

4.5.3 Flood Affected Houses for Each Flood

As shown in the inundation area maps, no flood water rose up to flood level of private houses in case of 1966, 1974, 1975 and 1976 floods. Only in 1972 flood, flood water reached floor level. The number of the houses affected by flood water in relation to ponding depth above floor level is estimated as presented below.

Depth Above Floor Level (m)	0-0.5	0.5-1.0	1.0-1.5	over 1.5
No. of Houses	1869	552	0	0

4.5.4 Damaged Value

Damage on houses in the project area is estimated at P3.51 million in 1972 using the flood damage rate and the number of the houses flooded. Details of the calculation are presented in TABLE IV-25.

4.6 Damage on Transportation

Due to flood water and sand sedimentation brought by the flood, transportation facilities have been damaged. In the extreme case, roads and bridges were washed away by rushing stream of flood water. Besides, travel time or transportation cost increased during the flood time, which gave adverse effect on regional economy.

Flood damage on transportation can, thus, be summarized into the following three categories:

- i) Damage on bridges and roads;
- ii) Increased travel cost for detouring; and
- iii) Decreased regional product such as gross regional product resulting from temporary closure of major transportation arteries.

Flood damages on transportation facilities done by the flood during the period of 1963-1977 are described in TABLE IV-26.

Damage on bridges and roads can be approximately measured by the rehabilitation costs. Available data indicates that the rehabilitation costs are around P2.26 million disbursed during the fiscal year 1973 to 1975 as shown in TABLE IV-27. The disbursed amounts can be considered to be roughly equal to the rehabilitation costs for the damage of 1972 and 1974 floods since there were not so serious floods in 1975. In due consideration of the flood scale of the two floods, the rehabilitation costs for 1972 flood and 1974 flood are estimated at P1.81 million and P0.45 million.

million at 1974 price level respectively. There is no complete record for the rehabilitation cost of bridges and roads for 1966 flood. By referring the relation between the damage on bridges and roads and the rehabilitation cost, in the past records, the rehabilitation cost in 1966 flood is roughly estimated at P0.94 million at 1974 price.

These rehabilitation costs are revalued at 1978 price level by using an average inflation rate of 6.2% per annum, which are P1.20 million, P2.30 million and P0.57 million respectively for the flood of 1966, 1972 and respectively.

For the damages in categories ii) and iii), estimation is not made in this study since there is not much data available concerning these. Even if estimated, they would be only rough approximately which is not consistent to estimate for category i).

4.7 Damages on River Structures

Flooding of the Pasig-potrero river has also done damages on river structures, causing washing out and erosion of the dikes and scouring of boulder riprap. Capital expenditures have been necessitated for repairing the damaged structures. The details are illustrated in TABLE IV-28.

4.8 Total Damage

Total damages are calculated for the main floods in 1966, 1972, 1974, 1976 and 1977 respectively by aggregating the damages estimated in this chapter. They are P8.95 million, P21.48 million, P6.01 million, P4.41 million and P3.19 million for the floods in 1966, 1972, 1974, 1976 and 1977, in terms of 1978 value, respectively. The breakdown of the total damages are presented in TABLE IV-29.

TABLE IV-1 DEGREE OF FLOODING AND SAND SEDIMENTATION

Classification of Flooding

A. Inundation period

(1)	(2)	(3)	(4)
1 to 2 days	3 to 4 days	5 to 7 days	More than 7 days

B. Inundation depth

(1)	(2)	(3)	(4)
Less than 15 cm	15 to 45 cm	45 to 75 cm	More than 75 cm

Classification of Sand-sedimentation

C. Depth of sand-sediments

(1)	(2)	(3)	(4)
Less than 10 cm	10 to 30 cm	30 to 50 cm	More than 50 cm

TABLE IV-2 AREA INUNDATED AND SAND DEPOSITED
(gross area)

Degree of flood			(ha)				
Inundation	Sand Deposit		1966	1972	1974	1976	1977
(duration)	(depth)	(depth)					
A (1)	B (1)	-	-	-	1,320	-	-
A (1)	B (2)	-	70	70	70	-	1,000
A (2)	B (1)	-	-	-	-	150	-
A (2)	B (2)	-	1,200	-	1,370	1,340	1,400
A (3)	B (2)	-	-	-	-	590	-
A (3)	B (3)	-	1,250	-	1,250	-	1,170
A (4)	B (3)	-	-	1,050	-	1,250	-
A (4)	B (4)	-	-	1,470	-	-	-
A (1)	B (1)	C (1)	-	-	180	-	-
A (1)	B (2)	C (1)	1,420	-	400	-	220
A (1)	B (2)	C (2)	-	-	-	-	190
A (2)	B (1)	C (1)	-	450	-	70	-
A (2)	B (2)	C (1)	120	-	350	40	-
A (2)	B (2)	C (2)	1,030	20	-	160	-
A (3)	B (2)	C (1)	-	-	-	420	-
A (3)	B (2)	C (2)	-	-	-	-	-
A (4)	B (3)	C (2)	-	130	-	-	-
A (4)	B (3)	C (3)	-	540	-	-	-
A (4)	B (4)	C (4)	-	1,770	-	-	-
Total			5,090	5,550	4,940	3,020	3,980
Duration of inundation:							
A (1) ; short period;			1,490	70	1,970	-	1,410
A (2) ; medium period;			2,350	470	1,720	1,760	1,400
A (3) & A (4); long period;			1,250	4,960	1,250	1,260	1,170
Inundation depth:							
B (1) ; shallow;			-	450	1,500	220	-
B (2) ; rather deep;			3,840	90	2,190	2,550	2,810
B (3) & B (4); deep;			1,250	4,960	1,250	250	1,170
Depth of sand eposition:							
C (1) ; thin;			1,540	450	930	530	220
C (2) ; rather thick;			1,030	150	-	160	190
C (3) ; thick;			-	2,310	-	-	-

TABLE IV-3 CROPPED AREA OF PADDY BY GROWING STAGES

Year	Flood Degree	Total Cropping Area (ha)	Cropping Area by Growing Stages		
			Nursery to Tillering (ha)	Young Panicle Formation (ha)	Heading to Reopening (ha)
(mic-May, 1966)	A(1).B(2)	60	40	-	20
	A(1).B(2).C(1)	1,270	800	-	470
	A(2).B(2)	1,070	680	-	390
	A(2).B(2).C(1)	105	65	-	40
	A(2).B(2).C(2)	920	580	-	340
	A(3).B(3)	730	730	-	-
	Total	4,155	2,895	-	1,260
(Jul.-Aug., 1972)	A(1).B(2)	60	10	50	-
	A(2).B(1).C(2)	-	-	-	-
	A(3).B(2).C(2)	20	-	20	-
	A(4).B(3)	950	-	950	-
	A(4).B(3).C(2)	120	-	120	-
	A(4).B(3).C(3)	490	-	490	-
	A(4).B(4)	730	-	730	-
	A(4).B(4).C(4)	1,320	-	1,320	-
Total	3,690	10	3,680	-	
(mid-Aug., 1974)	A(1).B(1)	910	580	320	-
	A(1).B(1).C(1)	130	70	50	-
	A(1).B(2)	80	70	-	-
	A(1).B(2).C(1)	400	380	-	-
	A(2).B(2)	1,330	1,310	-	-
	A(2).B(2).C(1)	380	330	-	-
	A(3).B(3)	760	730	-	-
Total	3,990	3,470	370	-	

(to be continued)

Year	Flood Degree	Total Cropping Area (ha)	Cropping Area by Growing Stages		
			Nursery to Tillering (ha)	Young Panicle Formation (ha)	Heading to Reopening (ha)
(mid-May., 1976)	A(2).B(1)	80	50	-	30
	A(2).B(1).C(1)	40	20	-	20
	A(2).B(2)	580	0	-	580
	A(2).B(2).C(1)	30	30	-	-
	A(2).B(2).C(2)	120	120	-	-
	A(3).B(2)	450	450	-	-
	A(3).B(2).C(1)	330	330	-	-
	A(4).B(3)	470	470	-	-
	Total	2,100	1,470	-	630
(Nov., 1977)	A(1).B(2)	980	690	295	-
	A(1).B(2).C(1)	230	150	75	-
	A(1).B(2).C(2)	130	130	-	-
	A(2).B(2)	980	980	-	-
	A(3).B(3)	510	-	-	510
		Total	2,830	1,950	370

TABLE IV-4 EVALUATION OF AGRICULTURAL DAMAGES CAUSED BY FLOODING

Damages on Agricultural Product (Paddy rice)

Description	Typical Flooding in Past Year				
	1966	1972	1974	1976	1977
1. Area affected by flood (ha)					
a. Short time inundation	1,330	60	1,520	0	1,340
b. medium time inundation	2,095	0	1,710	850	980
c. long time inundation	730	3,630	760	1,250	510
2. Planting area affected (ha)					
a. first cropping	2,895	3,680	370	1,470	510
b. second cropping	1,260	0	3,470	630	1,590
c. third cropping	0	10	0	0	370
3. Production prospected (t) (normal condition)	8,310	8,490	10,770	4,620	6,420
4. Production damaged (t)					
a. first cropping	2,260	7,550	110	2,010	1,130
b. second cropping	910	0	3,010	410	890
c. third cropping	0	-	0	0	120
<u>Total</u>	3,170	7,550	3,120	2,420	2,140
5. Crop damage					
a. propotional rate (%)	38.1	88.9	29.0	52.4	33.3
b. values (P 10 ³)	3,645.5	8,682.5	3,587.5	2,783.0	2,461.0

TABLE IV-5 AVERAGE YIELD OF PADDY IN THE PAST YEAR

Municipality	(t/ha)							
	1966	1971	1972	1973	1974	1975	1976	1977
Bacolor	1.8	1.8	2.4	2.4	2.7	2.8	2.3	2.7
Guagua	2.0	2.1	1.7	2.2	2.5	2.1	2.2	2.5
Sta. Rito	2.3	2.5	2.7	2.2	2.8	2.8	2.3	2.7
Total average	2.0	2.1	2.3	2.3	2.7	2.5	2.2	2.6

Note; Figures are obtained from the selected area where the land is free from the flood problems. The field is an average on both irrigated field and rain-fed field.

Data Source: Extension offices in Municipalities and Provincial Agri-Extension office.

TABLE IV-6 YIELD REDUCTION RATE

Drop Growth Stage	Yield reduction (%) at different duration of extreme submergence			
	1-2 days	3-4 days	5-7 days	7 days
	<u>Clear Water</u>			
20 days after transplanting	10	20	30	35
Young panicle or formation partly inundated	10	30	65	95-100
Young panicle formation completely inundated	25	45	80	90-100
Heading Stage	15	25	30	70
Ripening Stage	0	15	20	20
	<u>Muddy Water</u>			
Young panicle formation partly inundated /1	20	50	85	90-100
Young panicle formation completely inundated	70	80	85	90-100
Heading	30	80	90	90-100
Ripening Stage	5	10	30	30

/1: Partly means leaves (9-15 cm on long) remain above water surface.

Source: The Philippines recommends for rice 1977, p. 130

Note: Extreme submergence damage on rice according to stage of growth (Cacili, n.d.)

