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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

THE STUDY ON SABO AND FLOOD CONTROL IN THE BALOAG RIVER BASIN

FINAL REPORT

VOLUME IV-1

DATA BOOK 1

DECEMBER 1997

OTI ENGINEERING CO., LTD.
IN ASSOCIATION WITH
SANYU CONSULTANTS INC.
PASCO INTERNATIONAL INC.

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LIST OF REPORTS

VOLUME I SUMMARY

VOLUME II MAIN REPORT

VOLUME III-1 SUPPORTING REPORT (MASTER PLAN STUDY)

A. Socio-economy and Land Use
B. Climate and Hydrology
C. Flood Damage Analysis
D. Watershed and Flood Plain Conditions
E. River Conditions
F. Sediment Control Plan
G. River Improvement Plan
H. Non-structural Measures and Institutional Aspects
I. Multipurpose Development of the Project
J. Economic and Financial Evaluation
K. Environmental Aspects
L. Aerophotogrammetric and Topographic Survey

VOLUME III-2 SUPPORTING REPORT (FEASIBILITY STUDY)

Sabo and Flood Control

A. Sediment Analysis
B. Sabo Dam Plan
C. River Improvement Plan
D. Construction Plan and Cost Estimate
E. Project Evaluation
F. Environmental Impact Assessment
G. Aerophotogrametric and Topographic Survey
H. River Monitoring

Laoag City Urban Drainage

A. Laoag City Urban Drainage Improvement

VOLUME IV-1 DATA BOOK I

DB.1 Flood Damage and Flood Fighting System
DB.2 Drainage System and Flood Damage
DB.3 Riverbed Material
DB.4 Geophysical Data

VOLUME IV-2 DATA BOOK II

Topographic Survey Results

LIST OF DATA

DB. I	FLOOD DAMAGE AND FLOOD FIGHTING SYSTEM
DB. II	DRAINAGE SYSTEM AND FLOOD DAMAGE
DB. III	RIVERBED MATERIAL
DB. IV	GEOPHYSICAL DATA

DB. I

FLOOD DAMAGE AND FLOOD FIGHTING SYSTEM

TABLE OF CONTENTS

LIST OF TABLES

Flood Damage and Flood Fighting System Survey
for
The Study On Sabo And Flood Control
In Laoag River Basin, Philippines

1. Introduction

The Flood Damage and Flood Fighting System Survey (FDFFS) was conducted as part of The Study on Sabo and Flood Control in Laoag River Basin, Philippines

The objective of the study is to formulate a master plan for sabo and flood control in the Laoag River Basin and to confirm the technical and economic feasibility of the urgent or priority project(s) identified in the master plan.

The study includes the evaluation of the flood damages and the possible solutions on how to control or to fight flooding within the 1,350 km^2 Laoag River Basin. To clarify the flooding conditions and extent of flood damage during the past major flood events, the JICA Study Team contracted Woodfields Consultants, Inc. (WCI) to conduct a questionnaire survey. The questionnaire survey was conducted from April 25 to May 17, 1996, and the results of which are presented in this report.

1-1. Objective

The objective of the flood damage and flood fighting system survey is to know the flooding conditions, damages and non-structural measures for flood mitigation during the past major flood events in Laoag River Basin.

1-2. Survey Area

The survey area is the flood-prone area of the Laoag River Basin. This area consists of alluvial fan complex in the upper reaches and floodplain in the lower reaches. The total survey area is approximately 400 km^2.

The survey area comprises one city and eight municipalities, namely, Laoag City, San Nicolas, Sarrat, Piddig, Nueva Era, Espiritu, Marcos, Dingras and Solsona, all in the Province of Ilocos Norte. As listed in Table 1, a total of 115 barangays were included in the survey area.

1-3. Objective Persons (Survey Respondents)

A total of 115 barangays were surveyed, and their respective barangay captains were the respondents of the questionnaire survey. Some of the LGU officials were also interviewed. From them, various data and information regarding flooding within the Laoag River Basin were gathered. Also in Table 1 are the names of the respondents and the dates of interview.

1-4. Methodology

WCI put up three teams for this survey. They visited the 115 barangays, accomplished the questionnaires prepared by the JICA Study Team, and verified the geographical locations of the barangays using Global Positioning System (GPS).

The barangay captain/chairman or his representative was the respondent of the questionnaire survey.

Mayors were also visited to make courtesy call, gather data and get their endorsements to the barangay captains/chairmen.

Inundated areas in the barangay were also identified in the field and plotted on the map of the city/municipality.

Coordination meetings with Mr. Kazuto Suzuki of the JICA Study Team were held to discuss the progress of the survey and to submit the accomplished questionnaires.

1-5. Questionnaire Survey Items

The questionnaire survey form used in the survey is presented in Appendix A.

The major survey items are as follows:

a) Area affected by flooding, the date of occurrence and its duration.
b) The type of flood the area had experienced.
c) Identification of the location where there is breached or river washed lands.
d) Extent of direct and indirect damages.
e) Possible flood control projects requested by the residents.
f) Present flood fighting system used by the residents.

2. Survey Results

As presented in this report, the surveyed data were inputted in the database, processed and as much as possible compared with both published and unpublished statistics of the different government agencies.

2-1. Surveyed Barangays

As shown in the table below, the 115 surveyed barangays which were identified by the JICA Study Team represented about 46.4% of the total number of barangays in Laoag City and the eight towns of the survey area. All the barangays of Solsona were surveyed, and only 10 out of 80 barangays in Laoag City.

MUNICIPALITY	TOTAL NUMBER OF BARANGAYS	NUMBER OF SURVEYED BARANGAYS
Piddig	23	7
Laoag City	80	10
San Nicolas	24	6
Sarrat	24	18
Espiritu	20	11
Marcos	13	9
Dingras	31	26
Solsona	22	22
Nueva Era	11	6
TOTAL	248	115

As shown in the table below, the eight municipalities and one city covered by the survey accounted for 50.6% and 50.4% of the total number of households and total population of the province in 1990. For the surveyed barangays, the respective percentages are 22.5 and 22.6.

	HOUSEHOLDS		POPULATION	
MUNICIPALITY	TOTAL	SURVEYED BARANGAYS	TOTAL	SURVEYED BARANGAYS
Piddig	3,466	802	17,060	3,963
Laoag City	16,866	1,909	83,215	9,618
San Nicolas	5,523	1,406	27,614	6,925
Sarrat	4,369	3,533	21,272	17,339
Espiritu	2,947	1,761	15,337	9,233
Marcos	2,532	1,802	12,954	9,234
Dingras	5,942	5,084	30,512	26,149
Solsona	3,720	3,720	18,867	18,867
Nueva Era	1,038	583	5,230	2,907
TOTAL	46,403	20,600	232,061	104,235
ILOCOS NORTE	91,606		460,684	

Population and households in 1990 and in 1996

The 1996 FDFFS survey results on households and population are presented in Appendix B: Table B-1 for the 115 barangays, in Tables B-2 to B-10 for each municipality, in Table B-11 for poblacions and in Table B-12 for non-poblacions.

According to the FDFFS survey results, the 1996 population susceptible to floods in the 115 barangays totals 131,029. Dingras has the highest number of people surveyed at 34,707, next is Solsona at 25,286. As reflected in the above-said tables, the three most populous barangays are San Marcos in Dingras with 3,983, Barcelona in Solsona with 3,623, and San Bautista in San Nicolas with 3,600. On the other hand, Barangays Cacafean (Marcos), Bimmanga (Piddig) and San Julian (Solsona) have the least number of people at 253, 265, and 285 respectively. The municipality with the highest average number of people per barangay is San Nicolas at 1,436, followed by Dingras at 1,335.

The survey area is predominantly rural with 80.9% of its 131,029 population living in rural non-poblacion barangays, while the rest residing in urban poblacion barangays.

As shown in Table 2, the 1996 population in the 115 surveyed barangays is 131,029 which is a 25.7% increment from the 1990 census population of 104,235. This increase means an average annual growth rate of 3.67% which is more than twice the observed annual growth rate of 1.78% between 1980 and 1990 for the entire Laoag City and the eight municipalities (Table 3). The municipalities of Nueva Era, Piddig, Solsona and Dingras registered more than 4% average growth rate per annum at 7.92%, 4.88%, 4.86% and 4.68% respectively. These figures are higher than those observed between 1980 and 1990 for each entire municipality (Table 3).

The notable increase in population may be due to transmigration of farmers and migration of people from Muslim provinces of Mindanao and lahar-affected communities of Pampanga.

As shown in Table 3, the municipalities with population densities greater than 500 persons per square kilometer in 1990 were Laoag City (779.13) and San Nicolas (560.49). Nueva Era is the least dense with only 8.12 persons/km^2.

Again in Table 2, the average household size for the survey area in 1990 and in 1996 are 5.06 and 6.01 respectively. For the province, the 1990 observed figure is 5.04.

There were 20,600 households in 1990 for the survey area, and the FDFFS survey shows 21,792 households in 1996.

The urban poblacion barangays have smaller average household size as compared with the rural non-poblacion barangays: 5.54 against 6.13 in 1996 and 4.96 against 5.09 in 1990.

Also in Table 3, the number of households and the average household size in 1990 for the entire Laoag City and the eight municipalities were 46,403 and 5.01 respectively.

Occupations of people in the surveyed barangays

The 1996 FDFFS survey results on occupations are presented in Appendix C. Table 4 shows the average number of people by type of occupation and by municipality.

About 15,047 people in the survey area are engaged in farming and 86.5% of which live in the non-poblacion barangays; the next major group (2,036 people) are employed as public officials.

2-2. Characteristics of the Households

Types and prices of dwelling units

Appendix D shows the FDFFS survey results on types of dwelling materials and prices of dwelling unit by type of dwelling material. Table 5 presents the average number and price of dwelling units by type of dwelling material and by municipality.

About 48% of the households in the survey area live in houses made of concrete, and 36%, 9% and 6% in houses constructed with a combination of concrete and wood, with indigenous materials and with wood respectively. There are more houses made of combination of wood and concrete and only wood in poblacions than in non-poblacion barangays. On the other hand, more residences are constructed with concrete and indigenous materials in non-poblacion barangays than in poblacions. The average price per square meter of houses made of concrete is 2,370 pesos, wood 1,500 pesos, concrete and wood combined 1,939 pesos, and indigenous materials 467 pesos.

Prices of residential lots

Table 5 also indicates the average price of residential lots by municipality. Appendix D also shows the details of this table.

The most expensive lots are found in San Nicolas at 558 pesos/m^2, followed by Laoag City at 281 pesos/m^2. Lot prices of less than 100 pesos/m^2 are found in the mountain towns of Piddig (partly mountainous), Espiritu, Marcos, and Nueva Era. The ratio of residential lot prices between poblacion and non-poblacion barangays is 5.56:1.

Numbers and prices of house furnitures/appliances

Table 6 shows the average percentage of households by type of furniture/ appliance and the average prices of furnitures/appliances by municipality. Details of this table are shown in Appendix E.

Of the 21,792 households in the survey area, 38% have chests of drawers, 46% have televisions, 2% have carpets, 66% have dressers, 79% have sofa sets, 84% have stereos, 80% have cabinets, 95% have dining sets, and 39% have refrigerators.

