72	3.72	126.59	122.87
2036						3.72	3.72	126.59	122.87
2037						3.72	3.72	126.59	122.87
2038						3.72	3.72	126.59	122.87
2039						3.72	3.72	126.59	122.87
2040						3.72	3.72	126.59	122.87
2041						3.72	3.72	126.59	122.87
2042						3.72	3.72	126.59	122.87
2043						3.72	3.72	126.59	122.87
2044						3.72	3.72	126.59	122.87
2045						3.72	3.72	126.59	122.87
2046						3.72	3.72	126.59	122.87
2047						3.72	3.72	126.59	122.87
2048						3.72	3.72	126.59	122.87
2049						3.72	3.72	126.59	122.87
2050						3.72	3.72	126.59	122.87

IRR = 11.40%

Table IX-3-1(2/4) ANNUAL COST AND BENEFIT FLOW OF ALTERNATIVE CASES FOR THE MASTER PLAN

Case II : Safety degree of Phase I = 25-year return period (Optimum Plan) Unit : Million Peso

Year	Economic Cost							Benefit	Balance
	Const.	Admin.	E/S	Phy. Conti.	Land Acq.	O&M	Total		
1993							0.00	0.00	0.00
1994							0.00	0.00	0.00
1995			26.78	2.68			29.46	0.00	(29.46)
1996			26.78	2.68			29.46	0.00	(29.46)
1997							0.00	0.00	0.00
1998							0.00	0.00	0.00
1999							0.00	0.00	0.00
2000					8.05		8.05	0.00	(8.05)
2001	37.28	2.33	4.66	4.43	8.05		56.74	0.00	(56.74)
2002	37.28	2.33	4.66	4.43	8.05		56.74	10.59	(46.15)
2003	37.28	2.33	4.66	4.43	8.05		56.74	21.19	(35.56)
2004	37.28	2.33	4.66	4.43	8.05		56.74	31.78	(24.96)
2005	37.28	2.33	4.66	4.43	8.05		56.74	42.38	(14.37)
2006	37.28	2.33	4.66	4.43	8.05		56.74	52.97	(3.77)
2007	37.28	2.33	4.66	4.43	8.05		56.74	63.57	6.82
2008	37.28	2.33	4.66	4.43			48.69	74.16	25.47
2009	37.28	2.33	4.66	4.43			48.69	84.76	36.06
2010	37.28	2.33	4.66	4.43			48.69	95.35	46.66
2011	37.28	2.33	4.66	4.43			48.69	105.95	57.25
2012	33.79	2.11	4.22	4.01		2.26	46.39	116.54	70.15
2013	33.79	2.11	4.22	4.01		2.26	46.39	117.66	71.27
2014	33.79	2.11	4.22	4.01		2.26	46.39	118.77	72.39
2015	33.79	2.11	4.22	4.01		2.26	46.39	119.89	73.50
2016	33.79	2.11	4.22	4.01		2.26	46.39	121.01	74.62
2017	33.79	2.11	4.22	4.01		2.26	46.39	122.12	75.74
2018	33.79	2.11	4.22	4.01		2.26	46.39	123.24	76.85
2019	33.79	2.11	4.22	4.01		2.26	46.39	124.36	77.97
2020	33.79	2.11	4.22	4.01		2.26	46.39	125.47	79.09
2021						3.72	3.72	126.59	122.87
2022						3.72	3.72	126.59	122.87
2023						3.72	3.72	126.59	122.87
2024						3.72	3.72	126.59	122.87
2025						3.72	3.72	126.59	122.87
2026						3.72	3.72	126.59	122.87
2027						3.72	3.72	126.59	122.87
2028						3.72	3.72	126.59	122.87
2029						3.72	3.72	126.59	122.87
2030						3.72	3.72	126.59	122.87
2031						3.72	3.72	126.59	122.87
2032						3.72	3.72	126.59	122.87
2033						3.72	3.72	126.59	122.87
2034						3.72	3.72	126.59	122.87
2035						3.72	3.72	126.59	122.87
2036						3.72	3.72	126.59	122.87
2037						3.72	3.72	126.59	122.87
2038						3.72	3.72	126.59	122.87
2039						3.72	3.72	126.59	122.87
2040						3.72	3.72	126.59	122.87
2041						3.72	3.72	126.59	122.87
2042						3.72	3.72	126.59	122.87
2043						3.72	3.72	126.59	122.87
2044						3.72	3.72	126.59	122.87
2045						3.72	3.72	126.59	122.87
2046						3.72	3.72	126.59	122.87
2047						3.72	3.72	126.59	122.87
2048						3.72	3.72	126.59	122.87
2049						3.72	3.72	126.59	122.87
2050						3.72	3.72	126.59	122.87