TABLE IV-7 DEGREE OF YIELD REDUCTION (%) OF PADDY

Degree of Past Flooding	Three Major Stage of Crop		
	Nursery to Tillering	Young Panicle Formation	Heading to Repening
A(1).B(1)	10	10	10
A(1).B(2)	10	10	10
A(2).B(1)	15	30	30
A(2).B(2)	20	30	30
A(3).B(2)	45	85	65
A(3).B(3)	30	65	85
A(4).B(3)	85	65	70
A(4).B(4)	100	100	95
A(1).B(1).C(1)	10	15	15
A(1).B(2).C(1)	20	20	10
A(1).B(2).C(2)	35	35	80
A(2).B(1).C(1)	15	30	65
A(2).B(2).C(1)	50	30	50
A(2).B(2).C(2)	100	65	80
A(3).B(2).C(1)	50	85	70
A(3).B(2).C(2)	100	80	90
A(4).B(3).C(2)	100	85	85
A(4).B(3).C(3)	100	100	100
A(4).B(4).C(4)	100	100	100

TABLE IV-8. CROP DAMAGES CAUSED BY FLOODING

Year	Degree of Flooding	Planting Area Affected (ha)	Production Damaged (t)	Damage Values (P 10 ³)
Mid-May, 1966	A(1).B(2)	60	10	11.5
	A(1).B(2).C(1)	1,270	410	471.5
	A(2).B(2)	1,070	510	586.5
	A(2).B(2).C(1)	105	100	115.0
	A(2).B(2).C(2)	920	1,700	1,955.0
	A(3).B(3)	730	440	506.0
	Total	4,155	3,170	3,645.5
Jul.-Aug., 1972	A(1).B(2)	60	10	11.5
	A(2).B(1).C(2)	-	-	-
	A(3).B(2).C(2)	20	40	46.0
	A(4).B(3)	950	1,420	1,633.0
	A(4).B(3).C(2)	120	230	264.6
	A(4).B(3).C(3)	490	1,130	1,299.5
	A(4).B(4)	730	1,680	1,932.0
	A(4).B(4).C(4)	1,320	3,040	3,496.0
	Total	3,690	7,550	8,682.5
Mid-Aug., 1974	A(1).B(1)	910	240	276.0
	A(1).B(1).C(1)	130	50	57.5
	A(1).B(2)	80	20	23.0
	A(1).B(2).C(1)	400	200	230.0
	A(2).B(2)	1,330	1,060	1,219.0
	A(2).B(2).C(1)	380	270	310.5
	A(3).B(3)	760	1,280	1,472.0
	Total	3,990	3,120	3,587.5

(to be continued)

Year	Degree of Flooding	Planting Area Affected (ha)	Production Damaged (t)	Damage Values (P 10 ³)
Mid-May, 1976	A(2).B(1)	80	40	46.0
	A(2).B(1).C(1)	40	20	23.0
	A(2).B(2)	580	380	437.0
	A(2).B(2).C(1)	30	30	34.5
	A(2).B(2).C(2)	120	360	299.0
	A(3).B(2)	450	450	517.5
	A(3).B(2).C(1)	330	360	414.0
	A(4).B(3)	470	880	1,012.0
	Total	2,100	2,420	2,783.0
Nov., 1977	A(1).B(2)	980	260	299.0
	A(1).B(2).C(1)	230	120	138.0
	A(1).B(2).C(2)	130	120	138.0
	A(2).B(2)	980	510	586.5
	A(3).B(3)	510	1,130	1,299.5
	Total	2,830	2,140	2,461.0

Note: Damage values in terms of the production damage of paddy are estimated by the current price of paddy at P 1.15/kg.

TABLE IV-9 DAMAGES CAUSED BY FLOODING

Damages on Agricultural Facilities
(Mid-May, 1966)

Description	Bacolor	Guagua	Sta. Rita	Total
A. Area affected (ha)	3,850	580	660	5,090
(1) Paddy field (ha)	3,480	170	510	4,160
(2) Upland field (ha)	0	70	0	70
(3) Fish-pond (ha)	180	210	0	390
(4) Village yard (ha)	190	130	150	470
B. Paddy field damaged	460	30	130	620
- Partially eroded (ha)	290	20	80	390
- Seriously eroded (ha)	170	10	50	230
C. Creeks & Irrigation canals	15,560	740	4,200	20,500
- Major creeks (m)	2,660	140	700	3,500
= partially washed-out	2,000	100	500	2,600
= seriously washed-out	660	40	200	900
- Minor canals (m)	12,900	600	3,500	17,000
= partially washed-out	8,700	500	2,300	11,500
= seriously washed-out	4,200	100	1,200	5,500
D. Farm roads (m)	3,400	100	900	4,400
= partially washed-out	2,400	100	600	3,100
= seriously washed-out	1,000	0	300	1,300
E. Major structure (Nos.)				
= bridges	3	0	2	5
= curvert	10	1	3	14

Source: (1) Short report on flood damage, Municipality offices
 (2) Information collected by field interview, 1978
 (3) Interpretation of topographic map (1:50,000)
 based on the informations obtained by field interview,
 1978.

TABLE IV-10 DAMAGES CAUSED BY FLOODING

Damages on Agricultural Facilities
(Jul. - Aug., 1972)

Description	Bacolor	Guagua	Sta. Rita	Total
A. Area affected (ha)	3,450	750	1,300	5,500
(1) Paddy field	2,670	170	850	3,690
(2) Upland field	0	70	0	70
(3) Fish-pond	200	340	0	540
(4) Village yard	580	170	450	1,200
B. Paddy field damaged	630	40	200	870
- Partially eroded (ha)	360	20	120	500
- Seriously eroded (ha)	270	20	80	370
C. Creeks & Irrigation canals	32,100	10,000	10,000	52,100
- Major creeks (m)	9,400	2,900	2,900	15,200
= partially washed-out	6,500	2,100	1,900	10,500
= seriously washed-out	2,900	800	1,000	4,700
- Minor canals (m)	22,700	7,100	7,100	36,900
= partially washed-out	13,800	4,300	4,400	22,500
= seriously washed-out	8,900	2,800	2,700	14,400
D. Farm roads (m)	11,700	3,700	3,600	19,000
= partially washed-out	7,300	2,300	2,300	11,900
= seriously washed-out	4,400	1,400	1,300	7,100
E. Major structure (Nos.)				
= Bridges	8	2	3	13
= Curverts	19	6	6	31

Source: (1) Short report on flood damages, Municipality offices.
 (2) Information collected by field interview, 1978
 (3) Interpretation of topographic map (1:50,000) based on the information obtained by field interview, 1978

TABLE IV-11. DAMAGES CAUSED BY FLOODING

Damages on Agricultural Facilities
(Mid-Aug., 1974)

Description	Bacolor	Guagua	Sta. Rita	Total
A. Area affected (ha)	2,970	1,360	610	4,940
(1) Paddy field	2,100	170	560	2,830
(2) Upland field	0	70	0	70
(3) Fish-pond	400	790	0	1,190
(4) Village yard	470	330	50	850
B. Paddy field damaged	650	30	120	800
- Partially eroded (ha)	450	30	70	550
- Seriously eroded (ha)	200	0	50	250
C. Creeks & Irrigation canals	10,100	1,600	2,600	14,300
- Major creeks (m)	1,600	300	400	2,300
= partially washed-out	1,300	250	350	1,900
= seriously washed-out	300	50	50	400
- Minor canals (m)	8,500	1,300	2,200	12,000
= partially washed-out	6,400	1,000	1,600	9,000
= seriously washed-out	2,100	300	600	3,000
D. Farm roads (m)	2,000	300	500	2,800
= partially washed-out	1,600	300	400	2,300
= seriously washed-out	400	0	100	500
E. Major structure (Nos.)				
= Bridges	2	-	-	2
= Curverts	3	-	2	5

Source: (1) Short report on flood damages, Municipality offices
 (2) Information collected by field interview, 1978
 (3) Interpretation of topographic map (1:50,000) based on
 the information obtained by field interview, 1978

TABLE IV-12 DAMAGES CAUSED BY FLOODING

Damages on Agricultural Facilities
(Mid-May, 1976)

Description	Bacolor	Guagua	Sta. Rita	Total
A. Area affected (ha)	1,930	630	460	3,020
(1) Paddy field	1,550	170	380	2,100
(2) Upland field	0	70	0	70
(3) Fish-pond	200	340	0	540
(4) Village yard	180	50	80	310
B. Paddy field damaged	540	30	100	670
= Partially eroded (ha)	350	30	60	440
= Seriously eroded (ha)	190	0	40	230
C. Creeks & Irrigation canals	7,100	1,900	2,900	11,900
- Major creeks (m)	1,200	400	500	2,100
= partially washed-out	900	250	350	1,500
= seriously washed-out	300	150	150	600
- Minor canals (m)	5,900	1,500	2,400	9,800
= partially washed-out	3,800	1,100	1,500	6,400
= seriously washed-out	2,100	400	900	3,400
D. Farm roads (m)	1,500	500	600	2,600
= partially washed-out	1,080	320	400	1,800
= seriously washed-out	420	180	200	800
E. Major structure (Nos.)				
= Bridges	-	-	-	-
= Curverts	4	-	1	5

Source: (1) Short report on flood damages, Municipality offices
 (2) Information collected by field interview, 1978
 (3) Interpretation of topographic map (1:50,000) based on the information obtained by field interview, 1978

TABLE IV-13 DAMAGES CAUSED BY FLOODING

Damages on Agricultural Facilities
(Nov., 1977)

Description	Bacolor	Guagua	Sta. Rita	Total
A. Area affected (ha)	2,570	750	660	3,980
(1) Paddy field	2,150	170	510	2,830
(2) Upland field	0	70	0	70
(3) Fish-pond	200	340	0	540
(4) Village yard	220	170	150	540
B. Paddy field damaged	310	70	150	530
- Partially eroded (ha)	200	40	100	340
- seriously eroded (ha)	110	30	50	190
C. Creeks & Irrigation canals	6,900	4,400	3,300	14,600
- Major creeks (m)	1,200	800	600	2,600
= partially washed-out	1,000	600	500	2,100
= seriously washed-out	200	200	100	500
- Minor canals (m)	5,700	3,600	2,700	12,000
= partially washed-out	4,000	2,500	1,900	8,400
= seriously washed-out	1,700	1,100	800	3,600
D. Farm road (m)	900	600	500	2,000
= partially washed-out	700	500	300	1,500
= seriously washed-out	200	100	200	500
E. Major structures (Nos.)				
= Bridges	-	-	-	-
= Curverts	2	0	1	3

Source: (1) Short report on flood damage, Municipality offices
 (2) Information collected by field interview, 1978
 (3) Interpretation of topographic map (1:50,000) based on the information obtained by field interview, 1978

TABLE IV-14 DAMAGES ON FARM LAND AND STRUCTURES

1. Farm land and Field ridges.

- Seriously washed-out

o Repair and Maintenance of field ridges and land re-grading
= no machinery operation was practiced.

= mainly operated by hand-labour 50 M/D to 55 M/D per ha
and with two water-buffaroes/20 days per ha.

$$(55 \text{ M/D} \times \text{P } 10) + (2 \times 20 \times \text{P } 8) \\ = \text{P } 550 + \text{P } 320 = \text{P } 870/\text{ha}$$

- Partially washed-out

o Repair and Maintenance of field ridges and land re-grading
= 20 M/D to 30 M/D with two water-buffaroes per 5 days per ha.

$$(30 \text{ M/D} \times \text{P } 10) + (2 \times 5 \times \text{P } 8) \\ = \text{P } 300 + \text{P } 80 = \underline{\underline{\text{P } 380/\text{ha}}}$$

2. Creek and irrigation canals

- Seriously broke (or washed-out)

= Repair and maintenance mainly operated by hand-labour.