2-3. Agriculture and Fishery

Areas and prices of farmlands

As shown in Table 7, the average farm size is 153 has/barangay and 1.04 has per farmer. It is 0.52 ha/farmer in poblacion barangays and 1.13 has/farmer in non-poblacion barangays. The farm households in Laoag City, Sarrat and Solsona possess on the average less than one hectare of farmland.

Table 7 also shows that the average farm lot price is 44.98 pesos/m^2. The highest farm lot price is 137.50 pesos/m^2 in San Nicolas, followed by 124.50 pesos/m^2 in Laoag City, while the lowest is 10.67 pesos/m^2 in the mountainous town of Marcos. The price in poblacion barangays is twice the price in non-poblacion barangays.

Details of Table 7 are shown in Appendix F.

Cropping patterns of different crops

The cropping patterns and calendars prevailing in the survey area are presented in Table 8. Appendix G shows the FDFFS survey results, while Appendix J presents the same data at city/municipal level as provided by the Provincial Agriculture Office (PAO). The following four types of cropping pattern can be deduced from the survey results:

i)	Paddy rice	+	paddy rice
ii)	Paddy rice	+	
iii)	Paddy rice	+	upland crops
iv)		+	upland crops

In the survey area, the wet season paddy rice is transplanted as early as May and as late as July and harvested as early as August and as late as December. The dry season paddy rice is transplanted as early as September and as late as January depending on the supply-limits of irrigation water, and it is harvested from January to May. The cropping time varies from year to year due to unstable irrigation conditions.

In Table 8, the cropping pattern usually prevailing in the city/municipality, as provided by the Provincial Agriculture Office (PAO), is shown for the purpose of comparison with FDFFS survey results.

As shown in Table 8, upland crops like corn, mongo beans, vegetables, etc. are mostly cultivated in the dry season, except for tobacco which grows in one year.

Planted Areas

According to the FDFFS survey results as shown in Table 8, the total planted area in the wet season is 25,193 has, and 82% of which are covered with different crops in the dry season.

About 19,153 has are irrigated paddy fields in the wet season. The irrigated area in the dry season is estimated at 9,003 has which are cropped with dry season paddy rice. The rainfed paddy fields account for about 5,302.5 has, occupying about 22% of the total hectarage for paddy rice.

After harvest of the wet season paddy rice, 82% of the farmlands are planted with different crops in the dry season. Upland crops like corn, mongo beans, vegetables, etc. are grown without irrigation in about 11,673.6 has. About 92.5% of which are planted with corn (5,182 has), mongo beans (2,001.5 has), vegetables (1,682 has), garlic (854 has), tobacco (584 has) and cotton (490 has).

Wet season upland crops are grown only in 737.5 has.

Appendix H shows the survey results on planted areas in detail.

Yields and prices of crops

As shown in Table 9, the average yield of paddy rice in the survey area ranges from 2.95 MT/ha in Laoag City to 4.05 MT/ha in San Nicolas. For the whole city/municipality, the average yield varies from 3.5 MT/ha to 4.0 MT/ha in 1991 and, according to PAO, from 3.7 MT/ha to 4.5 MT/ha. The large variation may be attributed to different irrigation condition in different places.

The average price of palay in the survey area ranges from 10,000 pesos/MT to 11,360 pesos/MT, which are comparable with those given by PAO.

Table 9 also shows the yields and prices of upland crops in the survey area, as compared with those in 1991 and those provided by PAO. The details of yields and prices of paddy rice and the different upland crops are found in Appendices I and J.

Productions and prices of livestock

According to PAO's data in Table 10, the average production of cattle in one barangay ranges from 41 heads (6.1 MT) in San Nicolas to 257 heads (38.2 MT) in Piddig, assuming a carcass weight of 150 kgs for one cattle. The hogs' average production varies from 62 heads (3.6 MT, assuming a carcass weight of 58 kgs) in Laoag City to 302 heads (17.5 MT) in Dingras. For chicken, the highest and lowest average production per barangay are 1,125 heads in Marcos and 208 heads in Piddig respectively.

As shown in Table 10, the FDFFS surveyed prices for cattle and chicken are higher than those of PAO.

Appendices I and J detail the survey results on the productions and prices of livestock.

Productions and prices of fish

As shown in Table 11, Tilapia is raised in Laoag City and the seven municipalities excluding Piddig. Its average production ranges from 0.40 MT in Espiritu to 4.64 MT in Solsona and its average price is 65,000 pesos/MT. Bangus and other fish are produced in Laoag City.

Appendices I and J present the survey results on fish productions and prices.

2-4. Social Conditions

Infrastructure

Table 12 presents the type, number and cost of the infrastructures existing in the survey area by municipality. Appendix K shows them in detail. Take note in this table that no hospitals but only day care and health centers were found in the surveyed barangays.

Factory

Table 12 and Appendix K show that only six factories were surveyed: one in Sarrat and five in Laoag City.

2-5. Flooding

(a) Characteristics of Flooding in Laoag River Basin

Typhoons/storms that caused heavy flood damages in the area

Table 13 list the names and dates of occurrence of the typhoons that caused heavy flood damages in the survey area. Although Typhoon Pepang flooded 78 barangays as compared with the 60 barangays inundated by Typhoon Gening, the flood water in the latter was deeper than in the former. Out of the 14 typhoons mentioned by the respondents, these Typhoons Gening, Pepang and Maring were

the most devastating. As indicated in the table below, Typhoon Gening was most damaging (in terms of the number of barangays affected) in Laoag City, San Nicolas, Sarrat and Marcos, while Typhoons Pepang and Maring affected greatly the municipalities of Espiritu, Dingras and Solsona.

Typhoon	Piddig	Laoag City	San Nicolas	Sarrat	Espiritu	Marcos	Dingras	Solsona	Nueva Era
Gening	4	9	6	14	2	10	1	0	2
Pepang	3	1	0	2	9	0	16	20	3
Maring	0	0	0	0	0	0	4	1	0

Causes of flooding

As shown in Table 14, the main cause of flooding in the survey area during Typhoons Gening and Pepang was river overflow. And, a combination of river overflow and poor drainage system caused the inundation in some of the poblacion barangays.

Flood duration in the barangay

Table 14 shows that the duration of flooding in the surveyed barangays during Typhoons Gening and Pepang ranged from as short as one (1) hour to as long as seven (7) days. As indicated in the table below however, floodwater in majority of the surveyed barangays subsided in 3 to 12 hours.

Flood duration (hrs)	Piddig	Laoag City	San Nicolas	Sarrat	Espiritu	Marcos	Dingras	Solsona	Nueva Era
1	1	1		2					
2		1							
3	2	4	1	6	3	1	14	9	3
6				2					
12	2	2	5	7	8	3	9	7	
24									
48	2	1		1		4	2	1	1
>48						2		5	1

Moreover, the table below demonstrates that flood duration in the barangay is not relative to the floodwater level. At different levels of flood water (from 0 to more than 1.5 m.), flood receded within 12 hours in almost all the surveyed barangays.

Floodwater level above road	Flood duration (hours)			
	0 to 12	12 to 24	24 to 48	>48
0 to 0.5 m.	23	0	1	2
0.5 to 1.0 m.	35	1	4	4
1.0 to 1.5 m.	20	0	0	0
>1.5 m.	11	0	1	0

Flood flow velocity in the barangay / Type of inundation

As shown in Table 14, the type of inundation in the survey area was generally flowing, and the flood flow velocity in the barangay was related to the flood duration. Thus, a flood duration of 0 to 12 hours would mean a very fast flood flow velocity; 13 to 24 hours would mean a fast flood flow rate; 25 to 48 hours would mean a moderate flood flow velocity; and more than 48 hours would mean a slow to very slow flood flow velocity.

The survey indicates that the flood flow velocity in the barangay during Typhoons Gening and Pepang was very fast considering the number of cases where the flood lasted within 12 hours only.

Extent of inundation in the farmland

During Typhoons Gening, Pepang and Maring, most of the farmlands in the survey area were 100% inundated as shown in Table 14 and emphasized in the table below.

Percentage of farmland flooded	Number of barangays
0 to 0.5	10
0.5 to 1.0	104

Maximum depth of floodwater above street level, groundfloor and farmland

The table below shows by municipality the ranges of maximum depths of flood water above street level and the number of surveyed barangays in each range. It indicates that the maximum level of flood water in most barangays in the survey area was within 1.5 meters only.

Floodwater levels (m)	Piddig	Laoag City	San Nicolas	Sarrat	Espiritu	Marcos	Dingras	Solsona	Nueva Era
0 to 0.5	2	2		4	4	2	5	7	
0.5 to 1.0	1	6	2	6	5	3	9	11	1
1.0 to 1.5	3	2	3	2	1	3	7	2	1
1.5 to 2.0	1			3		1	1	1	
>2.0			1	3		1			

Here, it must be emphasized that if the flood water level is above the road level, it follows that the farmland is already under water since, in most cases in the survey area, the road level is higher than the farmland.

Because of the absence of a common benchmark for the entire survey area, it is difficult to compare the extent of inundation or the floodwater depths among the surveyed barangays.

Condition of floodwater/sediment deposits at farmlands, residential areas and roads

After the flood, boulders are deposited along riverbanks; gravel and sands are transported to the farmlands by floodwaters; and silts are found not only in farm lands but also in residential areas and road systems.

In the table below, the survey shows that the sediments deposited in the farms of the downstream municipality of San Nicolas and Laoag City are mostly silt and sand. Piddig, Espiritu, Marcos and Nueva Era which are upstream towns receive sand and gravel deposits in their farmlands. The sediment deposits in the farmlands in Sarrat, Dingras and Solsona vary from silt to gravel including debris.

Sedi-ments	Piddig	Laoag City	San Nicolas	Sar-rat	Espi-ritu	Mar-cos	Ding-ras	Sol-sona	Nueva Era
Silt	0	8	0	5	0	0	15	3	1
Sand	3	1	6	3	1	4	1	2	1
Gravel	4	1	0	9	10	6	4	11	3
Debris							6	6	

The table below for the sedimentation in the road system indicates almost the same results or pattern as in the above table (for the farmlands).

Sedi-ments	Piddig	Laoag City	San Nicolas	Sar-rat	Espi-ritu	Mar-cos	Ding-ras	Sol-sona	Nueva Era
Silt	2	8	6	9	5	3	15	5	1
Sand	2	1		8	5	4	2	1	1
Gravel	3	1		1		1	3	11	
Debris							3	4	

(b) Details of Flood Damage

Direct damages

Damage to crop and livestock

In Table 15, the percentage of crop damaged is expressed in terms of the total crop production expected from the flooded farmland. However, the crop damage ratio should be derived considering flood depth, flood duration, sedimentation, flood flow velocity and crop growth stage.

The table below shows the *apparent* relationship between percentage of crop damaged and floodwater level. The direct relationship between the two could be clarified only if the floodwater level is tied up with true elevations after a topographic survey of the study area is made.