Note : IRR = 12.6% IRR = 12.64%

	Discount Rate 10%	15%
B/C =	1.266	0.825
NPV =	68.55	-26.06 (mil.P.)

Table IX-3-1(3/4) ANNUAL COST AND BENEFIT FLOW OF ALTERNATIVE CASES FOR THE MASTER PLAN

Case III : Safety degree of Phase I = 10-year return period Unit : Million Peso

Year	Economic Cost							Benefit	Balance
	Const.	Admin.	E/S	Phy. Conti.	Land Acq.	O&M	Total		
1993				0.00			0.00	0.00	0.00
1994				0.00			0.00	0.00	0.00
1995			26.78	2.68			29.46	0.00	(29.46)
1996			26.78	2.68			29.46	0.00	(29.46)
1997				0.00			0.00	0.00	0.00
1998				0.00			0.00	0.00	0.00
1999				0.00			0.00	0.00	0.00
2000				0.00	8.05		8.05	0.00	(8.05)
2001	36.14	2.26	4.52	4.29	8.05		55.26	0.00	(55.26)
2002	36.14	2.26	4.52	4.29	8.05		55.26	11.01	(44.26)
2003	36.14	2.26	4.52	4.29	8.05		55.26	22.01	(33.25)
2004	36.14	2.26	4.52	4.29	8.05		55.26	33.02	(22.24)
2005	36.14	2.26	4.52	4.29	8.05		55.26	44.03	(11.24)
2006	36.14	2.26	4.52	4.29	8.05		55.26	55.03	(0.23)
2007	36.14	2.26	4.52	4.29	8.05		55.26	66.04	10.78
2008	36.14	2.26	4.52	4.29			47.21	77.05	29.83
2009	36.14	2.26	4.52	4.29			47.21	88.05	40.84
2010	35.35	2.21	4.42	4.20		1.79	47.96	99.06	51.10
2011	35.35	2.21	4.42	4.20		1.79	47.96	101.56	53.60
2012	35.35	2.21	4.42	4.20		1.79	47.96	104.07	56.10
2013	35.35	2.21	4.42	4.20		1.79	47.96	106.57	58.61
2014	35.35	2.21	4.42	4.20		1.79	47.96	109.07	61.11
2015	35.35	2.21	4.42	4.20		1.79	47.96	111.57	63.61
2016	35.35	2.21	4.42	4.20		1.79	47.96	114.08	66.11
2017	35.35	2.21	4.42	4.20		1.79	47.96	116.58	68.62
2018	35.35	2.21	4.42	4.20		1.79	47.96	119.08	71.12
2019	35.35	2.21	4.42	4.20		1.79	47.96	121.58	73.62
2020	35.35	2.21	4.42	4.20		1.79	47.96	124.09	76.12
2021						3.72	3.72	126.59	122.87
2022						3.72	3.72	126.59	122.87
2023						3.72	3.72	126.59	122.87
2024						3.72	3.72	126.59	122.87
2025						3.72	3.72	126.59	122.87
2026						3.72	3.72	126.59	122.87
2027						3.72	3.72	126.59	122.87
2028						3.72	3.72	126.59	122.87
2029						3.72	3.72	126.59	122.87
2030						3.72	3.72	126.59	122.87
2031						3.72	3.72	126.59	122.87
2032						3.72	3.72	126.59	122.87
2033						3.72	3.72	126.59	122.87
2034						3.72	3.72	126.59	122.87
2035						3.72	3.72	126.59	122.87
2036						3.72	3.72	126.59	122.87
2037						3.72	3.72	126.59	122.87
2038						3.72	3.72	126.59	122.87
2039						3.72	3.72	126.59	122.87
2040						3.72	3.72	126.59	122.87
2041						3.72	3.72	126.59	122.87
2042						3.72	3.72	126.59	122.87
2043						3.72	3.72	126.59	122.87
2044						3.72	3.72	126.59	122.87
2045						3.72	3.72	126.59	122.87
2046						3.72	3.72	126.59	122.87
2047						3.72	3.72	126.59	122.87
2048						3.72	3.72	126.59	122.87
2049						3.72	3.72	126.59	122.87
2050						3.72	3.72	126.59	122.87
								IRR =	12.68%