= labour requirement per km; 2,000 M/D to 3,500 M/D

$$3,500 \text{ M/D} \times \text{P } 10/\text{M/D} = \underline{\underline{\text{P } 35,000/\text{km}}}$$

- Repair of minor canals seriously broke are estimated to
be 10% of above. $\underline{\underline{\text{P } 3,500/\text{km}}}$

- Partially broken (or washed-out)

= labour requirement per km, 500 M/D to 750 M/D

$$750 \text{ M/D} \times \text{P } 10 \text{ M/D} = \underline{\underline{\text{P } 7,500/\text{km}}}$$

- Minor canal partially broken: $\underline{\underline{\text{P } 750/\text{km}}}$

(to be continued)

3. Facilities such as culverts and intake facilities

Unit price = culvert (1.00 m x 3.00 m long) = P 2,000/No.

4. Farm road

- Seriously broken or washed out

= labour requirement per km for repair and maintenance
200 M/D to 230 M/D per km.

230 M/D x P 10 M/D = P 2,300/km

- Partially broken or washed-out

= labour requirement per km for repair and maintenance
50 M/D to 120 M/D per km.

120 M/D x P 10 M/D = P 1,200/km

5. Bridges on Farm road

= unit price (construction cost) of wooden or bamboo
bridges (1.5 m wide x 3 m long) = 500 pare

- concrete bridge; P 20,000 - 30,000/No.

TABLE IV-15 DAMAGED VALUES ESTIMATED ON AGRICULTURAL FACILITIES

(Mid-May, 1966)

(P 10³)

Description	Bacolor	Guagua	Sta. Rita	Total
1. Paddy field damaged				
a. Partially eroded	110.2	7.6	30.4	148.2
b. Seriously eroded	147.9	8.7	43.5	200.1
Sub-total	<u>258.1</u>	<u>16.3</u>	<u>73.9</u>	<u>348.3</u>
2. Irrigation facilities				
a. Major creeks				
a.1 Partially washedout	15.0	0.7	3.7	19.4
a.2 Seriously washedout	23.1	1.4	7.0	31.5
b. Minor canals				
b.1 Partially washedout	6.5	0.4	1.7	8.6
b.2 Seriously washedout	14.7	0.3	4.2	19.2
Sub-total	<u>59.3</u>	<u>2.8</u>	<u>16.6</u>	<u>78.7</u>
3. Farm roads				
a. Partially washedout	2.9	0.1	0.7	3.7
b. Seriously washedout	2.3	0	0.7	3.0
Sub-total	<u>5.2</u>	<u>0.1</u>	<u>1.4</u>	<u>6.7</u>
4. Major structure				
a. Bridges	1.5	0	1.0	2.5
b. Curverts	20.0	2.0	6.0	28.0
Sub-total	<u>21.5</u>	<u>2.0</u>	<u>7.0</u>	<u>30.5</u>
Total	344.1	21.2	98.9	464.2

TABLE IV-16 DAMAGED VALUES ESTIMATED ON AGRICULTURAL FACILITIES

(Jul. - Aug., 1972)

(P 10³)

Description	Bacolor	Guagua	Sta. Rita	Total
1. Paddy field damaged				
a. Partially eroded	136.8	7.6	45.6	190.0
b. Seriously eroded	234.9	17.4	69.6	321.9
Sub-total	<u>371.7</u>	<u>25.0</u>	<u>115.2</u>	<u>511.9</u>
2. Irrigation facilities				
a. Major creeks				
a.1 Partially washedout	48.7	15.8	14.2	78.7
a.2 Seriously washedout	101.5	28.0	35.0	164.5
b. Minor canals				
b.1 Partially washedout	6.7	2.1	2.0	10.8
b.2 Seriously washedout	31.2	9.8	9.5	50.5
Sub-total	<u>188.1</u>	<u>55.7</u>	<u>60.7</u>	<u>304.5</u>
3. Farm roads				
a. Partially washedout	8.8	2.8	2.8	14.4
b. Seriously washedout	10.1	3.2	3.0	16.3
Sub-total	<u>18.9</u>	<u>6.0</u>	<u>5.8</u>	<u>30.7</u>
4. Major structure				
a. Bridges	4.0	1.0	1.5	6.5
b. Curverts	38.0	12.0	12.0	62.0
Sub-total	<u>42.0</u>	<u>13.0</u>	<u>13.5</u>	<u>68.5</u>
Total	620.7	99.7	195.2	915.6

TABLE IV-17 DAMAGED VALUES ESTIMATED ON
AGRICULTURAL FACILITIES

(Mid-Aug., 1974)

(P 10³)

Description	Bacolor	Guagua	Sta. Rita	Total
1. Paddy field damaged				
a. Partially eroded	171.0	11.4	26.6	209.0
b. Seriously eroded	174.0	0	43.5	217.5
Sub-total	<u>345.0</u>	<u>11.4</u>	<u>70.1</u>	<u>426.5</u>
2. Irrigation facilities				
a. Major creeks				
a.1 Partially washedout	9.8	1.9	2.6	14.3
a.2 Seriously washedout	10.5	1.8	1.8	14.1
b. Minor canals				
b.1 Partially washedout	4.8	0.8	1.2	6.8
b.2 Seriously washedout	7.4	1.1	2.1	10.6
Sub-total	<u>32.5</u>	<u>5.6</u>	<u>7.7</u>	<u>45.8</u>
3. Farm roads				
a. Partially washedout	1.9	0.4	0.5	2.8
b. Seriously washedout	0.9	0	0.2	1.1
Sub-total	<u>2.8</u>	<u>0.4</u>	<u>0.7</u>	<u>3.9</u>
4. Major structure				
a. Bridges	1.0	0	0	1.0
b. Curverts	6.0	0	4.0	10.0
Sub-total	<u>7.0</u>	<u>0</u>	<u>4.0</u>	<u>11.0</u>
Total	387.3	17.4	82.5	487.2

TABLE IV-18 DAMAGED VALUES ESTIMATED ON
AGRICULTURAL FACILITIES

(Mid-May, 1976)

(P 10³)

Description	Bacolor	Guagua	Sta. Rita	Total
1. Paddy field damaged				
a. Partially eroded	133.0	11.4	22.8	167.2
b. Seriously eroded	165.3	0	34.8	200.1
Sub-total	<u>298.3</u>	<u>11.4</u>	<u>57.6</u>	<u>367.3</u>
2. Irrigation facilities				
a. Major creeks				
a.1 Partially washedout	6.6	1.9	2.6	11.1
a.2 Seriously washedout	10.5	5.3	5.3	21.1
b. Minor canals				
b.1 Partially washedout	2.8	0.8	1.1	4.7
b.2 Seriously washedout	7.3	1.4	3.2	11.9
Sub-total	<u>27.2</u>	<u>9.4</u>	<u>12.2</u>	<u>48.8</u>
3. Farm roads				
a. Partially washedout	1.3	0.4	0.5	2.2
b. Seriously washedout	1.0	0.4	0.5	1.9
Sub-total	<u>2.3</u>	<u>0.8</u>	<u>1.0</u>	<u>4.1</u>
4. Major structures				
a. Bridges	0	0	0	0
b. Curverts	8.0	0	2.0	10.0
Sub-total	<u>8.0</u>	<u>0</u>	<u>2.0</u>	<u>10.0</u>
Total	335.8	21.6	72.8	430.2

TABLE IV-19 DAMAGED VALUES ESTIMATED ON
AGRICULTURAL FACILITIES

(Nov., 1977)

(P 10³)

Description	Bacolor	Guagua	Sta. Rita	Total
1. Paddy field damaged				
a. Partially eroded	76.0	15.2	38.0	129.2
b. Seriously eroded	95.7	26.1	43.5	165.3
Sub-total	<u>171.7</u>	<u>41.3</u>	<u>81.5</u>	<u>294.5</u>
2. Irrigation facilities				
a. Major creeks				
a.1 Partially washedout	7.5	4.5	3.7	15.7
a.2 Seriously washedout	7.0	7.0	3.5	17.5
b. Minor canals				
b.1 Partially washedout	3.0	1.9	1.4	6.3
b.2 Seriously washedout	6.0	3.9	2.8	12.7
Sub-total	<u>23.5</u>	<u>17.3</u>	<u>11.4</u>	<u>52.2</u>
3. Farm roads				
a. Partially washedout	0.8	0.6	0.4	1.8
b. Seriously washedout	0.5	0.2	0.5	1.2
Sub-total	<u>1.3</u>	<u>0.8</u>	<u>0.9</u>	<u>3.0</u>
4. Major structures				
a. Bridges	0	0	0	0
b. Curverts	4.0	0	2.0	6.0
Sub-total	<u>4.0</u>	<u>0</u>	<u>2.0</u>	<u>6.0</u>
Total	200.5	59.4	95.8	355.7

TABLE IV-20 EXPENDITURE FOR RE-CROPPING PER HA

		(P)
a.	Seeds	90 kg - 100 kg x P 1.95 kg = 195
b.	Fertilizer	3 bag (area) x P 75 bag = 225
c.	Chemicals	1 l (insecticides) x P 35 l = 35
d.	Labor for field preparation	
	- Land grading	15 M/D x P 10.2 153
	- Ploughing	10 M/D x P 10.2 102
	- Puddling	5 M/D x P 10.2 51
e.	Labor for nursery preparation	
		10 M/D x P 10.2 102
f.	Labor for transplanting	
		15 M/D x P 10.2 153
g.	Labor for harvesting and threshing per ha	
	15 M/D x P 10.5 in addition to the expenses under normal condition	157
Total		1,173

TABLE IV-21 EVALUATION OF AGRICULTURAL DAMAGES CAUSED BY FLOODING AND SAND-SEDIMENTS

Expenditures in addition to normal conditions

Description	1966	1972	1974	1976	1977
1. Planting area affected (ha)					
a. Re-transplanting area	1,220	0	0	330	20
b. Harvesting area affected	1,260	0	0	630	510
2. Additional expenditure					
a. Re-transplanting (P10 ³)	1,239.5	0	0	335.3	20.4
b. Harvesting & processing (P10 ³)	197.8	0	0	98.9	80.1

TABLE IV-22' DAMAGES CAUSED BY SAND-SEDIMENTATION

Damages on Land Arability and Productivity

(mid-May, 1966 and Jul. - Aug., 1972)

Description	(ha)			
	Bacolor	Guagua	Sta. Rita	Total
<u>1966: Total paddy field (ha)</u>	3,480	170	510	4,160
A. Area affected (ha)	2,320	-	250	2,570
- C(1): thinly sedimented	1,440	-	100	1,540
- C(2): rather deeply sedimented	880	-	150	1,030
- C(3): deeply sedimented	-	-	-	-
- C(4): urtra deeply sedimented	-	-	-	-
B. Damages on land arability	280	-	-	280
- completely missed (waste)	-	-	-	-
- diversified to upland crop	280	-	-	280
C. Damages on land productivity	1,780	-	240	2,020
- missing irrigability (rain-fed)	980	-	80	1,060
- partly missing irrigability	800	-	160	960
<u>1972: Total paddy field (ha)</u>	2,670	170	850	3,690
A. Area affected (ha)	2,360	100	450	2,910
- C(1): thinly sedimented	-	-	-	-
- C(2): rather deeply sedimented	600	-	-	600
- C(3): deeply sedimented	400	-	140	540
- C(4): urtra deeply sedimented	1,360	100	310	1,770
B. Damages on land arability	940	70	290	1,300
- completely missed (waste)	770	60	250	1,080
- transformed to upland crop	170	10	40	220
C. Damages on land productivity	1,420	30	600	2,050
- missing irrigability (rain-fed)	1,130	-	450	1,580
- partly missing irrigability	290	30	150	470

(to be continued)