Floodwater level above road	Percentage of crop damaged			
	0 to 0.25	0.25 to 0.5	0.5 to 0.75	0.75 to 1.0
0 to 0.5 m.	3	6	9	6
0.5 to 1.0 m.	3	8	12	17
1.0 to 1.5 m.	1	2	5	16
>1.5 m.	0	2	3	6

The percentage of livestock damaged is expressed in terms of the total livestock production. As shown in the table below, this percentage is relatively small: only less than 25% in most cases. It is also indicated that no direct relationship between percentage of livestock damaged and floodwater level exists because of human intervention: livestock is moving and can be evacuated easily during floods.

Floodwater level above road	Percentage of livestock damaged			
	0 to 0.25	0.25 to 0.5	0.5 to 0.75	0.75 to 1.0
0 to 0.5 m.	12	5	1	0
0.5 to 1.0 m.	31	7	2	1
1.0 to 1.5 m.	16	4	3	1
>1.5 m.	3	3	0	0

Damage to buildings

There are about 21,792 households subject to flooding in the survey area. About 84% of houses is made of strong or mixed materials such as concrete or woods and 9% is made of indigenous but weak materials and could easily be destroyed by strong flood current.

As shown in Table 16, most houses that were totally damaged in the survey area were due to the very fast flood flow velocity in the barangay. The flood duration in the barangay was mostly 12 hours. In the table below, the percentage of houses totally damaged was mostly lower than 25%, regardless of the height of floodwater in the barangay. This percentage is low since only few houses are made of weak materials.

Floodwater level above ground floor	Percentage of houses totally damaged			
	0 to 0.25	0.25 to 0.5	0.5 to 0.75	0.75 to 1.0
0 to 0.5 m.	6	0	0	0
0.5 to 1.0 m.	10	1	0	0
1.0 to 1.5 m.	9	1	0	0
>1.5 m.	6	1	0	0

Damage to building contents (furniture and appliances)

As shown in Table 17, furniture/appliance damage in the survey area was mostly related to the very fast flood flow velocity and the 12-hour (or shorter) flood duration in the barangay. In the table below, the percentage of furniture/appliance

damaged was mostly lower than 25%, also regardless of the height of floodwater in the barangay. This low percentage is due to the fact that furniture and appliances are usually evacuated or placed in higher places during floods.

Floodwater level above ground floor	Percentage of furniture damaged			
	0 to 0.25	0.25 to 0.5	0.5 to 0.75	0.75 to 1.0
0 to 0.5 m.	8	0	1	0
0.5 to 1.0 m.	17	3	0	1
1.0 to 1.5 m.	12	5	1	1
>1.5 m.	12	4	2	0

Number of casualties

Table 18 shows that Typhoon Gening claimed 13 human lives and Typhoon Pepang had 29 casualties.

Indirect damages

The indirect damage consists of the income loss due to suspension of normal activities due to flood.

As shown in Table 19, suspension of farm operation and road transportation lasted from one day to several years. This did not depend obviously on the duration and height of floodwater but on the thickness of sedimentation. Sediments deposited on the farmlands are sometimes too thick to cultivate. While the restoration of unpassable roads depends on how fast the government respond to the request of the barangay for equipment that will remove the sediment deposits.

River washed areas

Most of the non-cultivated areas belong to the river washed lands along the big tributaries in the survey area. These washed lands are covered with gravel and sands which are too thick to cultivate. The table below summarizes Table 20 with regards to the present land use and hectarage as surveyed. The surveyed river washed areas are shown in the inundation map in Appendix N.

Present land use	Hectarage
Rivercourse/watercourse	94.04
Bare	1,657.7
Fishpond	3.5
Partially planted	406
Others	1.5
Total	2,162.74

2-6. Flood Preparedness/Fighting

(a) Flood Preparedness

Appendix L contains the Calamities and Disaster Preparedness Plan prepared by the National Disaster Coordinating Council (NDCC). This plan presents among

others the composition and responsibilities of the national organization for emergencies, the organization that will provide the vehicle for a concerted and coordinated disaster control effort from the National down to the Regional, Provincial, City/Municipal and Barangay levels. Under this plan, the NDCC shall exercise direction and control, through the Office of Civil Defense, over all emergency operations from the regional down to the lowest political subdivisions /councils. The Council shall coordinate the department's support/assistance activities in disaster management through this organizational arrangement. It shall likewise provide top executive management and control over multi-departmental types of disaster-stabilization operations.

At barangay level, a Barangay Disaster Coordinating Council composed of the Barangay Captain as Chairman and leading persons in the community as members has the following tasks:

1. Establishes the Barangay Disaster Operations Center (BDOC);

2. Coordinates from the BDOC, the disaster operation activities of its tasked units;

3. Implements within the barangay the guidelines set by the Municipal Disaster Coordinating Council (MDCC);

4. Advises the members of the Barangay Disaster Coordinating Council regarding disaster management; and

5. Submits recommendations to the MDCC/CDCC as necessary.

With regard to flood preparedness in the survey area, the barangay officials and people undertake the activities enumerated in the table below and detailed in Table 21, including those of DPWH and LGU. The two most common measures adapted by the barangay is to construct temporary river bank protections and to advise on possible evacuation. The participation of DPWH has been limited to a few barangays because their measures are permanent and require funds from the government. About 23 barangays are inactive relative to flood preparedness.

	Flood Preparedness	Number of Barangays
1	Brgy officials instruct people to evacuate	4
2	Brgy people construct temporary river bank protection	43
3	DPWH constructed spur dikes and ripraps	5
4	Brgy officials advise people to prepare for possible evacuation	33
5	None	23
6	LGU declogs drainage system	1
7	People construct temporary trench made of bamboo and stones	7
8	People transfer furniture to higher places	1
9	DPWH dredged Burnay River and constructed temporary dikes	2
10	People transfer commodities and livestock to higher places	1

(b) Flood Fighting

As shown in Table 21 and summarized in the table below, the barangay resorts only to evacuation of affected families to higher grounds as a means to fight flood.

	Flood Fighting System	Number of Barangays
1	Evacuation of affected families to higher grounds	59
2	None	47
3	Transfer of furniture to higher grounds	2
4	Construction of emergency river bank protection	7

2-7. Request for a Sabo and Flood Control Project

Since there is always the possibility of occurrence of big floods and subsequent damage of existing cultivated areas in the future, some measures to protect the enlargement of this non-cultivated area are requested by the surveyed barangays.

Table 22 shows that the measure requested by most of the barangays is dredging of the river (35%), followed by bank protection (22%) and general river control (17%). The barangay people were very receptive to any project that will mitigate flooding in Laoag River Basin. This table is detailed in Appendix M.

2-8. Inundation Map

Appendix N contains the inundation map of the survey area. This map (1/70000) was made based on the various data collected during the FDFFS survey. This map is expected to be revised when the actual topographic survey of the study area is completed and more accurate data are collected.

1. Inundated area is shown in yellow color. The boundaries of which were approximated during the survey or interview.

2. River washed areas are shown in blue color. The boundaries of which were also estimated during field interviews.

3. Rivers and other bodies of water are dark blue lines and colored dark blue.

4. Largest flood (LF) indicates the year of occurrence of the largest flood experienced in the surveyed barangay.

5. Depth of water (DW) indicates the maximum floodwater level above the street, farmland or groundfloor experienced in the surveyed barangay.

6. Type of flow (TF) indicates the flood flow velocity in the barangay during the largest flood and whether the floodwater is flowing or ponding.

7. Extent of damage (ED) includes river washed areas and damage to crop, houses, and furniture/appliances. Damages are presented as described above.

3. Conclusion

This report presents the results of the FDFFS survey as to the flooding conditions, damages, and non-structural measures for flood mitigation during the past major flood events. In particular, the data gathered from this survey shall form the basis for estimating the damageable values of crops, livestock, fish, infrastructures, etc. and calculating damage ratios to be used for flood damage analysis.

TABLES

Table 1 Surveyed barangays, respondents and dates of interview. (1/3)

	MUNICIPALITY	BARANGAY	BARANGAY CHAIRMAN	DATE OF INTERVIEW
1	Piddig	Bimmanga	Leonor BALGUNA	5/11/1996
2	Piddig	Callusa	Jimmy BAYAG	5/10/1996
3	Piddig	Dupitac	Bernardo HILARIO	5/10/1996
4	Piddig	Estancia	Octavio CASTRO	5/11/1996
5	Piddig	Gayamat	Nestor BRINGAS	5/10/1996
6	Piddig	Libnaoan	Rogelio BARTOLOME	5/11/1996
7	Piddig	Mangitayag	Anastacio SANTOS	5/11/1996
8	Laoag City	1 San Lorenzo (Pob.)	Arturo GERONIMO	5/10/1996
9	Laoag City	30-a Suyo	Ricardo PASCUAL	5/9/1996
10	Laoag City	30-b Santa Maria	Ruben DULDULAO	5/9/1996
11	Laoag City	34-b Gabu Norte East	Serafin ACIERTO	5/10/1996
12	Laoag City	43 Cavit (4)	Graciano ALONZO	5/9/1996
13	Laoag City	45 Tangid	Narciso MOLINA,SR.	5/9/1996
14	Laoag City	51-a Nangalisan East	Gilbert MARTILLANO	5/10/1996
15	Laoag City	51-b Nangalisan West	Aurelio PASION	5/10/1996
16	Laoag City	53 Rioeng	Constantino CORPUZ	5/9/1996
17	Laoag City	54-b Camangaan	Godofredo MANGAOIL	5/10/1996
18	San Nicolas	1 San Francisco (Pob.)	Edgar ESPEJO	5/16/1996
19	San Nicolas	24 Santa Monica (Nagrebcan)	Jaime ULEP	5/15/1996
20	San Nicolas	San Baltazar (Bo.2) (Pob.)	Ruben LAZO	5/16/1996
21	San Nicolas	San Bartolome (Bo.4) (Pob.)	Victor QUETORAS	5/15/1996
22	San Nicolas	San Ildefonso (Bo.3) (Pob.)	Napoleon HERNANDO	5/16/1996
23	San Nicolas	San Juan Bautista	Loreto HERNANDEZ	5/15/1996
24	Sarrat	San Agustin (Pob.)	Gerardo GANIRON	5/13/1996
25	Sarrat	San Andres	Rolando AGORILLA	5/15/1996
26	Sarrat	San Antonio	Ireneo H. CALAMAAN	5/15/1996
27	Sarrat	San Cristobal	Doroteo BASUG	5/14/1996
28	Sarrat	San Felipe	Ermilio DOCTOR	5/14/1996
29	Sarrat	San Francisco (Pob.)	Manuel TABORA	5/16/1996
30	Sarrat	San Isidro	Donato RAMOS	5/14/1996
31	Sarrat	San Joaquin (Pob.)	Camilo RASOS	5/15/1996
32	Sarrat	San Jose	Jimmy GANITANO	5/14/1996
33	Sarrat	San Leandro (Pob.)	Onofre FERNANDEZ	5/13/1996
34	Sarrat	San Lorenzo	Felix GANAL, SR.	5/14/1996
35	Sarrat	San Manuel	Federico GANAL	5/14/1996
36	Sarrat	San Marcos	Mariano DORONIO	5/14/1996
37	Sarrat	San Nicolas	Ferdinand GANO	5/14/1996
38	Sarrat	San Roque	Sotero CALANTO	5/13/1996
39	Sarrat	San Vicente (Pob.)	Antnio BULALACAO	5/13/1996
40	Sarrat	Santa Barbara (Pob.)	Doroteo PAZ	5/15/1996
41	Sarrat	Santo Tomas	Juanito AGMATA	5/14/1996
42	Espiritu	Balioeg	Artemio GALARSE	5/14/1996
43	Espiritu	Bugasi	Domingo ABIAN	5/14/1996
44	Espiritu	Caestebanan	Maximiano AGPALASIN	5/10/1996
45	Espiritu	Caribquib	Teodorico MORELLA	5/11/1996
46	Espiritu	Catagtaguen	Elideo de la CRUZ	5/10/1996
47	Espiritu	Hilario (Pob.)	Marilyn ABROGENA	5/11/1996
48	Espiritu	Lorenzo (Pob.)	Rodolfo DOMANICO	5/11/1996
49	Espiritu	Macayepyep	Santiago MORALES	5/11/1996
50	Espiritu	Sinamar	Damian BENITO	5/10/1996
51	Espiritu	Tabtabagan	Julio LAROCO	5/9/1996