Table IX-3-1(4/4) ANNUAL COST AND BENEFIT FLOW OF ALTERNATIVE CASES FOR THE MASTER PLAN

Case IV : Safety degree of Phase I = 5-year return period — Unit : Million Peso

Year	Economic Cost							Benefit	Balance
	Const.	Admin.	E/S	Phy. Conti.	Land Acq.	O&M	Total		
1993				0.00			0.00	0.00	0.00
1994				0.00			0.00	0.00	0.00
1995			26.78	2.68			29.46	0.00	(29.46)
1996			26.78	2.68			29.46	0.00	(29.46)
1997				0.00			0.00	0.00	0.00
1998				0.00			0.00	0.00	0.00
1999				0.00			0.00	0.00	0.00
2000				0.00	8.05		8.05	0.00	(8.05)
2001	36.11	2.26	4.51	4.29	8.05		55.22	0.00	(55.22)
2002	36.11	2.26	4.51	4.29	8.05		55.22	8.83	(46.40)
2003	36.11	2.26	4.51	4.29	8.05		55.22	17.65	(37.57)
2004	36.11	2.26	4.51	4.29	8.05		55.22	26.48	(28.75)
2005	36.11	2.26	4.51	4.29	8.05		55.22	35.31	(19.92)
2006	36.11	2.26	4.51	4.29	8.05		55.22	44.13	(11.09)
2007	36.11	2.26	4.51	4.29	8.05		55.22	52.96	(2.27)
2008	36.11	2.26	4.51	4.29			47.17	61.78	14.61
2009	35.43	2.21	4.43	4.21		1.59	47.87	70.61	22.74
2010	35.43	2.21	4.43	4.21		1.59	47.87	75.28	27.40
2011	35.43	2.21	4.43	4.21		1.59	47.87	79.94	32.07
2012	35.43	2.21	4.43	4.21		1.59	47.87	84.61	36.73
2013	35.43	2.21	4.43	4.21		1.59	47.87	89.27	41.40
2014	35.43	2.21	4.43	4.21		1.59	47.87	93.94	46.06
2015	35.43	2.21	4.43	4.21		1.59	47.87	98.60	50.73
2016	35.43	2.21	4.43	4.21		1.59	47.87	103.27	55.39
2017	35.43	2.21	4.43	4.21		1.59	47.87	107.93	60.06
2018	35.43	2.21	4.43	4.21		1.59	47.87	112.60	64.72
2019	35.43	2.21	4.43	4.21		1.59	47.87	117.26	69.39
2020	35.43	2.21	4.43	4.21		1.59	47.87	121.93	74.05
2021						3.72	3.72	126.59	122.87
2022						3.72	3.72	126.59	122.87
2023						3.72	3.72	126.59	122.87
2024						3.72	3.72	126.59	122.87
2025						3.72	3.72	126.59	122.87
2026						3.72	3.72	126.59	122.87
2027						3.72	3.72	126.59	122.87
2028						3.72	3.72	126.59	122.87
2029						3.72	3.72	126.59	122.87
2030						3.72	3.72	126.59	122.87
2031						3.72	3.72	126.59	122.87
2032						3.72	3.72	126.59	122.87
2033						3.72	3.72	126.59	122.87
2034						3.72	3.72	126.59	122.87
2035						3.72	3.72	126.59	122.87
2036						3.72	3.72	126.59	122.87
2037						3.72	3.72	126.59	122.87
2038						3.72	3.72	126.59	122.87
2039						3.72	3.72	126.59	122.87
2040						3.72	3.72	126.59	122.87
2041						3.72	3.72	126.59	122.87
2042						3.72	3.72	126.59	122.87
2043						3.72	3.72	126.59	122.87
2044						3.72	3.72	126.59	122.87
2045						3.72	3.72	126.59	122.87
2046						3.72	3.72	126.59	122.87
2047						3.72	3.72	126.59	122.87
2048						3.72	3.72	126.59	122.87
2049						3.72	3.72	126.59	122.87
2050						3.72	3.72	126.59	122.87
								IRR =	11.08%