Description	Bacolor	Guagua	Sta. Rita	Total
<u>1974: Total paddy field (ha)</u>	2,100	170	560	2,830
A. Area affected (ha)	880	-	50	930
- C(1): thinly sedimented	880	-	50	930
- C(2): rather deeply sedimented	-	-	-	-
- C(3): deeply sedimented	-	-	-	-
- C(4): ultra deeply sedimented	-	-	-	-
B. Damages on land arability	-	-	-	-
- completely missed (waste)	-	-	-	-
- transformed to upland crop	-	-	-	-
C. Damages on land productivity	800	-	30	830
- missing irrigability (rain-fed)	-	-	-	-
- partly missing irrigability	800	-	30	830
<u>1976: Total paddy field (ha)</u>	1,930	630	460	3,020
A. Area affected (ha)	520	-	-	520
- C(1): thinly sedimented	400	-	-	400
- C(2): rather deeply sedimented	120	-	-	120
- C(3): deeply sedimented	-	-	-	-
- C(4): ultra deeply sedimented	-	-	-	-
B. Damages on land arability	40	-	-	40
- completely missed (waste)	-	-	-	-
- transformed to upland crop	40	-	-	40
C. Damages on land productivity	520	-	-	520
- missing irrigability (rain-fed)	-	-	-	-
- partly missing irrigability	520	-	-	520

(to be continued)

Description	(ha)			
	Bacolor	Guagua	Sta. Rita	Total
1977: Total paddy field (ha)	2,530	170	850	3,550
A. Area affected (ha)	360	-	-	360
- C(1): thinly sedimented	230	-	-	230
- C(2): rather deeply sedimented	130	-	-	130
- C(3): deeply sedimented	-	-	-	-
- C(4): ultra deeply sedimented	-	-	-	-
B. Damages on land arability	10	-	-	10
- completely missed (waste)	-	-	-	-
- transformed to upland crop	10	-	-	10
C. Damages on land productivity	155	-	-	155
- missing irrigability (rain-fed)	-	-	-	-
- partly missing irrigability	155	-	-	155

TABLE IV-23 DAMAGE VALUES ESTIMATED ON MISSING LAND ARABILITY AND PRODUCTIVITY

(P10 ³)				
Description	Bacolor	Guagua	Sta. Rita	Total
<u>mid-May, 1966</u>				
1. Damages on land arability				
a. completely missed (waste)	0	0	0	0
b. transformed to upland crop	161.0	0	0	161.0
Sub-total	<u>161.0</u>	<u>0</u>	<u>0</u>	<u>161.0</u>
2. Damages on land productivity				
a. missing irrigability (rain-fed)	788.9	0	64.4	853.3
b. partly missing irrigability	920.0	0	184.0	1,104.0
Sub-total	<u>1,708.9</u>	<u>0</u>	<u>248.4</u>	<u>1,957.3</u>
Total	1,869.9	0	248.4	2,118.3
<u>Jul. - Aug., 1972</u>				
1. Damages on land arability				
a. completely missed (waste)	2,036.6	158.7	661.3	2,856.6
b. transformed to upland crop	112.4	6.6	26.5	145.5
Sub-total	<u>2,149.0</u>	<u>165.3</u>	<u>687.8</u>	<u>3,002.1</u>
2. Damages on land productivity				
a. missing irrigability (rain-fed)	1,046.1	0	416.6	1,462.7
b. partly missing irrigability	383.5	39.6	193.4	616.5
Sub-total	<u>1,429.6</u>	<u>39.6</u>	<u>610.0</u>	<u>2,079.2</u>
Total	3,578.6	204.9	1,297.8	5,081.3

(to be continued)

(P10³)

Description	Bacolor	Guagua	Sta. Rita	Total
<u>mid-Aug., 1974</u>				
1. Damages on land arability				
a. completely missed (waste)	0	0	0	0
b. transformed to upland crop	0	0	0	0
Sub-total	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
2. Damages on land productivity				
a. missing irrigability (rain-fed)	0	0	0	0
b. partly missing irrigability	1,242.0	0	46.5	1,288.5
Sub-total	<u>1,242.0</u>	<u>0</u>	<u>46.5</u>	<u>1,288.5</u>
Total	1,242.0	0	46.5	1,288.5

mid-May, 1976

1. Damages on land arability				
a. completely missed (waste)	0	0	0	0
b. diversified to upland crop	25.3	0	0	25.3
Sub-total	<u>25.3</u>	<u>0</u>	<u>0</u>	<u>25.3</u>
2. Damages on land productivity				
a. missing irrigability (rain-fed)	0	0	0	0
b. partly missing irrigability	657.8	0	0	657.8
Sub-total	<u>657.8</u>	<u>0</u>	<u>0</u>	<u>657.8</u>
Total	683.1	0	0	683.1

(to be continued)

(P10³)

Description	Bacolor	Guagua	Sta. Rita	Total
<u>Nov., 1977</u>				
1. Damages on land arability				
a. completely missed (waste)	0	0	0	0
b. transformed to upland crop	7.4	0	9	7.4
Sub-total	<u>7.4</u>	<u>0</u>	<u>0</u>	<u>7.4</u>
2. Damages on land productivity				
a. missing irrigability (rain-fed)	0	0	0	0
b. partly missing irrigability	231.7	0	0	231.7
Sub-total	<u>231.7</u>	<u>0</u>	<u>0</u>	<u>231.7</u>
Total	239.1	0	0	239.1

TABLE IV-24 DAMAGE TO FISH-POND AND FISH PRODUCTION

Description	Pampanga Province	Project Area
<u>mid-May, 1966</u>		
- Area affected (ha)	-	390
- Value of damages (P 10 ³)	-	-
= facilities	-	16
= production	-	63
<u>Total</u>	<u>-</u>	<u>79</u>
<u>Jul. - Aug., 1972</u>		
- Area affected (ha)	13,680	540
- Value of damages (P 10 ³)	-	-
= facilities	12,009	474
= production	13,334	517
<u>Total</u>	<u>25,343</u>	<u>991</u>
<u>mid-Aug., 1974</u>		
- Area affected (ha)	3,440	1,190
- Value of damages (P 10 ³)	-	-
= facilities	112	39
= production	82	28
<u>Total</u>	<u>194</u>	<u>67</u>
<u>mid-May, 1976</u>		
- Area affected (ha)	8,250	540
- Value of damages (P 10 ³)	-	-
= facilities	-	-
= production	16,500	80
<u>Total</u>	<u>16,500</u>	<u>80</u>

(to be continued)

Description	Pampanga Province	Project Area
<u>Nov., 1977</u>		
- Area affected (ha)	-	540
- Value of damages (P10 ³)	-	
= facilities	-	13
= productin	-	17
<u>Total</u>	<u>-</u>	<u>30</u>

Data Source: Summary data on Estimate of Damage to Fish-pond Fisheries, Regional office No. III, San Fernando, Pampanga.

TABLE IV-27 DAMAGE ON HOUSES IN 1972

Name of Affected Villages	No. of Houses	House Value	Depth Above Floor Level	Damage Rate	Damage (P)
Municipality					
Bacolor					
B. Balas	170	8,500	0-0.5	0.05	72,250
B. Cabambangan	170	8,500	0.5-1.0	0.07	101,150
B. Cabetican	530	16,550	0.5-1.0	0.07	614,005
B. Parulog	252	8,500	1.0-1.5	0.10	214,200
B. San Antonio	834	8,500	0.5-1.0	0.07	496,230
B. San Vicenta	899	16,550	0-0.5	0.05	743,923
Municipality of Guagua					
B. San Juan	240	8,500	0-0.5	0.05	102,000
B. San Juan Bantista	252	16,550	0-0.5	0.05	208,530
B. San Roque	350	16,550	0-0.5	0.05	289,625
Municipality of Sta. Rita					
B. San Isidro	500	8,500	0-0.5	0.05	212,500
B. San Juan	335	8,500	0.5-1.0	0.07	199,325
B. Sta Monica	300	8,500	1.0-1.5	0.10	255,000
Total Damage					P 3,508,738

TABLE IV-26 DAMAGES OF THE ROADS (1963-1977)

Date	Typhoon	Damage
July. 1976	Huaning	
Oct. 1973	Luming Narcing	National road, (Bacolor-Guagua) submerged 0.50 m
July 6, 1972	Edeng	Left abutment of Mancatian bridge No.2 was washed away. Traffic on Bacolor-Guagua and Angeles-Porac Road was disrupted
Oct. 1971	Barang Erising Dadang Erling	
July. 1971	Hosing Simang	Light traffic on Road, Guagua-Bacolor was suspended
Sept. 1-5 & 11-13, 1970	Leleng Miding Pitang	Traffic was stopped
Aug. 6, 1969	Elang Goring	Flooded, National road, Bacolor km 72-74 & Guagua-Sta. Rita
Aug. 28, 29, 1968	Iniang Wendy	Submerged 3 ft National Road km 73-74
June 8, 1967		National road, Bacolor km 73-74 submerged
Aug. 1966		National road, Bacolor km 72-74 submerged

(to be continued)

Date	Typhoon	Damage
May 19, 1966	Irma'	National road, Bacolor km 73-74 submerged. 5 gaps of 4 min width on barrio road at sta. Barbara. One span wooden bridge washed out. 3 gaps on San Juan barrio road.
June 29, 1964	Dading	Impassable, Mancatián Bridge. National road Bacolor km 72-74 submerged.
June 29, 1963	Diding	3 gaps of 30m, 5m & 80m on Porac-Angeles road. National road, Bacolor km 72-74 submerged.

TABLE IV-27 REHABILITATION COST FOR ROAD AND BRIDGE
(FY 1973 - FY 1975)

Rehabilitation Project	Expenditure (Pesos)
Bacolor-Angeles	403,100
Guagua-Sta. Rita-Porac	390,744
Bacolor-Porac	384,800
Bacolor-Sta. Rita	241,300
Bacolor-Porac Ph. I	161,390
Guagua-Sta. Rita	325,900
Bacolor-Porac	350,457
Total	P 2,257,691

Source:

TABLE IV-28 DAMAGES OF THE RIVER STRUCTURES (1963-1977)

Date	Typhoon	Damage		
		Dike	Amount, Peso	Remarks
Nov. 14, 1977	Unding	Right dike, washed out Sta. 5+950-6+100 Sta. 11+750-12+200 , eroded Sta. 0+000-0 +120 , Riprap Sta. 11+250-11+600	75,000 386,000 312,000 73,920	Total 846,920
July , 1976	Huaning	Right dike, washed out Sta. 10+000-10+140 , scoured Sta. 5+874-5+943		
May 20-28, 1976	Didang	Right dike, washed out Sta. 5+300-6+250 Sta. 9+530-10+250 Sta. 0+050-0+282 , road hump washed Sta. 7+333 Left dike, washed out Sta. 4+750-5+050 Sta. 7+250-9+700 , road hump washed Sta. 7+545 & 8+842	253,650 188,550 156,050 6,000 75,600 194,040 11,000	Total 884,890
Oct. 22, 1975	Neneng	Right dike, foot scoured Sta. 0+450-1+280 Sta. 5+820-5+920 Sta. 6+150-6+200 Sta. 10+100-10+200 Left dike, foot scoured Sta. 7+300-9+700		
Aug. 1974		Right dike, washed out Cutud, Potrero, Bacolor	100,000	
Oct. 1973	Luming & Narcing	Right dike, washed out Sta. 0+070-0+100 Sta. 1+000-1+015		

(to be continued)

(2)