Table 1 Surveyed barangays, respondents and dates of interview.(2/3)

	MUNICIPALITY	BARANGAY	BARANGAY CHAIRMAN	DATE OF INTERVIEW
52	Espiritu	Valdez	Ignacio RAMOS	5/9/1996
53	Marcos	Cacafean	Roberto PUGYAO	5/8/1996
54	Marcos	Daquioag	Anselmo B. MABUTI, JR	5/8/1996
55	Marcos	Elizabeth (Culao)	Llanes A. BASUG	5/8/1996
56	Marcos	Escoda	Benjamin C. TANGONAN	5/9/1996
57	Marcos	Ferdinand	Marcelino J. BALLON	5/8/1996
58	Marcos	Fortuna	Marilyn A. JUAN	5/7/1996
59	Marcos	Pacifico (Agunit)	Angel B. MALVAR	5/9/1996
60	Marcos	Santiago	Wison C. SIMEON	5/8/1996
61	Marcos	Tabucbuc (Ragas)	Gines S. GUILLERMO	5/8/1996
62	Marcos	Valdez	Nerio P. PILLOS	5/7/1996
63	Dingras	Albano (Pob.)	Benigno AQUINO	5/1/1996
64	Dingras	Bagut	Dionisio FELIFE	4/30/1996
65	Dingras	Parado(Bangay)	Ambrocio MANDING	4/27/1996
66	Dingras	Baresbes	Loreto ROSQUESTA	4/26/1996
67	Dingras	Barong	Elpidio DE LOS SANTOS	4/26/1996
68	Dingras	Bungcag	Santiago LAGRIO	5/1/1996
69	Dingras	Dancel	Renato CEREDON	4/30/1996
70	Dingras	Elizabeth	Carmelo BASILIO	4/28/1996
71	Dingras	Foz	Donato RUBIO	4/27/1996
72	Dingras	Guerrero (Pob.)	Joefrey SAGUID	4/30/1996
73	Dingras	Lanas	Bernardino SARMIENTO	4/28/1996
74	Dingras	Lumbad	Roland BALLESTEROS	4/30/1996
75	Dingras	Madamba (Pob.)	Elvis PARADO	5/1/1996
76	Dingras	Mandaloque	Reynaldo HIDALGO	5/16/1996
77	Dingras	Medina	Dominador CASTRO	4/27/1996
78	Dingras	Peralta (Pob.)	Agustin LAGRIO	5/1/1996
79	Dingras	Puruganan (Pob.)	Emiliana VALENCIA	5/2/1996
80	Dingras	Root (Baldias)	Benigno SABUCO	5/2/1996
81	Dingras	Sagpatan	Anastacio ABADILLA	4/29/1996
82	Dingras	San Esteban	Egmidio MACARIO	4/29/1996
83	Dingras	Francisco	Elena BALENDIA	4/26/1996
84	Dingras	San Marcelino (Padong)	Vivencio AGUILAR	4/26/1996
85	Dingras	San Marcos	Ernesto SALVADOR	4/29/1996
86	Dingras	Sulquiano	Generoso MONTE SR.	5/3/1996
87	Dingras	Suyo (3)	Julio CALANO	5/2/1996
88	Dingras	Ver	Artemio BAYUDAN	4/28/1996
89	Solsona	Aguitap	Faustino VALDEZ JR.	5/3/1996
90	Solsona	Bagbag	Mario AGCAOILI	5/3/1996
91	Solsona	Bagbago	Brigido JUAN	5/8/1996
92	Solsona	Barcelona	Edwin MATEO	5/2/1996
93	Solsona	Bubuos	Andrew MACKAY	5/3/1996
94	Solsona	Capurictan	Efren JOSE	5/3/1996
95	Solsona	Catangraran	Franklin CALUMAG	5/5/1996
96	Solsona	Darasdas	Melecio DE LOS SANTOS	5/1/1996
97	Solsona	Juan (Pob.) (1)	Cresencio VILORIA	5/8/1996
98	Solsona	Laureta (Pob.)	Edison De LARA	5/8/1996
99	Solsona	Lipay	Freddie ABAD	5/2/1996
100	Solsona	Maananteng	Augusto PASCUA	4/30/1996
101	Solsona	Manalpac	Elpidio DOMINGO	5/5/1996
102	Solsona	Mariquet	Vicente MEJIA	5/5/1996

Table 1 Surveyed barangays, respondents and dates of interview. (3/3)

	MUNICIPALITY	BARANGAY	BARANGAY CHAIRMAN	DATE OF INTERVIEW
103	Solsona	Nagpatpatan	Loreto RARANGOL	5/5/1996
104	Solsona	Nalasin	Andres JAMIAS	4/30/1996
105	Solsona	Puttao	Cirilo RAYMUNDO	5/5/1996
106	Solsona	San Juan	Nestor GALLEGOS	5/2/1996
107	Solsona	San Julian	Eymard GANAL	5/2/1996
108	Solsona	Santa Ana	Jose MARTINEZ	5/5/1996
109	Solsona	Santiago	Benjamin GASPAR	5/8/1996
110	Solsona	Talugtog	Macarte AGPAOA	4/30/1996
111	Nueva Era	Acnam	Aurencio GALUT	5/12/1996
112	Nueva Era	Cabittauran	Osias BUENO	5/13/1996
113	Nueva Era	Caray	Fernando BALAGSO	5/12/1996
114	Nueva Era	Poblacion	Lenin ALEJANDRO	5/13/1996
115	Nueva Era	Santo Nino	Macario DE LOS REYES	5/13/1996

Table 2 Population, annual growth rate, average household size and number of households of surveyed barangays by municipality: 1990 census and 1996 FDFFS survey.

	POPULATION			1990		1996	
MUNICIPALITY	1990	1996	AVE. ANNUAL GROWTH RATE	AVERAGE HOUSEHOLD SIZE	NUMBER OF HOUSEHOLDS	AVERAGE HOUSEHOLD SIZE	NUMBER OF HOUSEHOLDS
Piddig	3,963	5,318	4.88	4.94	802	6.20	858
Laoag City	9,618	11,465	2.74	5.04	1,909	5.62	2,040
San Nicolas	6,925	8,615	3.49	4.93	1,406	7.76	1,110
Sarrat	17,339	19,381	1.68	4.91	3,533	5.37	3,606
Espiritu	9,233	11,648	3.74	5.24	1,761	6.38	1,827
Marcos	9,234	10,091	1.33	5.12	1,802	5.04	2,001
Dingras	26,149	34,707	4.68	5.14	5,084	6.57	5,283
Solsona	18,867	25,286	4.86	5.07	3,720	6.00	4,217
Nueva Era	2,907	4,518	7.92	4.99	583	5.32	850
TOTAL	104,235	131,029	3.67	5.06	20,600	6.01	21,792
Poblacions	20,998	24,990	2.72	4.96	4,235	5.54	4,507
Non-poblacions	83,237	106,039	3.91	5.09	16,365	6.13	17,285
ILOCOS NORTE	390,666			5.04	91,606		

Table 3 Population, population density, annual growth rate, average household size and number of households by municipality: 1980 and 1990.

MUNICIPALITY	POPULATION 1980	POPULATION 1990	AVE. ANNUAL GROWTH RATE	LAND AREA (sq. km.)	POPULATION DENSITY 1980	POPULATION DENSITY 1990	1990 AVERAGE HOUSEHOLD SIZE	1990 NUMBER OF HOUSEHOLDS
Piddig	14,774	17,078	1.46	179.70	82.21	95.04	4.93	3,466
Laoag City	69,648	83,756	1.86	107.51	647.89	779.13	4.97	16,866
San Nicolas	23,384	27,632	1.68	49.30	474.32	560.49	5.00	5,523
Sarrat	18,798	21,272	1.24	80.70	232.94	263.59	4.87	4,369
Espiritu	12,887	15,342	1.76	74.50	172.98	205.93	5.21	2,947
Marcos	10,306	12,990	2.34	79.41	129.80	163.60	8.13	2,532
Dingras	26,511	30,519	1.42	100.20	264.58	304.58	5.14	5,942
Solsona	14,731	18,883	2.51	163.50	90.10	115.49	5.08	3,720
Nueva Era	3,927	5,238	2.92	644.70	6.09	8.12	5.05	1,038
TOTAL	194,966	232,710	1.78				5.01	46,403
ILOCOS NORTE	390,666	461,661	1.68	3,399.34	114.93	135.81	5.04	91,606

Source: Socio-Economic Profile, Province of Ilocos Norte

Table 4 Average number of people (per surveyed barangay) by type of occupation and by municipality.

OCCUPATIONS	SURVEY AREA	PIDDIG	LAOAG CITY	SAN NICOLAS	SARRAT	ESPI-RITU	MARCOS	DING-RAS	SOL-SONA	NUEVA ERA	POBLA-CIONS	NON-POB-LACIONS
Farmers with livestock	137	90	90	32	150	133	201	150	172	102	98	147
Farmers without livestock	10		16	2	5	7	3	31	3		8	10
Carpenters	7	3	13	43	3	2		7	5		16	5
Public officials	20	18	31	24	20	14	18	19	10	54	51	12
Laborers	11	6	22	49	10	4		6	7	12	23	7
Fishermen	<1		1					2		2	2	<1
Doctors	2	1	2	6	4	2		2	1		5	1
Engineers	2	1	2	6	4	4		<1	<1		4	1
Businessmen	2		9	16				<1			8	<1
Waiters	1		3	5	<1			<1			3	<1
Skilled workers	1		3		<1			1	<1		2	<1
Teachers	<1			5					1		1	<1
Pensioners	<1											<1
Nurses	2	2	4	7	3			1	<1		3	1
Store/canteen employees	1		2								3	<1
Factory workers	1		7									1

Table 5 Average number and price of houses by type of material and average price of residential lot by municipality.

	CONCRETE	WOOD	CONCRETE AND WOOD	INDIGENOUS MATERIAL	AVERAGE PRICE* OF RESIDENTIAL LOT
SURVEY AREA	95	14	70	17	152.72
Piddig	45	20	52	5	85.71
Laoag City	178	37	59		281.11
San Nicolas	74	11	83	18	558.33
Sarrat	77	18	89	16	175.72
Espiritu	79	3	53	32	51.59
Marcos	104		84	35	15.05
Dingras	75	19	81	17	121.96
Solsona	123	8	49	11	120.42
Nueva Era	83		66	21	95.00
Poblacions	77	29	112	8	422.90
Non-poblacions	98	11	60	19	75.52
AVERAGE PRICE* OF DWELLING UNIT	2,370.00	1,500.00	1,939.00	467.00	

* pesos/square meter

Table 6 Average percentage of households by type of furniture/appliance and average prices of furnitures/appliances by municipality.