Table IX-3-2(1/4) ANNUAL COST AND BENEFIT FLOW OF ALTERNATIVE CASES FOR PHASE I

Safety degree : 50-year return period flood Unit : Million Peso

Year	Economic Cost							Benefit	Balance
	Const.	Admin.	E/S	Phy. Conti.	Land Acq.	O&M	Total		
1993				0.00			0.00	0.00	0.00
1994				0.00			0.00	0.00	0.00
1995			20.24	2.02			22.27	0.00	(22.27)
1996			20.24	2.02			22.27	0.00	(22.27)
1997				0.00			0.00	0.00	0.00
1998				0.00			0.00	0.00	0.00
1999				0.00			0.00	0.00	0.00
2000				0.00	8.05		8.05	0.00	(8.05)
2001	35.99	2.25	4.50	4.27	8.05		55.06	0.00	(55.06)
2002	35.99	2.25	4.50	4.27	8.05		55.06	8.26	(46.79)
2003	35.99	2.25	4.50	4.27	8.05		55.06	16.53	(38.53)
2004	35.99	2.25	4.50	4.27	8.05		55.06	24.79	(30.27)
2005	35.99	2.25	4.50	4.27	8.05		55.06	33.05	(22.01)
2006	35.99	2.25	4.50	4.27	8.05		55.06	41.31	(13.74)
2007	35.99	2.25	4.50	4.27	8.05		55.06	49.58	(5.48)
2008	35.99	2.25	4.50	4.27			47.01	57.84	10.83
2009	35.99	2.25	4.50	4.27			47.01	66.10	19.09
2010	35.99	2.25	4.50	4.27			47.01	74.36	27.36
2011	35.99	2.25	4.50	4.27			47.01	82.63	35.62
2012	35.99	2.25	4.50	4.27			47.01	90.89	43.88
2013	35.99	2.25	4.50	4.27			47.01	99.15	52.15
2014	35.99	2.25	4.50	4.27			47.01	107.41	60.41
2015	35.99	2.25	4.50	4.27			47.01	115.68	68.67
2016						2.97	2.97	123.94	120.97
2017						2.97	2.97	123.94	120.97
2018						2.97	2.97	123.94	120.97
2019						2.97	2.97	123.94	120.97
2020						2.97	2.97	123.94	120.97
2021						2.97	2.97	123.94	120.97
2022						2.97	2.97	123.94	120.97
2023						2.97	2.97	123.94	120.97
2024						2.97	2.97	123.94	120.97
2025						2.97	2.97	123.94	120.97
2026						2.97	2.97	123.94	120.97
2027						2.97	2.97	123.94	120.97
2028						2.97	2.97	123.94	120.97
2029						2.97	2.97	123.94	120.97
2030						2.97	2.97	123.94	120.97
2031						2.97	2.97	123.94	120.97
2032						2.97	2.97	123.94	120.97
2033						2.97	2.97	123.94	120.97
2034						2.97	2.97	123.94	120.97
2035						2.97	2.97	123.94	120.97
2036						2.97	2.97	123.94	120.97
2037						2.97	2.97	123.94	120.97
2038						2.97	2.97	123.94	120.97
2039						2.97	2.97	123.94	120.97
2040						2.97	2.97	123.94	120.97
2041						2.97	2.97	123.94	120.97
2042						2.97	2.97	123.94	120.97
2043						2.97	2.97	123.94	120.97
2044						2.97	2.97	123.94	120.97
2045						2.97	2.97	123.94	120.97
2046						2.97	2.97	123.94	120.97
2047						2.97	2.97	123.94	120.97
2048						2.97	2.97	123.94	120.97
2049						2.97	2.97	123.94	120.97
2050						2.97	2.97	123.94	120.97
							IRR =	12.50%	0.2