Date	Typhoon	Damage		
		Dike	Amount, Peso	Remarks
July, 1971	Hosing & Simang	Toes of dike at Mancatian were washed out		
Sep. 1-5 & 11-13, 1970	Loleng & Miding Pitang	Right dike, scoured Sta. 0+750-0+900 Sta. 1+130-1+300 Sta. 1+500-1+750 at Mancatian		
Aug. 6, 1969	Elang & Goring	Right dike, eroded Sta. 1+480-1+710		
Nov. 5, 1967	Weling	Eroded, Sta. 0+046-0+190 Sta. 0+450-0+775 Sta. 0+800-0+950 Sta. 1+125-1+450 at Mancatian		
July 29, 1967		Right dike, eroded Sta. 0+450-0+775 Sta. 10+500-13+000 Left dike, breached Sta. 12+000-12+200		Sapang Buluyut Sapang Buluyut
June 8, 1967		Right dike, washed out Sta. 0+500-0+520 at Mancatian		
Aug. 1966		Right dike, eroded Sta. 0+525-0+555 at Mancatian		
May, 1966		Washed out, 100 m, at Mancatian 220 m, Porac-Angeles road		
May 19, 1966	Irma	Right dike, scoured Sta. 0+080-0+300 Parallel dykes, washed away Sta. 11+300-12+500		Mancatian Sapan Baluyut

(to be continued)

(3)

Date	Typhoon	Damage		
		Dike	Amount, Peso	Remarks
May 19, 1966 (continued)	Irma	Left dike of Gugu Creek was destroyed at Bacolor		
June 29, 1964	Dading	Boulder riprap, scoured Sta. 0+450-0+800 Abutment of bridge, scoured Left dike, breached Sta. 11+950-12+000 Right dike, breached 100 m	Total 100,000	Mancatian Sapang Baluyut San Juan
June 29, 1963	Diding	Parallel dikes on Sapang Baluyut gave way		

TABLE IV-29 TOTAL DAMAGES BY MAIN FLOODS

Main Floods Damage Category	(Unit: P10 ³)				
	1966	1972	1974	1976	1977
1) Agricultural Production					
- Crops	3,650	8,680	3,590	2,780	2,460
- Agricultural Facilities	460	920	490	430	360
- Unexpected Farming Expenditures	1,440	-	-	440	100
- Land Arability and Productivity	2,120	5,080	1,290	680	240
- Fishpond Culture	79	991	67	80	30
Sub-total	7,749	15,671	5,437	4,410	3,190
2) Houses, Transportation Facilities and River Structures					
- Houses	-	3,509	-	-	-
- Transportation Facilities	1,200	2,300	570	n.a.	n.a.
- River Structures	n.a.	n.a.	n.a.	n.a.	n.a.
Sub-total	1,200	5,809	570	-	-
Total	8,949	21,480	6,007	4,410	3,190

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TASK FORCE FOR FLOOD CONTROL AND RELATED ACTIVITIES

PASIG-POTRERO RIVER FLOOD CONTROL
AND SABO PROJECT PHILIPPINES

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TITLE OF DRAWING

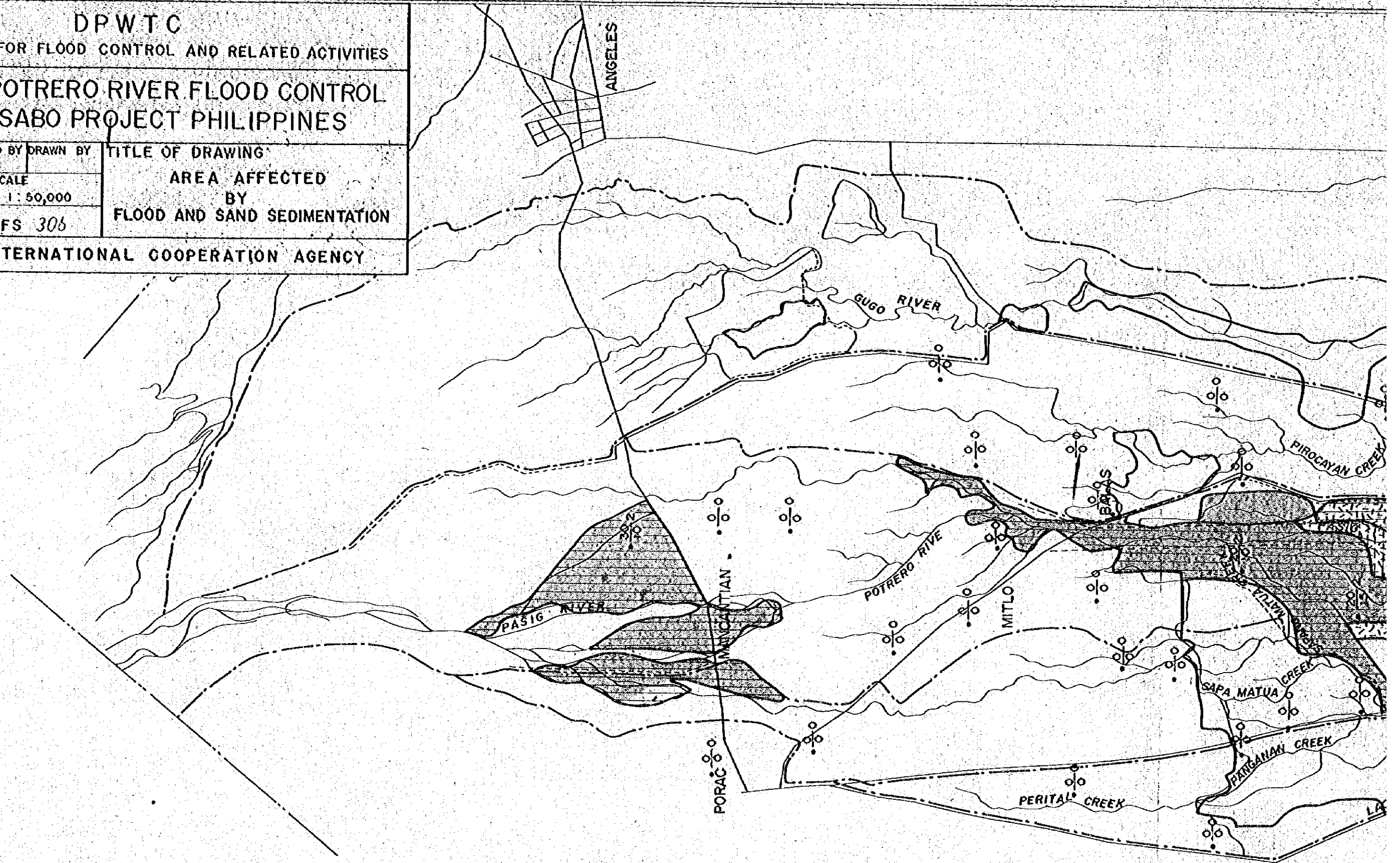
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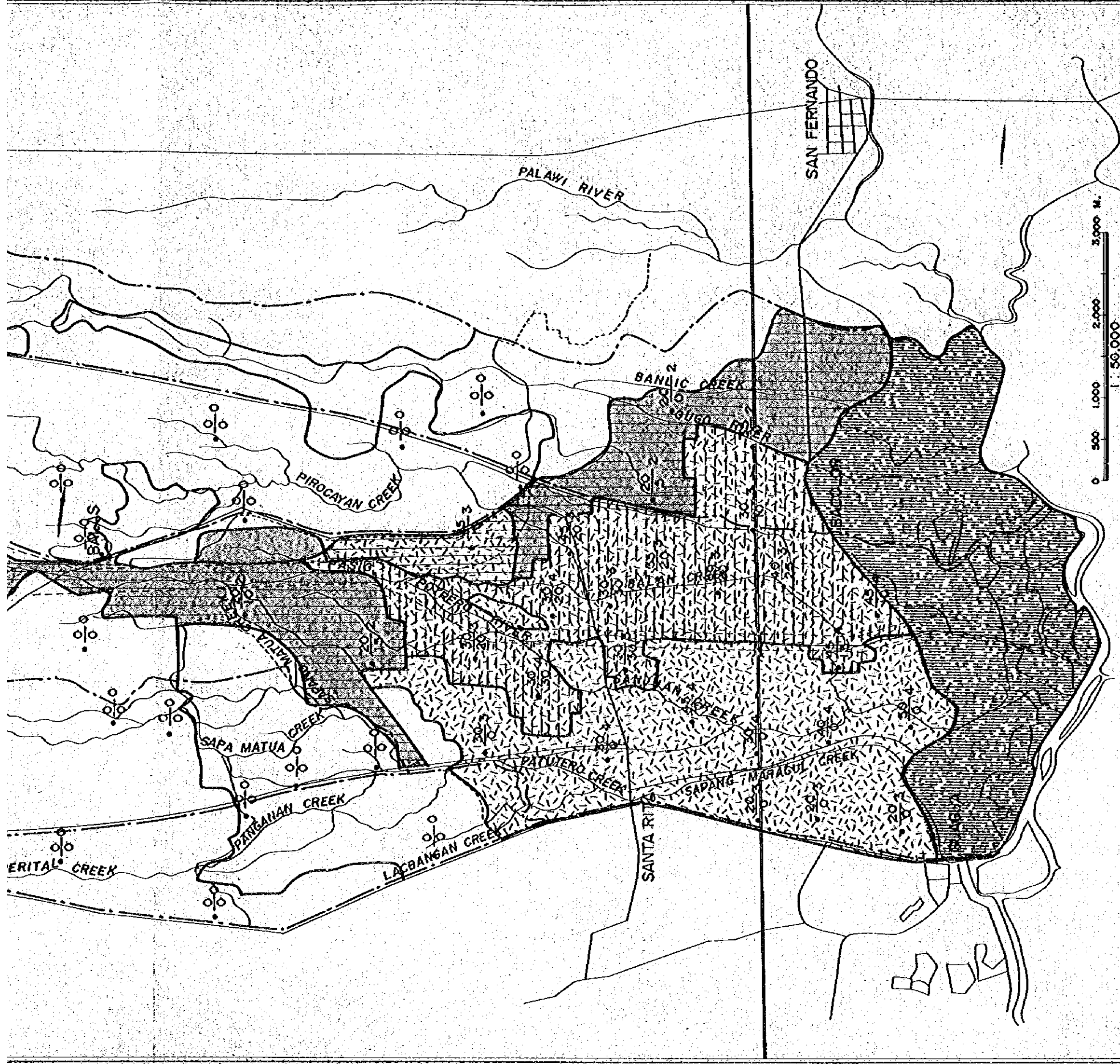
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BY
FLOOD AND SAND SEDIMENTATION

DRAWING NO.
PPFS 306

JAPAN INTERNATIONAL COOPERATION AGENCY





AREA AFFECTED BY FLOODING AND SAND - SEDIMENTS

(mid - May , 1966)

MAPPING SYMBOL	CLASSIFICATION SYMBOL	EXTENT AREA (ha)	Note;	Classification criteria
	A(1).B(2)	70	A. Inundation period	(1) 1 to 2 days (2) 3 to 4 days (3) 5 to 7 days (4) more than 7 days
	A(1).B(2).C(1)	1,420	B. Inundation depth	less than 15 cm 45 cm 75 cm more than 75 cm
	A(2).B(2)	1,200	C. Depth of sediments	less than 10 cm 30 cm 50 cm more than 50 cm
	A(2).B(2).C(1)	120		
	A(2).B(2).C(2)	1,030		
	A(3).B(3)	1,250		
Total		5,090		

Data source; The Philippines recommends for rice, 1977
 Depth of inundation and sediments is
 preliminarily estimated based on the
 data obtained by field interviews with farmers.