	HOUSE-HOLDS	CHEST OF DRAWERS	TELE-VISION	CARPET	DRESSER	SOFA SET	STEREO	CABINET	DINING SET	REFRI-GERATOR
SURVEY AREA	21,792	0.38	0.46	0.02	0.66	0.79	0.84	0.80	0.95	0.39
Piddig	858	0.57	0.29	0.01	0.74	0.61	0.75	0.72	0.90	0.33
Laoag City	2,040	0.80	0.66	0.04	0.87	0.94	0.85	0.95	1.00	0.57
San Nicolas	1,110	0.15	0.88		0.68	0.96	0.97	0.87	1.00	0.60
Sarrat	3,606	0.63	0.64	0.01	0.72	0.87	0.95	0.95	1.00	0.46
Espiritu	1,827		0.46		0.73	0.89	0.90	0.77	0.93	0.33
Marcos	2,001	0.35	0.35		0.75	0.64	0.71	0.57	0.73	0.25
Dingras	5,283	0.26	0.32	-	0.51	0.78	0.74	0.79	0.98	0.28
Solsona	4,217	0.28	0.41	0.06	0.55	0.71	0.86	0.76	1.00	0.33
Nueva Era	850	0.68	0.33		0.84	0.65	0.82	0.74	0.90	0.21
Poblacions	4,507	0.35	0.73	0.07	0.63	0.88	0.96	0.90	0.99	0.57
Non-poblacions	17,285	0.39	0.40	0.01	0.67	0.77	0.81	0.78	0.95	0.35
AVERAGE PRICE*		4,152.46	7,833.33	1,625.00	4,933.33	6,203.50	6,666.67	4,744.95	6,054.33	8,000.00

*pesos/unit

Table 7 Average number of households and farmers, average farm areas, average farm area per farmer and average price by municipality.

MUNICIPALITY	AVE. NUMBER OF HOUSEHOLDS	AVE. NUMBER OF FARMERS	AVE. FARM AREA (has.)	AVE. FARM AREA PER FARMER	AVE. PRICE (pesos/sq.m.)
SURVEY AREA	194	147	153	1.04	44.98
Piddig	123	90	165	1.83	49.29
Laoag City	204	105	63	0.60	124.50
San Nicolas	185	33	15	0.45	137.50
Sarrat	200	156	130	0.83	38.78
Espiritu	165	141	141	1.00	24.59
Marcos	222	204	229	1.12	10.67
Dingras	217	180	209	1.16	21.67
Solsona	199	175	170	0.97	23.34
Nueva Era	173	102	194	1.90	64.00
Poblacions	225	106	55	0.52	74.65
Non-poblacions	187	157	177	1.13	37.83

Table 8(a) Palay and corn cropping patterns and planted areas by municipality. (1/2)

			PALAY				CORN			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
PIDDIG	Cropping pattern	FDFFS	May-Jul	Sep-Nov	Oct-Jan	Jan-Apr	May-Jun	Aug-Sep	Nov-Jan	Feb-Mar
		PAO	Jun- Aug	Sep-Nov	Oct-Nov	Jan-Feb			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated	1,199.0		953.0					
		Rainfed	324.0				2.0		79.5	
LAOAG CITY	Cropping pattern	FDFFS	Jun-Jul	Sep-Nov	Oct-Feb	Jan-May	May	Aug	Oct-Feb	Jan-May
		PAO	May-Jul	Sep-Nov	Oct-Dec	Jan-Mar			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated	516.0		155.0					
		Rainfed					20.0		237.0	
SAN NICOLAS	Cropping pattern	FDFFS	Jun-Jul	Sep-Nov	Jan	May	May	Aug	Feb	May
		PAO								
	Planted Areas (has.)	Irrigated	63.0		50.0					
		Rainfed	23.0				17.5		10.0	
SARRAT	Cropping pattern	FDFFS	May-Jul	Aug-Nov	Jan	May	May-Jun	Aug-Sep	Oct-Feb	Jan-May
		PAO	Jun-Jul	Oct-Dec	Jan	Apr-May			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated	1,680.0		140.0					
		Rainfed	1,088.0				268.5		143.0	
ESPIRITU	Cropping pattern	FDFFS	May-Jul	Aug-Nov	Sep-Dec	Dec-May	May-Jun	Aug-Sep	Oct-Jan	Jan-Apr
		PAO	Jun-Sep	Sep-Dec	Oct-Nov	Jan-Feb			Oct-Dec	Jan-Feb
	Planted Areas (has.)	Irrigated	3,485.0		891.0					
		Rainfed	810.0				37.0		638.0	
MARCOS	Cropping pattern	FDFFS	May-Jul	Sep-Nov	Oct	Jan			Sep-Dec	Dec-Mar
		PAO	May-Aug	Sep-Dec	Oct-Dec	Jan-Mar	May-Jul	Aug-Sep	Oct-Jan	Jan-Apr
	Planted Areas (has.)	Irrigated	222.0						10.0	
		Rainfed	2,000.5						685.0	
DINGRAS	Cropping pattern	FDFFS	Apr-Jul	Aug-Nov	Sep-Dec	Dec-Mar	Apr-Jun	Jul-Sep	Oct-Jan	Jan-Apr
		PAO	May-Jul	Aug-Oct	Sep-Feb	Dec-May			Sep-Dec	Dec-Mar
	Planted Areas (has.)	Irrigated	5,467		3,986					
		Rainfed	554.0				75.0		1,538.0	

Table 8(a) Palay and corn: cropping patterns and planted areas by municipality. (2/2)

			PALAY				CORN			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
SOLSONA	Cropping pattern	FDFFS	May-Jul	Sep-Nov	Oct-Dec	Jan-Apr			Sep-Jan	Dec-Apr
		PAO	May-Jul	Aug-Oct	Oct-Feb	Jan-May			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated	5,963.0		2,828.0					
		Rainfed	174.0				131.0		1,757.0	
NUEVA ERA	Cropping pattern	FDFFS	May-Jul	Sep-Dec					Dec-Jan	Mar-Apr
		PAO	Jun-Aug	Sep-Nov	Oct-Nov	Jan-Feb			Oct-Nov	Jan-Feb
	Planted Areas (has.)	Irrigated	558.0							
		Rainfed	329.0						84.5	
	Planted Areas (has.)	Irrigated	19,153.0		9,003.0					
		Rainfed	5,302.5							
TOTAL			24,455.5		9,003.0		551.0		5,182.0	

*START: earliest start; END: latest end.

PAO: Provincial Agriculture Office, Province of Ilocos Norte

Table 8(b) Sugarcane and rootcrop: cropping patterns and planted areas by municipality.(1/2)

			SUGARCANE				ROOTCROP			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
PIDDIG	Cropping pattern	FDFFS			Jan-Feb	Jan-Feb	May-Dec	Aug-Mar		
		PAO							Sep-Dec	Dec-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			3.0		24.0			
LAOAG CITY	Cropping pattern	FDFFS								
		PAO							Nov-Jan	Feb-Apr
	Planted Areas (has.)	Irrigated								
		Rainfed								
SAN NICOLAS	Cropping pattern	FDFFS			Jan-Feb	Jan-Feb	May	Aug		
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed			5.0		11.5			
SARRAT	Cropping pattern	FDFFS			Apr-May	Apr-May			Oct	Jan
		PAO			Dec-Jan	Nov-Dec			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			3.0				6.0	
ESPIRITU	Cropping pattern	FDFFS					May-Oct	Aug-Jan	Oct	Jan
		PAO							Oct-Dec	Jan-Feb
	Planted Areas (has.)	Irrigated								
		Rainfed					15.0		15.0	
MARCOS	Cropping pattern	FDFFS								
		PAO							Nov-Jan	Feb-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed								

Table 8(b) Sugarcane and rootcrop: cropping patterns and planted areas by municipality.(2/2)

			SUGARCANE				ROOTCROP			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
DINGRAS	Cropping pattern	FDFFS							Oct-Dec	Jan-Mar
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed								
SOLSONA	Cropping pattern	FDFFS							Oct-Nov	Jan-Feb
		PAO							Oct-Jan	Jan-Apr
	Planted Areas (has.)	Irrigated								136.0
		Rainfed								
NUEVA ERA	Cropping pattern	FDFFS			Mar-Apr	Mar-Apr			Jan-Jun	Apr-Sep
		PAO							Sep-Dec	Dec-Mar
	Planted Areas (has.)	Irrigated								66.0
		Rainfed			2.25					
TOTAL					13.3		50.5			223.0

*START: earliest start; END: latest end.

PAO: Provincial Agriculture Office, Province of Ilocos Norte.

Table 8(c) Legume and tobacco: cropping patterns and planted areas by municipality.(1/2)

			LEGUME				TOBACCO			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
PIDIG	Cropping pattern	FDFFS	May-Jun	Aug-Sep	Jan-Dec	Apr-May				
		PAO			Sep-Dec	Dec-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed	21.0		49.0					
LAOAG CITY	Cropping pattern	FDFFS								
		PAO			Oct-Dec	Jan-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed								
SAN NICOLAS	Cropping pattern	FDFFS								
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed								
SARRAT	Cropping pattern	FDFFS	May	Aug						
		PAO							Sep-Dec	Dec-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed	20.0							
ESPIRITU	Cropping pattern	FDFFS							Nov-Dec	Jul-Aug
		PAO			Sep-Dec	Dec-Mar			Sep-Dec	Dec-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed							105.0	
MARCOS	Cropping pattern	FDFFS			Sep-Dec	Dec-Mar	Sep-Nov	May-Jul		
		PAO			Oct-Dec	Jan-Mar			Sep-Dec	Dec-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			20.0		5.0			

Table 8(c) Legume and tobacco: cropping patterns and planted areas by municipality.(2/2)

			LEGUME				TOBACCO			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
DINGRAS	Cropping pattern	FDFFS							Feb-Mar	Oct-Nov
		PAO			Oct-Dec	Jan-Mar			Sep-Dec	Dec-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed							474.0	
SOLSONA	Cropping pattern	FDFFS			Nov-Dec	Feb-Mar				
		PAO			Oct-Feb	Jan-May			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			180.0					
NUEVA ERA	Cropping pattern	FDFFS			Nov-Dec	Feb-Mar				
		PAO			Oct-Dec	Jan-Mar			Sep-Dec	Dec-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			52.25					
TOTAL			41.0		301.3				584.0	

*START: earliest start; END: latest end.