Table IX-3-2(2/4) ANNUAL COST AND BENEFIT FLOW OF ALTERNATIVE CASES FOR PHASE I

Safety degree : 25-year return period flood

Unit : Million Peso

Year	Economic Cost							Benefit	Balance
	Const.	Admin.	E/S	Phy. Conti.	Land Acq.	O&M	Total		
1993				0.00			0.00	0.00	0.00
1994				0.00			0.00	0.00	0.00
1995			15.38	1.54			16.91	0.00	(16.91)
1996			15.38	1.54			16.91	0.00	(16.91)
1997				0.00			0.00	0.00	0.00
1998				0.00			0.00	0.00	0.00
1999				0.00			0.00	0.00	0.00
2000				0.00	8.05		8.05	0.00	(8.05)
2001	37.28	2.33	4.66	4.43	8.05		56.74	0.00	(56.74)
2002	37.28	2.33	4.66	4.43	8.05		56.74	10.59	(46.15)
2003	37.28	2.33	4.66	4.43	8.05		56.74	21.19	(35.56)
2004	37.28	2.33	4.66	4.43	8.05		56.74	31.78	(24.96)
2005	37.28	2.33	4.66	4.43	8.05		56.74	42.38	(14.37)
2006	37.28	2.33	4.66	4.43	8.05		56.74	52.97	(3.77)
2007	37.28	2.33	4.66	4.43	8.05		56.74	63.57	6.82
2008	37.28	2.33	4.66	4.43			48.69	74.16	25.47
2009	37.28	2.33	4.66	4.43			48.69	84.76	36.06
2010	37.28	2.33	4.66	4.43			48.69	95.35	46.66
2011	37.28	2.33	4.66	4.43			48.69	105.95	57.25
2012						2.26	2.26	116.54	114.28
2013						2.26	2.26	116.54	114.28
2014						2.26	2.26	116.54	114.28
2015						2.26	2.26	116.54	114.28
2016						2.26	2.26	116.54	114.28
2017						2.26	2.26	116.54	114.28
2018						2.26	2.26	116.54	114.28
2019						2.26	2.26	116.54	114.28
2020						2.26	2.26	116.54	114.28
2021						2.26	2.26	116.54	114.28
2022						2.26	2.26	116.54	114.28
2023						2.26	2.26	116.54	114.28
2024						2.26	2.26	116.54	114.28
2025						2.26	2.26	116.54	114.28
2026						2.26	2.26	116.54	114.28
2027						2.26	2.26	116.54	114.28
2028						2.26	2.26	116.54	114.28
2029						2.26	2.26	116.54	114.28
2030						2.26	2.26	116.54	114.28
2031						2.26	2.26	116.54	114.28
2032						2.26	2.26	116.54	114.28
2033						2.26	2.26	116.54	114.28
2034						2.26	2.26	116.54	114.28
2035						2.26	2.26	116.54	114.28
2036						2.26	2.26	116.54	114.28
2037						2.26	2.26	116.54	114.28
2038						2.26	2.26	116.54	114.28
2039						2.26	2.26	116.54	114.28
2040						2.26	2.26	116.54	114.28
2041						2.26	2.26	116.54	114.28
2042						2.26	2.26	116.54	114.28
2043						2.26	2.26	116.54	114.28
2044						2.26	2.26	116.54	114.28
2045						2.26	2.26	116.54	114.28
2046						2.26	2.26	116.54	114.28
2047						2.26	2.26	116.54	114.28
2048						2.26	2.26	116.54	114.28
2049						2.26	2.26	116.54	114.28
2050						2.26	2.26	116.54	114.28
								IRR =	15.19%