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TASK FORCE FOR FLOOD CONTROL AND RELATED ACTIVITIES

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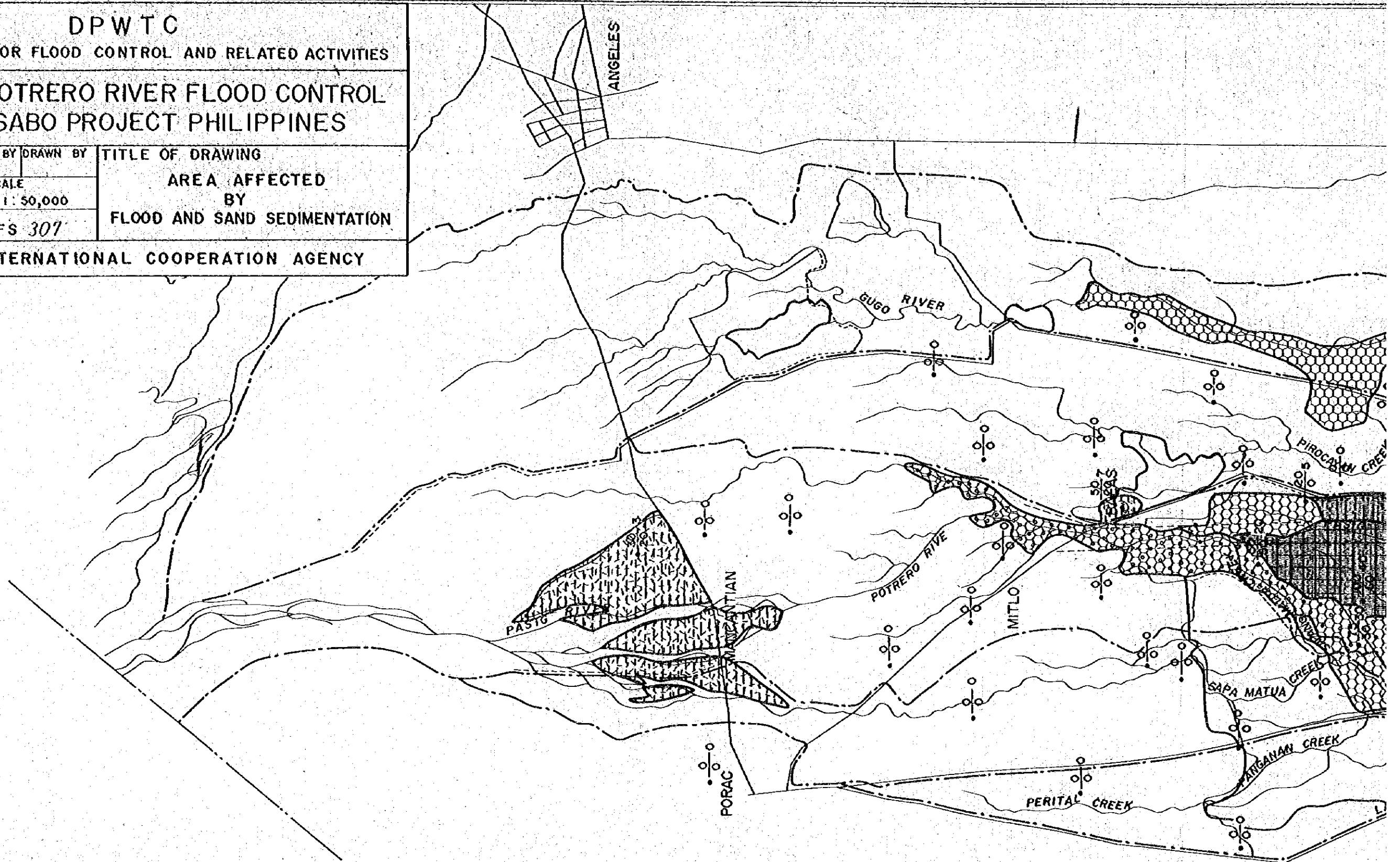
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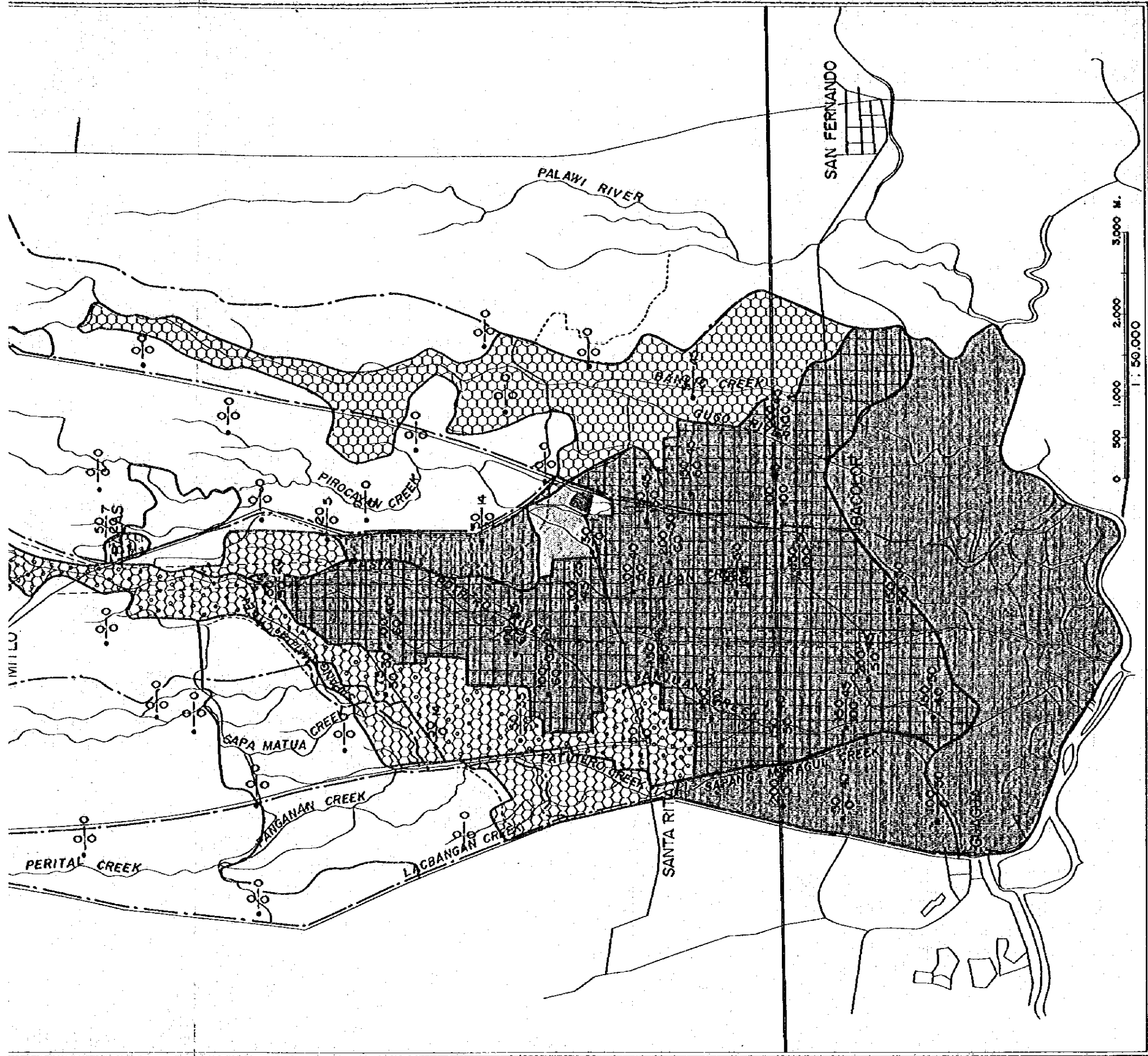
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AREA AFFECTED BY FLOODING AND SAND - SEDIMENTS
(Jnl - Aug., 1972)

MAPPING SYMBOL	CLASSIFICATION SYMBOL	EXTENT AREA (ha)	Note ;	Classification criteria			
				(1)	(2)	(3)	(4)
	A(1).B(2)	70	A. Inndation	1 to 2 days	3 to 4 days	5 to 7 days	more than 7 days
	A(2).B(1).C(2)	450	B. Inundation	less than 15 cm	15 to 45 cm	45 to 75 cm	more than 75 cm
	A(3).B(2).C(2)	20	C. Depth of sediments	less than 10 cm	10 to 30 cm	30 to 50 cm	more than 50 cm
	A(4).B(3)	1,050					
	A(4).B(3).C(2)	130					
	A(4).B(3).C(3)	540					
	A(4).B(4)	1,470					
	A(4).B(4).C(4)	1,770					
Total		5,500					

Data source ; The Philippines recomends for rice, 1977
Depth of inundation and sediments is preliminarily estimated based on the data obtained by field interviews with farmers.