PAO: Provincial Agriculture Office, Province of Ilocos Norte

Table 8(d) Garlic and beans: cropping patterns and planted areas by municipality. (1/2)

			GARLIC				BEANS			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
PIDDIG	Cropping pattern	FDFFS			May-Dec	Aug-Mar				
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed			11.5					
LAOAG CITY	Cropping pattern	FDFFS			Feb-Nov	May-Feb			Nov	Feb
		PAO			Oct-Dec	Jan-Mar			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			52.5				0.5	
SAN NICOLAS	Cropping pattern	FDFFS			Oct-Nov	Jan-Feb				
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed			3.0					
SARRAT	Cropping pattern	FDFFS			Sep-Dec	Dec-Mar				
		PAO			Oct-Dec	Jan-Mar			Sep-Nov	Dec-Feb
	Planted Areas (has.)	Irrigated								
		Rainfed			758.5					
ESPIRITU	Cropping pattern	FDFFS			Dec	Mar			Jan	Apr
		PAO			Sep-Dec	Dec-Mar			Sep-Nov	Dec-Feb
	Planted Areas (has.)	Irrigated								
		Rainfed			10.0				0.5	
MARCOS	Cropping pattern	FDFFS			Sep-Nov	Dec-Feb				
		PAO			Oct-Dec	Jan-Mar			Dec-Feb	Mar-May
	Planted Areas (has.)	Irrigated								
		Rainfed			5.0					

Table 8(d) Garlic and beans: cropping patterns and planted areas by municipality. (2/2)

			GARLIC				BEANS			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
DINGRAS	Cropping pattern	FDFFS			Nov	Feb			Jan-Dec	Apr-Mar
		PAO			Sep-Dec	Dec-Mar			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			25.0				3.0	
SOLSONA	Cropping pattern	FDFFS							May-Dec	Aug-Mar
		PAO							Nov-Feb	Feb-May
	Planted Areas (has.)	Irrigated								
		Rainfed							10.0	
NUEVA ERA	Cropping pattern	FDFFS								
		PAO			Sep-Dec	Dec-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed								
TOTAL					865.5				14.0	

*START: earliest start; END: latest end.

PAO: Provincial Agriculture Office, Province of Ilocos Norte

Table 8(c) Mongo and vegetable: cropping patterns and planted areas by municipality.(1/2)

			MONGO				VEGETABLE			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
PIDDIG	Cropping pattern	FDFFS			Feb-Dec	May-Mar			Oct-Dec	Jan-Mar
		PAO							Sep-Dec	Dec-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			45.5				122.5	
LAOAG CITY	Cropping pattern	FDFFS			Feb-Dec	May-Mar			Feb-Dec	May-Mar
		PAO			Oct-Dec	Jan-Mar			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			67.0				77.0	
SAN NICOLAS	Cropping pattern	FDFFS	Aug	Nov	Feb	May				
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed	16.5		6.0					
SARRAT	Cropping pattern	FDFFS			May-Dec	Aug-Mar			Oct-Jan	Jan-Apr
		PAO			Sep-Nov	Dec-Feb				
	Planted Areas (has.)	Irrigated								
		Rainfed			841.0				795.5	
ESPIRITU	Cropping pattern	FDFFS			Oct-Jan	Jan-Apr			Jan-Dec	Apr-Mar
		PAO			Sep-Nov	Dec-Feb			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			40.0				58.0	
MARCOS	Cropping pattern	FDFFS			Sep	Dec			Sep-Dec	Dec-Mar
		PAO			Nov-Dec	Feb-Mar			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			25.0				70.0	

Table 8(e) Mongo and vegetable: cropping patterns and planted areas by municipality.(2/2)

			MONGO				VEGETABLE			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
DINGRAS	Cropping pattern	FDFFS			Jan-Dec	Apr-Mar			Jan	Apr
		PAO			Oct-Dec	Jan-Mar			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed			163.5				136.5	
SOLSONA	Cropping pattern	FDFFS			Jan-Dec	Apr-Mar			Dec-Jan	Mar-Apr
		PAO			Nov-Feb	Feb-May			Sep-Feb	Dec-May
	Planted Areas (has.)	Irrigated								
		Rainfed			613.5				422.5	
NUEVA ERA	Cropping pattern	FDFFS								
		PAO			Oct-Dec	Jan-Mar			Sep-Dec	Dec-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed								
TOTAL			16.5		2,001.5				1,682.0	

*START: earliest start; END: latest end.

PAO: Provincial Agriculture Office, Province of Ilocos Norte

Table 8(f) Cassava and peanuts: cropping patterns and planted areas by municipality.(1/2)

			CASSAVA				PEANUTS			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
PIDDIG	Cropping pattern	FDFFS					May	Aug		
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed					2.5			
LAOAG CITY	Cropping pattern	FDFFS							Feb	May
		PAO							Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed							25.0	
SAN NICOLAS	Cropping pattern	FDFFS								
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed								
SARRAT	Cropping pattern	FDFFS					Jun	Sep		
		PAO							Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed					0.5			
ESPIRITU	Cropping pattern	FDFFS							Dec	Mar
		PAO			Sep-Nov	Dec-Feb			Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed							2.5	
MARCOS	Cropping pattern	FDFFS							Sep-Dec	Dec-Mar
		PAO							Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed							8.0	
DINGRAS	Cropping pattern	FDFFS								
		PAO							Sep-Dec	Dec-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed								

Table 8(f) Cassava and peanuts: cropping patterns and planted areas by municipality.(2/2)

			CASSAVA				PEANUTS			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
SOLSONA	Cropping pattern	FDFFS	May-Sep	Aug-Dec					May-Dec	Aug-Mar
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed	104.0						181.0	
NUEVA ERA	Cropping pattern	FDFFS							Jan-Feb	Apr-May
		PAO							Oct-Dec	Jan-Mar
	Planted Areas (has.)	Irrigated								
		Rainfed							5.0	
TOTAL			104.0				3.0		221.5	

*START: earliest start; END: latest end.

PAO: Provincial Agriculture Office, Province of Ilocos Norte

Table 8(g) Cotton and onion: cropping patterns and planted areas by municipality. (1/2)

			COTTON				ONION			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
FIDDIG	Cropping pattern	FDFFS								
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed								
LAOAG CITY	Cropping pattern	FDFFS							Feb-Nov	May-Feb
		PAO								
	Planted Areas (has.)	Irrigated								25.0
		Rainfed								
SAN NICOLAS	Cropping pattern	FDFFS								
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed								
SARRAT	Cropping pattern	FDFFS								
		PAO			Sep-Dec	Dec-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed								
ESPIRITU	Cropping pattern	FDFFS			Oct-Nov	Jan-Feb				
		PAO			Sep-Nov	Dec-Feb				
	Planted Areas (has.)	Irrigated								
		Rainfed			25.0					
MARCOS	Cropping pattern	FDFFS			Sep-Nov	Dec-Feb				
		PAO			Oct-Dec	Jan-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed			465.0					

Table 8(g) Cotton and onion: cropping patterns and planted areas by municipality. (2/2)

			COTTON				ONION			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
DINGRAS	Cropping pattern	FDFFS							Feb-Dec	May-Mar
		PAO			Oct-Jan	Jan-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed							50.0	
SOLSONA	Cropping pattern	FDFFS								
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed								
NUEVA ERA	Cropping pattern	FDFFS								
		PAO			Oct-Dec	Jan-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed								
TOTAL					490.0				75.0	

*START: earliest start; END: latest end.

PAO: Provincial Agriculture Office, Province of Ilocos Norte

Table 8(h) Squash and other crops: cropping patterns and planted areas by municipality.(1/2)

			SQUASH				OTHER CROPS			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
PIDDIG	Cropping pattern	FDFFS								
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed								
LADAG CITY	Cropping pattern	FDFFS								
		PAO			Sep-Nov	Dec-Feb				
	Planted Areas (has.)	Irrigated								
		Rainfed								
SAN NICOLAS	Cropping pattern	FDFFS								
		PAO								
	Planted Areas (has.)	Irrigated								
		Rainfed								
SARRAT	Cropping pattern	FDFFS								
		PAO			Oct-Dec	Jan-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed								
ESPIRITU	Cropping pattern	FDFFS								
		PAO			Sep-Dec	Dec-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed								
MARCOS	Cropping pattern	FDFFS							Sep-Apr	Dec-Jul
		PAO			Oct-Dec	Jan-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed								27.0

Table 8(h) Squash and other crops: cropping patterns and planted areas by municipality.(2/2)

			SQUASH				OTHER CROPS			
			First Cropping		Second Cropping		First Cropping		Second Cropping	
			Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End	Planting Start-End	Harvesting Start-End
DINGRAS	Cropping pattern	FDFFS								
		PAO			Sep-Dec	Dec-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed								
SOLSONA	Cropping pattern	FDFFS			Oct	Jan				
		PAO			Oct-Jan	Jan-Apr				
	Planted Areas (has.)	Irrigated								
		Rainfed				5.0				
NUEVA ERA	Cropping pattern	FDFFS								
		PAO			Sep-Dec	Dec-Mar				
	Planted Areas (has.)	Irrigated								
		Rainfed								
TOTAL						5.0				27.0

*START: earliest start; END: latest end.

PAO: Provincial Agriculture Office, Province of Ilocos Norte

Table 9 Average yields and prices of crops by municipality.

		PIDDIG	LAOAG CITY	SAN NICOLAS	SARRAT	ESPIRITU	MARCOS	DINGRAS	SOL-SONA	NUEVA ERA
TOBACCO	Ave. yield: FDFFS (MT/ha)					1.88				
	Ave. yield: 1991	1.00		1.00	1.50	1.00	1.00	1.23	1.00	
	Ave. yield: PAO			1.00	2.00	1.70	0.91	1.10	1.00	1.32
	Ave. price: FDFFS (pesos/MT)					38,000.00				
	Ave. price: PAO			38,000.00	38,000.00	40,000.00	40,000.00	40,000.00	38,000.00	38,000.00
GARLIC	Ave. yield: FDFFS (MT/ha)				2.81					
	Ave. yield: 1991	3.00	2.90	3.00	3.10	2.50	2.50	3.00		2.50
	Ave. yield: PAO			3.39	2.02	2.00	3.00	2.06		2.35
	Ave. price: FDFFS (pesos/MT)				110,000.00					
	Ave. price: PAO		100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	99,570.00		95,000.00
VEGETABLE	Ave. yield: FDFFS (MT/ha)				10.00					
	Ave. yield: 1991	8.90	7.79	5.63	7.47	7.15	9.69	4.00	15.54	7.51
	Ave. yield: PAO	5.00	5.00	6.00		7.50	10.00	7.00		5.00
	Ave. price: FDFFS (pesos/MT)				10,000.00					
	Ave. price: PAO	10,500.00	9,800.00	10,000.00		10,500.00	10,000.00	10,000.00	10,500.00	10,000.00
COTTON	Ave. yield: FDFFS (MT/ha)					2.00				
	Ave. yield: 1991		1.20	1.20	1.20	1.20	1.20	1.20		1.20
	Ave. yield: PAO			1.20	1.20					1.20
	Ave. price: FDFFS (pesos/MT)					17,000.00				
	Ave. price: PAO			17,000.00	17,000.00	17,000.00	17,000.00			17,000.00

Source of Ave. Yield: 1991: Socio-economic Profile: Province of Ilocos Norte

Source of Ave. Yield: PAO: Provincial Agriculture Office

Table 10 Livestock production and average price per barangay by type and by municipality.