Table IX-3-2(3/4) ANNUAL COST AND BENEFIT FLOW OF ALTERNATIVE CASES FOR PHASE I

Safety degree : 10-year return period flood Unit : Million Peso

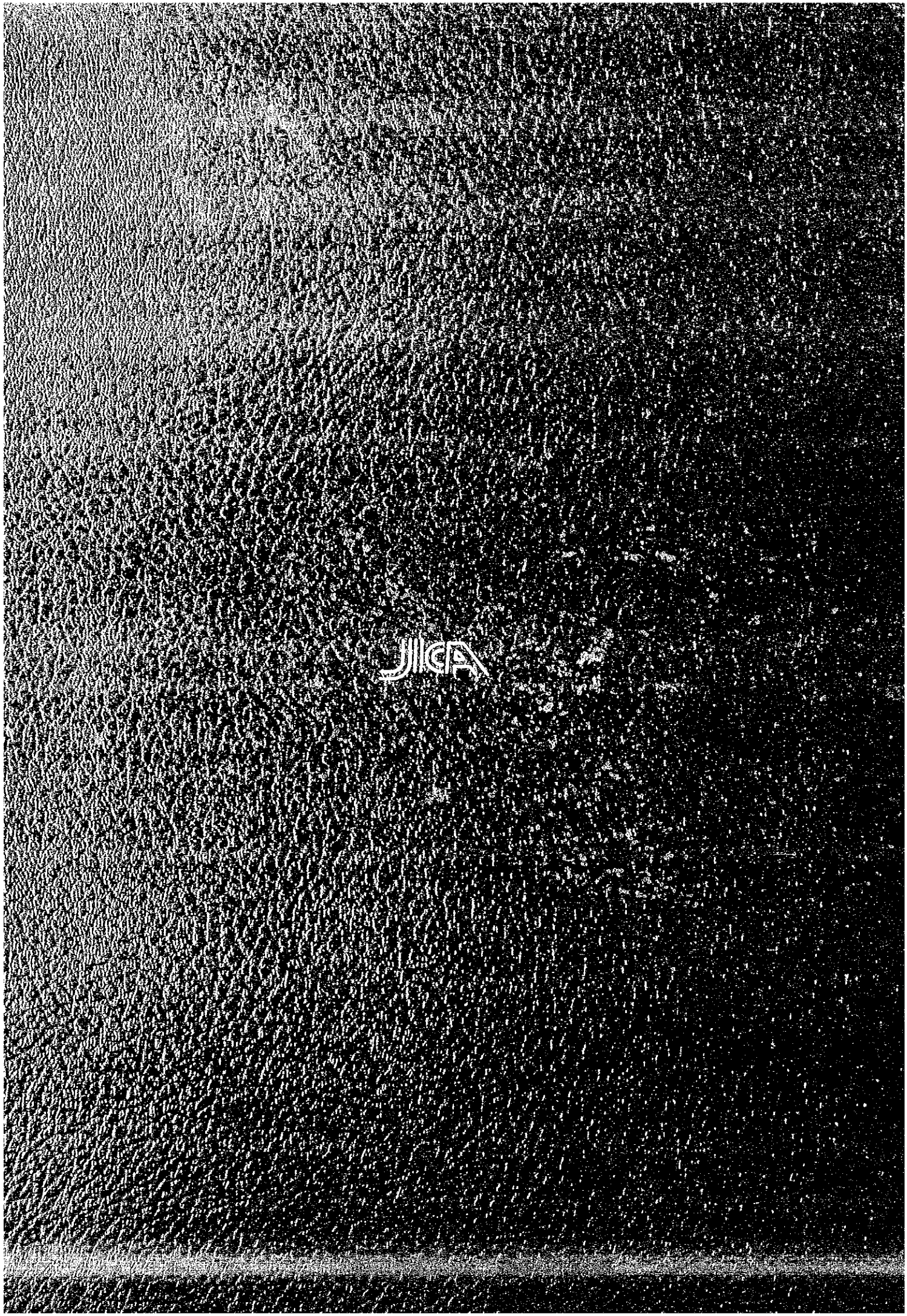
Year	Economic Cost							Benefit	Balance
	Const.	Admin.	E/S	Phy. Conti.	Land Acq.	O&M	Total		
1993							0.00	0.00	0.00
1994							0.00	0.00	0.00
1995			12.20	1.22			13.42	0.00	(13.42)
1996			12.20	1.22			13.42	0.00	(13.42)
1997							0.00	0.00	0.00
1998							0.00	0.00	0.00
1999							0.00	0.00	0.00
2000					8.05		8.05	0.00	(8.05)
2001	36.14	2.26	4.52	4.29	8.05		55.26	0.00	(55.26)
2002	36.14	2.26	4.52	4.29	8.05		55.26	11.01	(44.26)
2003	36.14	2.26	4.52	4.29	8.05		55.26	22.01	(33.25)
2004	36.14	2.26	4.52	4.29	8.05		55.26	33.02	(22.24)
2005	36.14	2.26	4.52	4.29	8.05		55.26	44.03	(11.24)
2006	36.14	2.26	4.52	4.29	8.05		55.26	55.03	(0.23)
2007	36.14	2.26	4.52	4.29	8.05		55.26	66.04	10.78
2008	36.14	2.26	4.52	4.29			47.21	77.05	29.83
2009	36.14	2.26	4.52	4.29			47.21	88.05	40.84
2010						1.79	1.79	99.06	97.27
2011						1.79	1.79	99.06	97.27
2012						1.79	1.79	99.06	97.27
2013						1.79	1.79	99.06	97.27
2014						1.79	1.79	99.06	97.27
2015						1.79	1.79	99.06	97.27