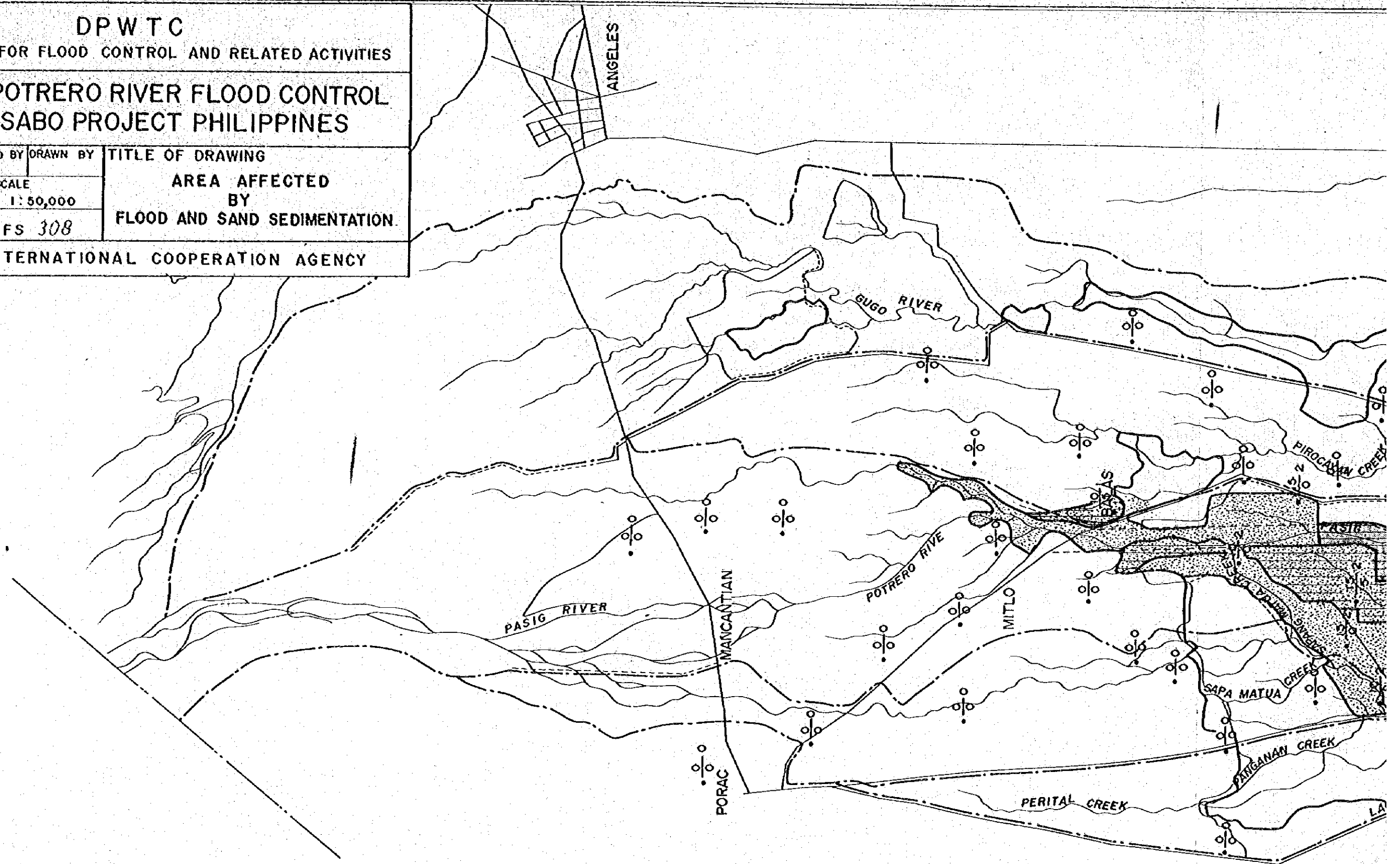
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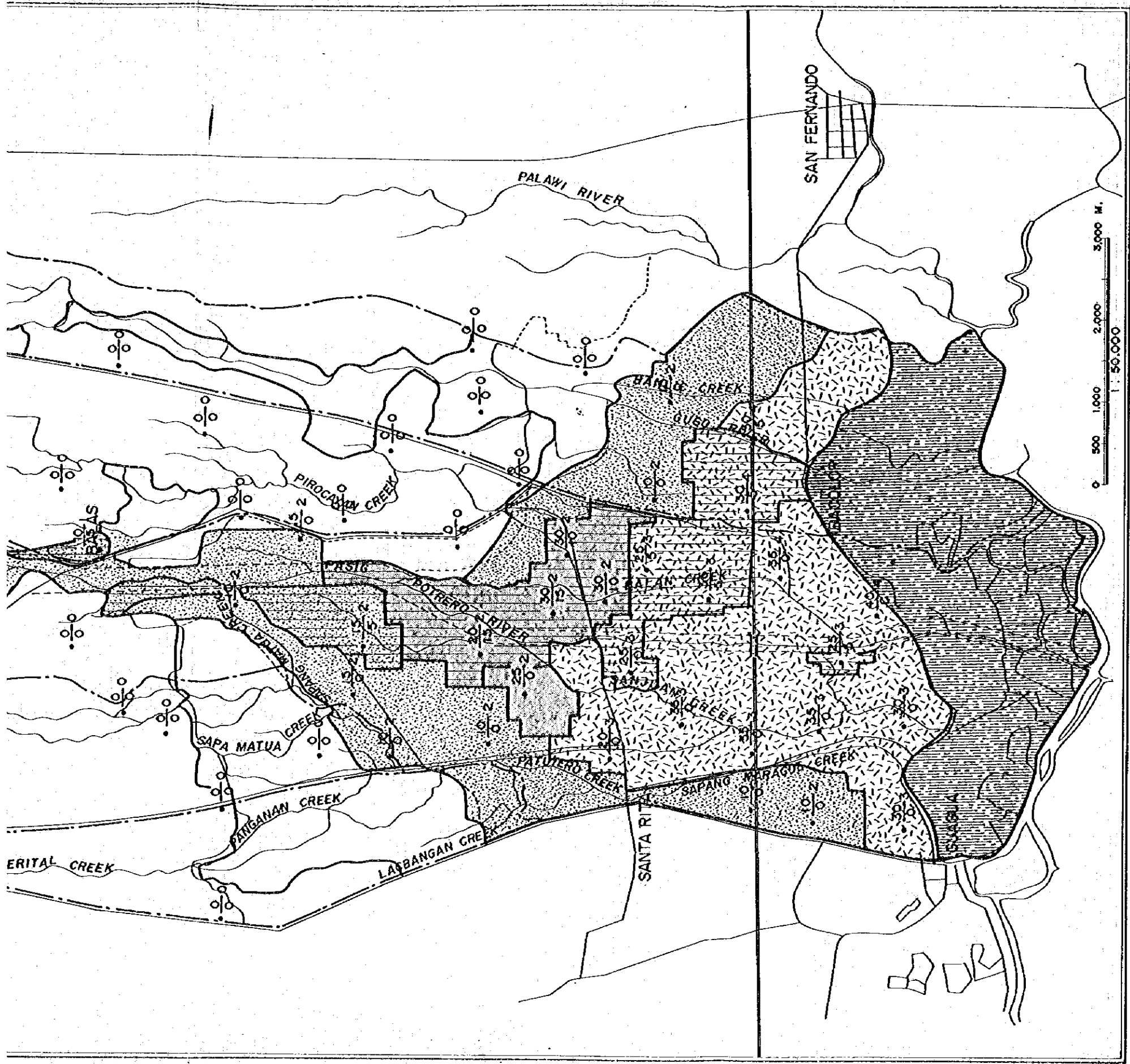
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AND SABO PROJECT PHILIPPINES

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AREA AFFECTED BY FLOODING AND SAND - SEDIMENTS

(mid - Aug., 1974)

MAPPING SYMBOL	CLASSIFICATION SYMBOL	EXTENT AREA (ha)	Note ;	Classification criteria			
				(1)	(2)	(3)	(4)
	A(1).B(1)	1,320	A. Inundation period	1 to 2 days	3 to 4 days	5 to 7 days	more than 7 days
	A(1).B(2)	70		B. Inundation depth	less than 15 cm	15 to 45 cm	45 to 75 cm
	A(1).B(2).C(1)	400	C. Depth of sediments	less than 10 cm	10 to 30 cm	30 to 50 cm	more than 50 cm
	A(2).B(2)	1,370					
	A(2).B(2).C(1)	350					
	A(3).B(3)	1,250					
		Total					
		4,940					

Data source ; The philippines recomends for rice, 1977
 Depth of inundation and sediments is
 preliminarily estimated based on the
 data obtained by field interviews with farmers.

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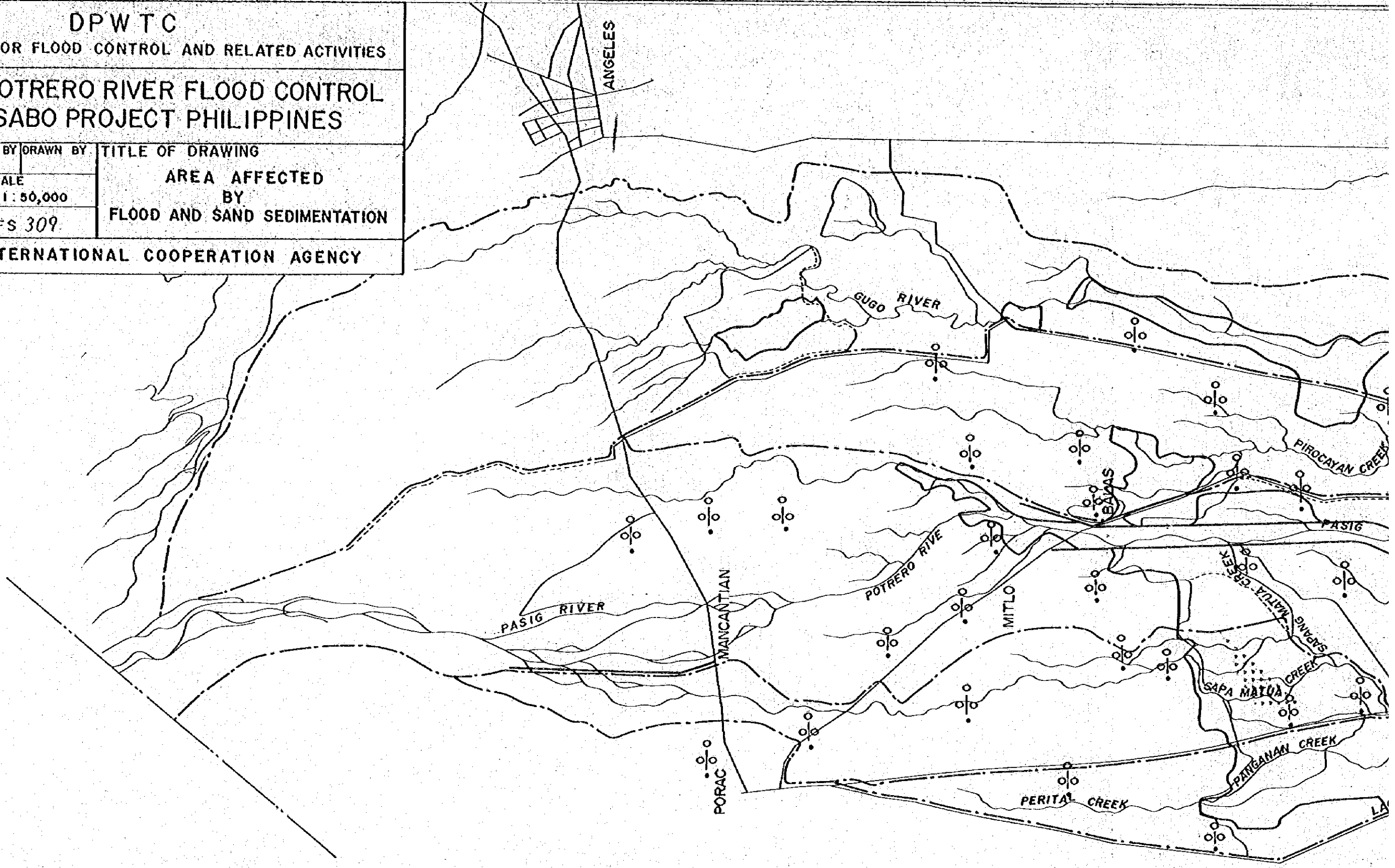
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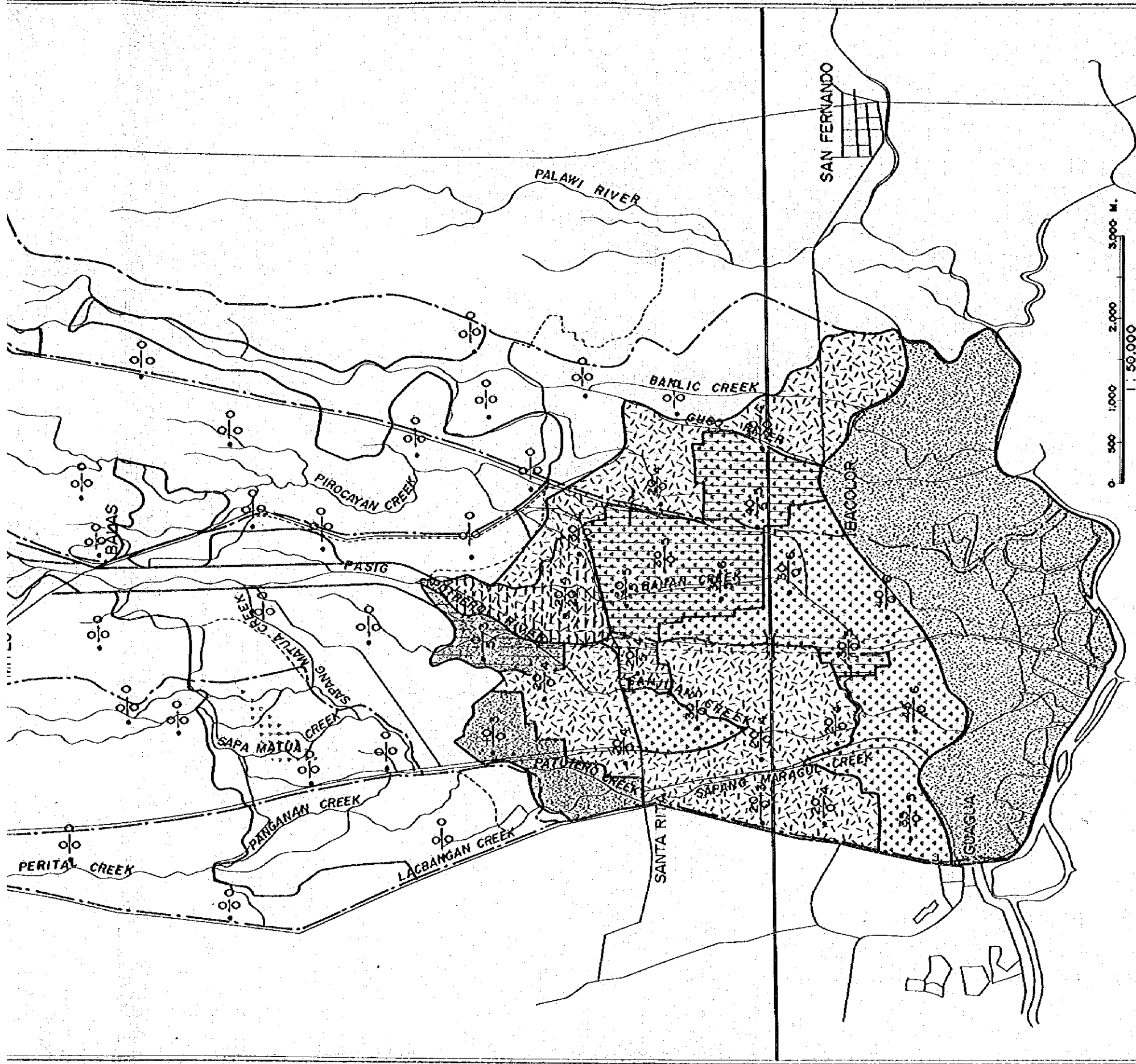
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AREA AFFECTED BY FLOODINGS AND SAND - SEDIMENTS
(mid - May., 1976)