		PIDDIG	LAOAG CITY	SAN NICOLAS	SARRAT	ESPIRITU	MARCOS	DINGRAS	SOL-SONA	NUEVA ERA
CATTLE	Ave. production: FDFFS (MT)								13.80	
	Ave. production: 1991*	38.20	6.40	6.10	15.90	30.50	20.40	25.50	27.30	12.70
	Ave. production: PAO*		6.46	6.04	15.96	30.50	20.53	25.70	27.30	12.72
	Ave. price: FDFFS (pesos/MT)	158,300.00	166,700.00	150,000.00	160,000.00	156,500.00		156,500.00	128,600.00	200,000.00
	Ave. price: PAO (pesos/MT)		110,000.00	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00
HOG	Ave. production: FDFFS (MT)								10.80	
	Ave. production: 1991*	4.50	3.60	8.00	8.70	13.60	9.20	17.50	11.10	5.80
	Ave. production: PAO*		3.85	8.30	8.88	13.75	10.00	17.48	11.06	6.82
	Ave. price: FDFFS (pesos/MT)								60,000.00	
	Ave. price: PAO (pesos/MT)		80,000.00	80,000.00	80,000.00	80,000.00	75,000.00	75,000.00	75,000.00	80,000.00
CHICKEN	Ave. production: FDFFS (MT)								0.60	
	Ave. production: 1991*	0.25	0.45	0.47	0.62	0.48	1.35	1.18	0.83	0.40
	Ave. production: PAO*		0.46	0.47	0.68	0.50	1.37	1.18	0.83	0.42
	Ave. price: FDFFS (pesos/MT)	80,000.00	80,600.00	55,000.00	66,400.00	60,900.00		64,300.00	73,400.00	65,000.00
	Ave. price: PAO (pesos/MT)		65,000.00	65,000.00	65,000.00	65,000.00	65,000.00	65,000.00	60,000.00	65,000.00

Source of Ave. Production: 1991: Socio-economic Profile: Province of Ilocos Norte

Source of Ave. Production: PAO: Provincial Agriculture Office

* At municipal level

Table 11 Fish production and average price per barangay by type and by municipality.

		PIDDIG	LAOAG CITY	SAN NICOLAS	SARRAT	ESPIRITU	MARCOS	DINGRAS	SOL-SONA	NUEVA ERA
TILAPIA	Ave. production: FDFFS (MT)								0.66	
	Ave. production: 1991*									
	Ave. production: PAO*		10.00	2.40	0.93	0.40	2.50	1.47	4.64	0.74
	Ave. price: FDFFS (pesos/MT)								75,000.00	
	Ave. price: PAO (pesos/MT)		65,000.00	65,000.00	65,000.00	65,000.00	65,000.00	65,000.00	65,000.00	65,000.00
BANGUS	Ave. production: FDFFS (MT)		10.00							
	Ave. production: 1991*									
	Ave. production: PAO*									
	Ave. price: FDFFS (pesos/MT)		50,000.00							
	Ave. price: PAO (pesos/MT)							80,000.00		
OTHER FISH	Ave. production: FDFFS (MT)								0.60	
	Ave. production: 1991*									
	Ave. production: PAO*		300.00							
	Ave. price: FDFFS (pesos/MT)								75,000.00	
	Ave. price: PAO (pesos/MT)		65,000.00					60,000.00		

Source of Ave. Production: 1991: Socio-economic Profile: Province of Ilocos Norte

Source of Ave. Production: PAO: Provincial Agriculture Office

* At municipal level

Table 11 Fish production and average price per barangay by type and by municipality.

		PIDDIG	LAOAG CITY	SAN NICOLAS	SARRAT	ESPIRITU	MARCOS	DINGRAS	SOL-SONA	NUEVA ERA
TILAPIA	Ave. production: FDFFS (MT)								0.66	
	Ave. production: 1991*									
	Ave. production: PAO*		10.00	2.40	0.93	0.40	2.50	1.47	4.64	0.74
	Ave. price: FDFFS (pesos/MT)								75,000.00	
	Ave. price: PAO (pesos/MT)		65,000.00	65,000.00	65,000.00	65,000.00	65,000.00	65,000.00	65,000.00	65,000.00
BANGUS	Ave. production: FDFFS (MT)		10.00							
	Ave. production: 1991*									
	Ave. production: PAO*									
	Ave. price: FDFFS (pesos/MT)		50,000.00							
	Ave. price: PAO (pesos/MT)							30,000.00		
OTHER	Ave. production: FDFFS (MT)								0.60	
FISH	Ave. production: 1991*									
	Ave. production: PAO*		300.00							
	Ave. price: FDFFS (pesos/MT)								75,000.00	
	Ave. price: PAO (pesos/MT)		65,000.00					60,000.00		

Source of Ave. Production: 1991: Socio-economic Profile: Province of Ilocos Norte

Source of Ave. Production: PAO: Provincial Agriculture Office

* At municipal level

Table 12 Number and cost of infrastructures. (2/2)

INFRASTRUCTURE	PIDDIG	LAOAG CITY	SAN NICOLAS	SARRAT	ESPIRITU	MARCOS	DINGRAS	SOLSONA	NUEVA ERA	REMARKS
Elementary school	6	10	22	13	7	8	8	10	9	Ave. number of classrooms
	210,600.00	210,600.00	210,600.00	210,600.00	210,600.00	210,600.00	210,600.00	210,600.00	210,600.00	Ave. cost/classroom (pesos)
High school	10	12	28	27	12	7	10	15	13	Ave. number of classrooms
	353,600.00	353,600.00	353,600.00	353,600.00	353,600.00	353,600.00	353,600.00	353,600.00	353,600.00	Ave. cost/classroom (pesos)
College/university							5			Total number surveyed
Post office		1					1	1		Total number surveyed
Parks				2						Total number surveyed
Public hall	7	9	3	19	11	10	25	22	5	Total number surveyed
	120,714.00	290,000.00	146,833.00	121,750.00	360,910.00	105,560.00	129,333.00	154,350.00	440,000.00	Ave. unit cost (pesos)
Day care center	2	8	2	9	5	8	9	8	3	Total number surveyed
	50,750.00	108,333.00		76,250.00	95,000.00	60,000.00	73,333.00	90,857.00	73,333.00	Ave. unit cost (pesos)
National road	1.8	4.2	1.1	4.8	2.2	2.9	1.7	2.6		Ave. length/brgy in kms
	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	Maintenance cost/km/yr (pesos)
Provincial road		2.4	0.5	2.6	1.6	3.7	2	2.8	4	Ave. length/brgy in kms
	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	Maintenance cost/km/yr (pesos)
Municipality road	2.5	3.2	0.6	2.5	3		4.2	11	3.4	Ave. length/brgy in kms
	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00	Maintenance cost/km/yr (pesos)
Barangay road	4	4.9	2.5	4	4.7	11.8	4.6	5.4	3.8	Ave. length/brgy in kms
	4,133.30	4,133.30	4,133.30	4,133.30	4,133.30	4,133.30	4,133.30	4,133.30	4,133.30	Maintenance cost/km/yr (pesos)
Intake/weir							3	21		Total number surveyed
Sluice								1		Total number surveyed
Drainage/Irrigation channel		0.483	0.5	1.4			4.457	28		Ave. length/brgy in kms
		230,555.55	230,555.55	230,555.55			230,555.55	230,555.55		Cost/km (pesos)
Bridge/box culvert	7	11	9	33	62	7	36	80		Total number surveyed

Table 12 Number and cost of infrastructures. (2/2)

INFRASTRUCTURE	PIDDIG	LAOAG CITY	SAN NICOLAS	SARRAT	ESPIRITU	MARCOS	DINGRAS	SOLSONA	NUEVA ERA	REMARKS
Factory		5		1						Total number surveyed
Health center		1		1			1	1		Total number surveyed
		153,333.33		153,333.33			153,333.33	153,333.33		Ave. unit cost (pesos)
Church/chapel			2	1			2	3		Total number surveyed
Agrarian office							1			Total number surveyed
Justice hall							1			Total number surveyed
Police station							1			Total number surveyed
Telephone office							1			Total number surveyed
Penal court							1			Total number surveyed
Others		2	2	2	1	1	1	4	1	Total number surveyed
		52,571.43	52,571.43	52,571.43	52,571.43	52,571.43	52,571.43	52,571.43	52,571.43	Ave. unit cost (pesos)

Table 3 Name and date of occurrence of big typhoons and inundation depth experienced in the survey area. (1/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	FLOODWATER LEVEL (meters)	REFERENCE
Piddig	Bimmanga	Gening	June 28-30, 1967	1.20	Above the street level
Piddig	Bimmanga	Yeyeng	September 15-16, 1993	0.80	Above the street level
Piddig	Bimmanga	Maring	August 27-30, 1984	0.80	Above the street level
Piddig	Callusa	Romahing	June 15-17, 1972	0.70	Above the street level
Piddig	Callusa	Gening	June 28-30, 1967	1.20	Above the street level
Piddig	Dupitac	Pepang	October 21-25, 1987	0.50	Above the street level
Piddig	Dupitac	Gening	June 28-30, 1967	0.70	Above the street level
Piddig	Dupitac	Weling	September 10, 1994	0.10	
Piddig	Estancia	Pepang	October 21-25, 1987	3.00	Above the street level
Piddig	Gayamat	Romahing	June 15-17, 1972	0.10	Above the farmland
Piddig	Gayamat	Gening	June 28-30, 1967	0.30	Above the farmland
Piddig	Libnaoan	Pepang	October 21-25, 1987	1.20	Above the street level
Piddig	Libnaoan	Maring	September 20, 1992	2.00	Above the street level
Piddig	Mangitayag	Maring	September 20, 1992	0.90	Above the street level
Piddig	Mangitayag	Pepang	October 21-25, 1987	1.50	Above the street level
Laoag City	1 San Lorenzo (Pob.)	Gening	June 28-30, 1967	1.50	Above the street level
Laoag City	1 San Lorenzo (Pob.)	Maring	September 20, 1992	0.80	Above the street level
Laoag City	1 San Lorenzo (Pob.)	Pepang	October 21-25, 1987	0.90	Above the street level
Laoag City	30-a Suyo	Maring	September 20, 1992	0.40	Above the street level
Laoag City	30-a Suyo	Pepang	October 21-25, 1987	0.40	Above the street level
Laoag City	30-a Suyo	Gening	June 28-30, 1967	0.50	Above the street level
Laoag City	30-b Santa Maria	Gening	June 28-30, 1967	1.50	Above the street level
Laoag City	34-b Gabu Norte East	Pepang	October 21-25, 1987	0.70	Above the street level
Laoag City	34-b Gabu Norte East	Maring	September 20, 1992	0.70	Above the street level
Laoag City	34-b Gabu Norte East	Gening	June 28-30, 1967	1.50	Above the street level
Laoag City	43 Cavit (4)	Gening	June 28-30, 1967	0.65	Above the street level
Laoag City	45 Tangid	Gening	June 28-30, 1967	0.60	Above the street level
Laoag City	45 Tangid	Pepang	October 21-25, 1987	0.40	Above the street level
Laoag City	45 Tangid	Maring	September 20, 1992	0.40	Above the street level
Laoag City	51-a Nangalisan East	Maring	September 20, 1992	1.00	Above the street level
Laoag City	51-a Nangalisan East	Pepang	October 21-25, 1987	1.00	Above the street level