2016						1.79	1.79	99.06	97.27
2017						1.79	1.79	99.06	97.27
2018						1.79	1.79	99.06	97.27
2019						1.79	1.79	99.06	97.27
2020						1.79	1.79	99.06	97.27
2021						1.79	1.79	99.06	97.27
2022						1.79	1.79	99.06	97.27
2023						1.79	1.79	99.06	97.27
2024						1.79	1.79	99.06	97.27
2025						1.79	1.79	99.06	97.27
2026						1.79	1.79	99.06	97.27
2027						1.79	1.79	99.06	97.27
2028						1.79	1.79	99.06	97.27
2029						1.79	1.79	99.06	97.27
2030						1.79	1.79	99.06	97.27
2031						1.79	1.79	99.06	97.27
2032						1.79	1.79	99.06	97.27
2033						1.79	1.79	99.06	97.27
2034						1.79	1.79	99.06	97.27
2035						1.79	1.79	99.06	97.27
2036						1.79	1.79	99.06	97.27
2037						1.79	1.79	99.06	97.27
2038						1.79	1.79	99.06	97.27
2039						1.79	1.79	99.06	97.27
2040						1.79	1.79	99.06	97.27
2041						1.79	1.79	99.06	97.27
2042						1.79	1.79	99.06	97.27
2043						1.79	1.79	99.06	97.27
2044						1.79	1.79	99.06	97.27
2045						1.79	1.79	99.06	97.27
2046						1.79	1.79	99.06	97.27
2047						1.79	1.79	99.06	97.27
2048						1.79	1.79	99.06	97.27
2049						1.79	1.79	99.06	97.27
2050						1.79	1.79	99.06	97.27
								IRR =	16.13%