MAPPING SYMBOL	CLASSIFICATION SYMBOL	EXTENT AREA (ha)	Note ;	Classification criteria			
				(1)	(2)	(3)	(4)
[Symbol 1]	A(2).B(1)	150	A. Inundation period	1 to 2 days	3 to 4 days	5 to 7 days	more than 7 days
[Symbol 2]	A(2).B(1).C(1)	70	B. Inundation depth	less than 15 cm	15 to 45 cm	45 to 75 cm	more than 75 cm
[Symbol 3]	A(2).B(2)	1,340	C. Depth of sediments	less than 10 cm	10 to 30 cm	30 to 50 cm	more than 50 cm
[Symbol 4]	A(2).B(2).C(1)	40					
[Symbol 5]	A(2).B(2).C(2)	160					
[Symbol 6]	A(3).B(2)	590					
[Symbol 7]	A(3).B(2).C(1)	420					
[Symbol 8]	A(4).B(3)	1,250					
Total		3,020					

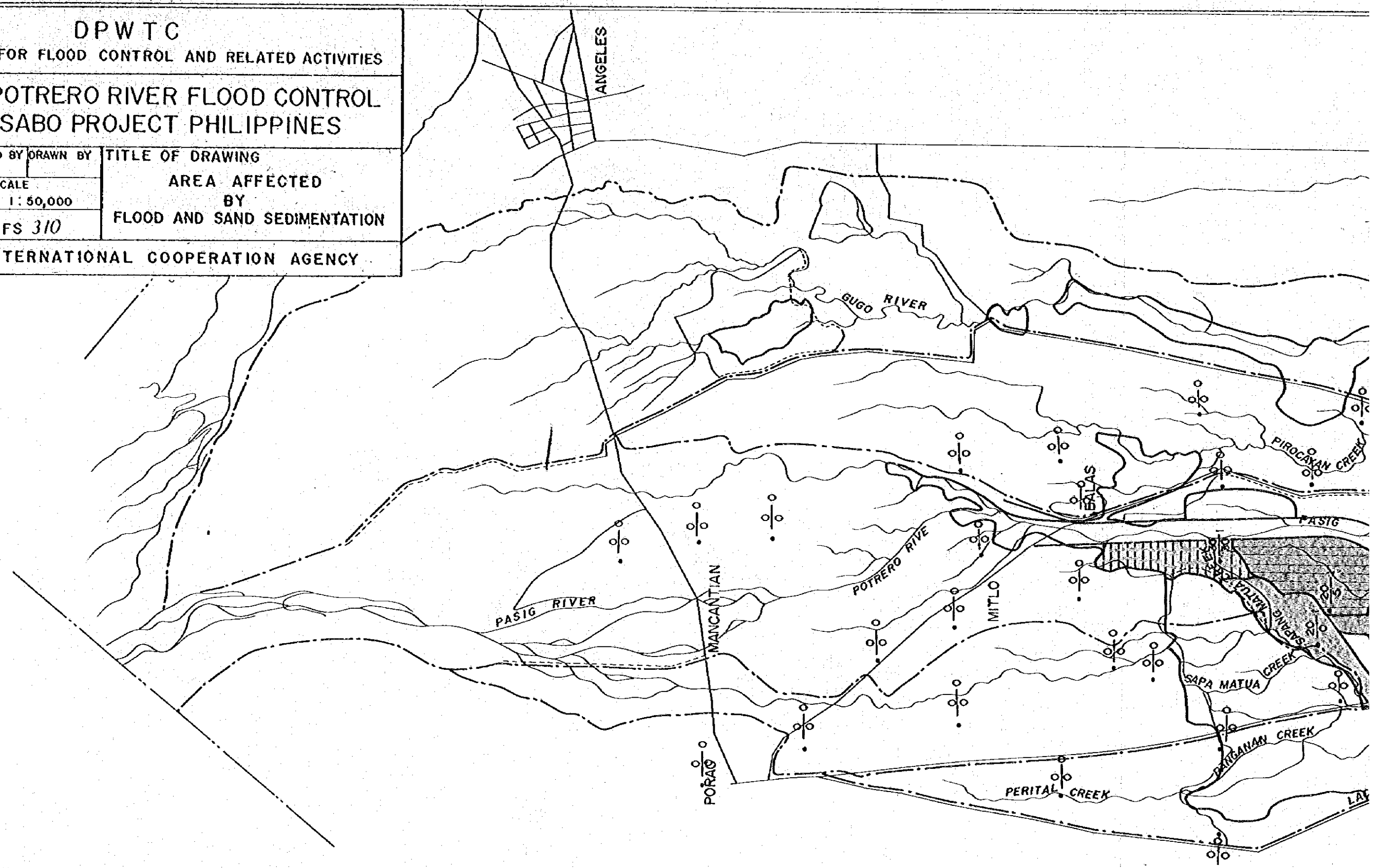
Data source ; The Philippines recomends for rice, 1977
Depth of inundation and sediments is
preliminarily estimated based on the
data obtained by field interviews with farmers.

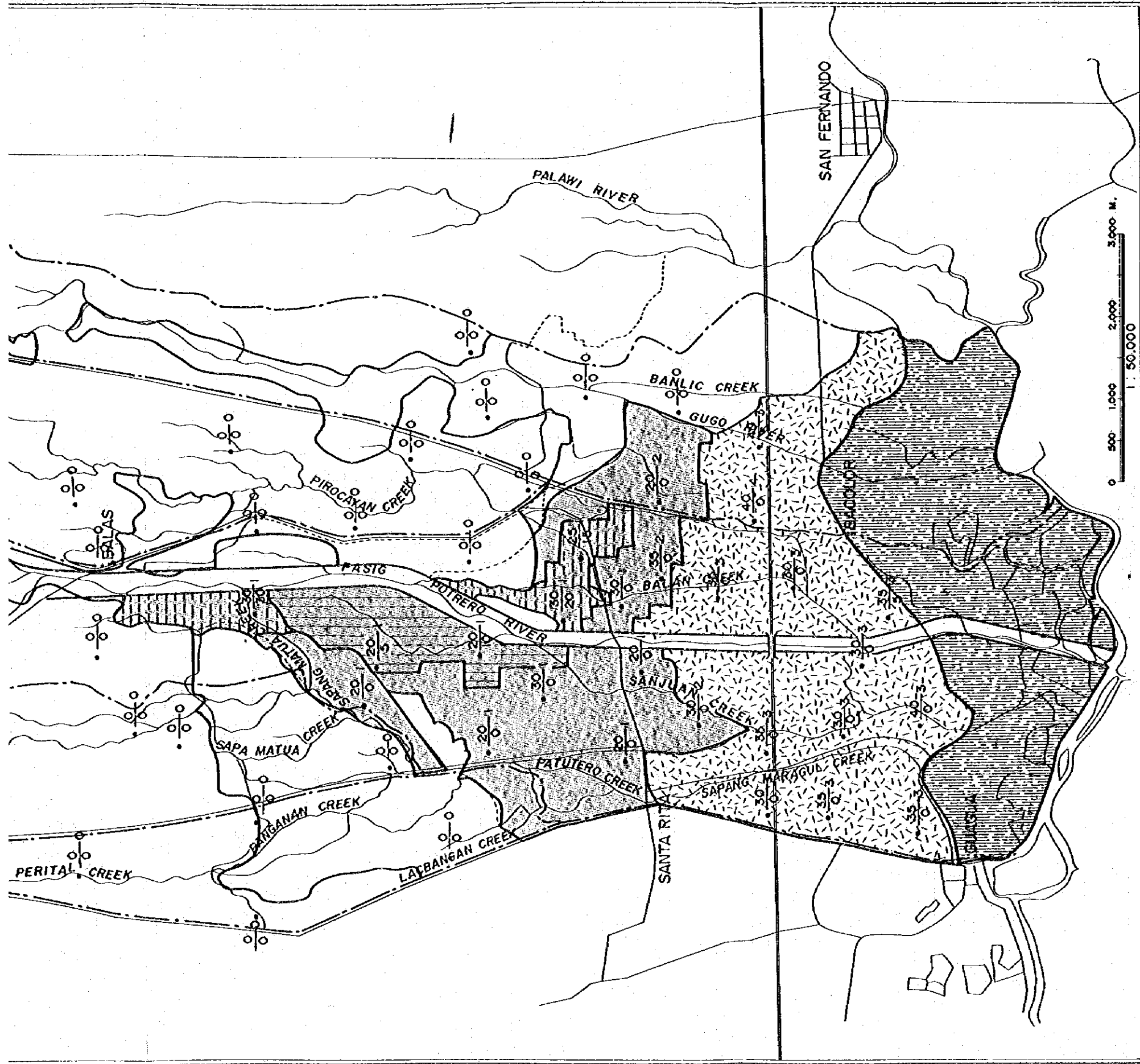
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AREA AFFECTED BY FLOODING AND SAND - SEDIMENTS

(Nov., 1977)

MAPPING SYMBOL	CLASSIFICATION SYMBOL	EXTENT AREA (ha)	Note ;	Classification criteria			
				(1)	(2)	(3)	(4)
	A(1).B(2)	1,000	A. Inundation period	1 to 2 days	3 to 4 days	5 to 7 days	more than 7 days
	A(1).B(2).C(1)	220	B. Inundation depth	less than 15 cm	15 to 45 cm	45 to 75 cm	more than 75 cm
	A(1).B(2).C(2)	190	C. Depth of sediments	less than 10 cm	10 to 30 cm	30 to 50 cm	more than 50 cm
	A(2).B(2)	1,400					
	A(3).B(3)	1,170					
	Total	3,980					

Data source ; The philippines recomends for rice, 1977
 Depth of inundation and sediments is
 preliminarily estimated based on the
 data obtained by field interviews with farmers.