Table IX-3-2(4/4) ANNUAL COST AND BENEFIT FLOW OF ALTERNATIVE CASES FOR PHASE I

Safety degree : 5-year return period flood

Unit : Million Peso

Year	Economic Cost							Benefit	Balance
	Const.	Admin.	E/S	Phy. Conti.	Land Acq.	O&M	Total		
1993				0.00			0.00	0.00	0.00
1994				0.00			0.00	0.00	0.00
1995			10.83	1.08			11.92	0.00	(11.92)
1996			10.83	1.08			11.92	0.00	(11.92)
1997				0.00			0.00	0.00	0.00
1998				0.00			0.00	0.00	0.00
1999				0.00			0.00	0.00	0.00
2000				0.00	8.05		8.05	0.00	(8.05)
2001	36.11	2.26	4.51	4.29	8.05		55.22	0.00	(55.22)
2002	36.11	2.26	4.51	4.29	8.05		55.22	8.83	(46.40)
2003	36.11	2.26	4.51	4.29	8.05		55.22	17.65	(37.57)
2004	36.11	2.26	4.51	4.29	8.05		55.22	26.48	(28.75)
2005	36.11	2.26	4.51	4.29	8.05		55.22	35.31	(19.92)
2006	36.11	2.26	4.51	4.29	8.05		55.22	44.13	(11.09)
2007	36.11	2.26	4.51	4.29	8.05		55.22	52.96	(2.27)
2008	36.11	2.26	4.51	4.29			47.17	61.78	14.61
2009						1.59	1.59	70.61	69.02
2010						1.59	1.59	70.61	69.02
2011						1.59	1.59	70.61	69.02
2012						1.59	1.59	70.61	69.02
2013						1.59	1.59	70.61	69.02
2014						1.59	1.59	70.61	69.02
2015						1.59	1.59	70.61	69.02
2016						1.59	1.59	70.61	69.02
2017						1.59	1.59	70.61	69.02
2018						1.59	1.59	70.61	69.02
2019						1.59	1.59	70.61	69.02
2020						1.59	1.59	70.61	69.02
2021						1.59	1.59	70.61	69.02
2022						1.59	1.59	70.61	69.02
2023						1.59	1.59	70.61	69.02
2024						1.59	1.59	70.61	69.02
2025						1.59	1.59	70.61	69.02
2026						1.59	1.59	70.61	69.02
2027						1.59	1.59	70.61	69.02
2028						1.59	1.59	70.61	69.02
2029						1.59	1.59	70.61	69.02
2030						1.59	1.59	70.61	69.02
2031						1.59	1.59	70.61	69.02
2032						1.59	1.59	70.61	69.02
2033						1.59	1.59	70.61	69.02
2034						1.59	1.59	70.61	69.02
2035						1.59	1.59	70.61	69.02
2036						1.59	1.59	70.61	69.02
2037						1.59	1.59	70.61	69.02
2038						1.59	1.59	70.61	69.02
2039						1.59	1.59	70.61	69.02
2040						1.59	1.59	70.61	69.02
2041						1.59	1.59	70.61	69.02
2042						1.59	1.59	70.61	69.02
2043						1.59	1.59	70.61	69.02
2044						1.59	1.59	70.61	69.02
2045						1.59	1.59	70.61	69.02
2046						1.59	1.59	70.61	69.02
2047						1.59	1.59	70.61	69.02
2048						1.59	1.59	70.61	69.02
2049						1.59	1.59	70.61	69.02
2050						1.59	1.59	70.61	69.02
								IRR =	13.32%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