Table 13 Name and date of occurrence of big typhoons and inundation depth experienced in the survey area. (2/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	FLOODWATER LEVEL (meters)	REFERENCE
Laoag City	51-b Nangalisan West	Gening	June 28-30, 1967	0.80	Above the street level
Laoag City	53 Rioeng	Maring	September 20, 1992	0.50	Above the street level
Laoag City	53 Rioeng	Gening	June 28-30, 1967	0.70	Above the street level
Laoag City	53 Rioeng	Pepang	October 21-25, 1987	0.40	Above the street level
Laoag City	54-b Camangaan	Gening	June 28-30, 1967	0.50	Above the street level
San Nicolas	1 San Francisco (Pob.)	Gening	June 28-30, 1967	3.00	Above the street level
San Nicolas	24 Santa Monica (Nagrebcan)	Gening	June 28-30, 1967	0.80	Above the street level
San Nicolas	24 Santa Monica (Nagrebcan)	Pepang	October 21-25, 1987	0.80	Above the street level
San Nicolas	San Baltazar (Bo.2) (Pob.)	Gening	June 28-30, 1967	1.50	Above the street level
San Nicolas	San Baltazar (Bo.2) (Pob.)	Maring	August 27-30, 1984		
San Nicolas	San Bartolome (Bo.4) (Pob.)	Maring	August 27-30, 1984	1.20	Above the street level
San Nicolas	San Bartolome (Bo.4) (Pob.)	Gening	June 28-30, 1967	1.20	Above the street level
San Nicolas	San Bartolome (Bo.4) (Pob.)	Pepang	October 21-25, 1987	1.20	Above the street level
San Nicolas	San Ildefonso (Bo.3) (Pob.)	Maring	September 20, 1992		
San Nicolas	San Ildefonso (Bo.3) (Pob.)	Gening	June 28-30, 1967	1.20	Above the street level
San Nicolas	San Juan Bautista	Gening	June 28-30, 1967	1.00	Above the street level
Sarrat	San Agustin (Pob.)	Weling	September 10, 1994		
Sarrat	San Agustin (Pob.)	Pepang	October 21-25, 1987		
Sarrat	San Agustin (Pob.)	Gening	June 28-30, 1967	1.00	Above the street level
Sarrat	San Andres	Pepang	October 21-25, 1987	0.30	Above the street level
Sarrat	San Andres	Maring	September 20, 1992	0.30	Above the street level
Sarrat	San Andres	Gening	June 28-30, 1967	0.30	Above the street level
Sarrat	San Antonio	Gening	June 28-30, 1967	0.70	Above the street level
Sarrat	San Antonio	Pepang	October 21-25, 1987		Could not reach residential area
Sarrat	San Antonio	Goring	July 20-26, 1977		Could not reach residential area
Sarrat	San Cristobal	Gening	June 28-30, 1967		
Sarrat	San Felipe	Gening	June 28-30, 1967		Could not reach street level
Sarrat	San Felipe	Maring	August 27-30, 1984		Could not reach street level
Sarrat	San Francisco (Pob.)	Yeyeng	September 15-16, 1993	0.30	Above the street level
Sarrat	San Francisco (Pob.)	Openg	September 10, 1989	1.20	Above the street level
Sarrat	San Isidro	Gening	June 28-30, 1967		Could not reach street level

Table 13 Name and date of occurrence of big typhoons and inundation depth experienced in the survey area. (3/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	FLOODWATER LEVEL (meters)	REFERENCE
Sarrat	San Joaquin (Pob.)	Gening	June 28-30, 1967	0.30	Above the street level
Sarrat	San Jose	Gening	June 28-30, 1967	3.00	Above the farmland
Sarrat	San Leandro (Pob.)	Gening	June 28-30, 1967	2.00	Above the street level
Sarrat	San Lorenzo	Gening	June 28-30, 1967	0.50	Above the street level
Sarrat	San Lorenzo	Pepang	October 21-25, 1987	0.30	Above the street level
Sarrat	San Manuel	Openg	September 10, 1989	0.30	Above the provincial road
Sarrat	San Manuel	Gening	June 28-30, 1967	0.70	Above the provincial road
Sarrat	San Manuel	Pepang	October 21-25, 1987	0.30	Above the provincial road
Sarrat	San Marcos	Pepang	October 21-25, 1987		
Sarrat	San Marcos	Gening	June 28-30, 1967	3.00	Above the street level
Sarrat	San Nicolas	Maring	September 20, 1992	0.20	Above the street level
Sarrat	San Nicolas	Pepang	October 21-25, 1987	0.50	Above the street level
Sarrat	San Roque	Pepang	October 21-25, 1987		
Sarrat	San Vicente (Pob.)	Gening	June 28-30, 1967	1.00	Above the street level
Sarrat	Santa Barbara (Pob.)	Weling	September 10, 1994	0.60	Above the street level
Sarrat	Santa Barbara (Pob.)	Pepang	October 21-25, 1987	0.60	Above the street level
Sarrat	Santa Barbara (Pob.)	Goring	July 20-26, 1977	1.00	Above the street level
Sarrat	Santo Tomas	Gening	June 28-30, 1967	1.00	Above the street level
Espiritu	Balioeg	Pepang	October 21-25, 1987	1.00	Above the brgy road
Espiritu	Bugasi	Pepang	October 21-25, 1987	1.00	Above the existing road
Espiritu	Bugasi	Gening	June 28-30, 1967	1.00	Above the existing road
Espiritu	Bugasi	Maring	August 27-30, 1984	1.00	Above the existing road
Espiritu	Caestebanan	Gening	June 28-30, 1967	0.65	Above the street level
Espiritu	Caribquib	Pepang	October 21-25, 1987	2.50	Above the farmland
Espiritu	Catagtaguen	Pepang	October 21-25, 1987	0.70	Above the street level
Espiritu	Hilario (Pob.)	Pepang	October 21-25, 1987	1.50	Above the brgy road
Espiritu	Lorenzo (Pob.)	Pepang	October 21-25, 1987	0.30	Above the farmland
Espiritu	Macayepyep	Pepang	October 21-25, 1987	0.50	Above the brgy road
Espiritu	Sinamar	Pepang	October 21-25, 1987	0.65	Above the street level
Espiritu	Tabtabagan	Pepang	October 21-25, 1987	2.00	Above the farmland
Espiritu	Valdez	Gening	June 28-30, 1967	0.50	Above the existing road

Table 13 Name and date of occurrence of big typhoons and inundation depth experienced in the survey area.(4/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	FLOODWATER LEVEL (meters)	REFERENCE
Marcos	Cacafean	Gening	June 28-30, 1967	1.75	
Marcos	Daquioag	Goring	July 20-26, 1977	0.20	Above the street level
Marcos	Daquioag	Gening	June 28-30, 1967	0.80	Above the street level
Marcos	Daquioag	Pepang	October 21-25, 1987	0.20	Above the street level
Marcos	Elizabeth (Culao)	Gening	June 28-30, 1967	2.40	Above the farmland
Marcos	Elizabeth (Culao)	Pepang	October 21-25, 1987	2.40	Above the farmland
Marcos	Escoda	Maring	August 27-30, 1984	0.80	
Marcos	Escoda	Gening	June 28-30, 1967	0.80	
Marcos	Escoda	Romahing	June 15-17, 1972	0.80	
Marcos	Ferdinand	Pepang	October 21-25, 1987	0.70	Above the existing road
Marcos	Ferdinand	Maring	August 27-30, 1984	0.30	Above the existing road
Marcos	Ferdinand	Gening	June 28-30, 1967	0.70	Above the existing road
Marcos	Fortuna	Maring	August 27-30, 1984	0.10	Above the street level
Marcos	Fortuna	Gening	June 28-30, 1967	0.10	Above the street level
Marcos	Fortuna	Kuring	June 20-24, 1985	0.10	Above the street level
Marcos	Pacifico (Agunit)	Maring	September 20, 1992	0.10	Only farmland
Marcos	Pacifico (Agunit)	Maring	August 27-30, 1984	0.10	Only farmland
Marcos	Pacifico (Agunit)	Gening	June 28-30, 1967	0.10	
Marcos	Santiago	Pepang	October 21-25, 1987	0.30	Above the street level
Marcos	Santiago	Gening	June 28-30, 1967	1.50	Above the street level
Marcos	Tabucbuc (Ragas)	Trining	October 27, 1991	1.10	Above the existing road
Marcos	Tabucbuc (Ragas)	Gening	June 28-30, 1967	1.50	Above the existing road
Marcos	Tabucbuc (Ragas)	Pepang	October 21-25, 1987	0.30	Above the existing road
Marcos	Tabucbuc (Ragas)	Maring	August 27-30, 1984	0.30	Above the existing road
Marcos	Valdez	Gening	June 28-30, 1967	1.10	Above the street level
Marcos	Valdez	Pepang	October 21-25, 1987	1.00	Above the street level
Marcos	Valdez	Goring	July 20-26, 1977	0.30	Above the street level
Dingras	Albano (Pob.)	Goring	July 20-26, 1977	1.00	Above the national road
Dingras	Albano (Pob.)	Pepang	October 21-25, 1987	1.00	Above the national road
Dingras	Bagut	Pepang	October 21-25, 1987	1.00	Above the barangay road
Dingras	Parado(Bangay)	Kuring	June 20-24, 1985	0.60	Above the provincial road

Table 13 Name and date of occurrence of big typhoons and inundation depth experienced in the survey area. (5/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	FLOODWATER LEVEL (meters)	REFERENCE
Dingras	Baresbes	Miding	August 17-19, 1986	1.20	Above the ricefield behind the Brgy Cap.'s house
Dingras	Baresbes	Kuring	June 20-24, 1985	1.20	Above the ricefield behind the Brgy Cap.'s house
Dingras	Barong	Rosing	July 19-21, 1971	1.20	Above the road level
Dingras	Bungcag	Goring	July 20-26, 1977	1.20	Above the national road
Dingras	Bungcag	Pepang	October 21-25, 1987	1.20	Above the national road
Dingras	Dancel	Pepang	October 21-25, 1987	1.00	Above the national road
Dingras	Elizabeth	Goring	July 20-26, 1977	1.50	Above the farmland, can't reach on the road
Dingras	Elizabeth	Pepang	October 21-25, 1987	1.20	Above the farmland, can't reach on the road
Dingras	Foz	Trining	October 27, 1991	0.60	Above the road level
Dingras	Guerrero (Pob.)	Pepang	October 21-25, 1987	1.50	Above the national road
Dingras	Lanas	Goring	July 20-26, 1977	0.80	Above the road level
Dingras	Lanas	Maring	August 27-30, 1984	0.80	Above the road level
Dingras	Lumbad	Goring	July 20-26, 1977	0.30	Above the national road
Dingras	Lumbad	Pepang	October 21-25, 1987	0.30	Above the national road
Dingras	Madamba (Pob.)	Goring	July 20-26, 1977	0.50	Above the national road
Dingras	Madamba (Pob.)	Pepang	October 21-25, 1987	0.50	Above the national road
Dingras	Madamba (Pob.)	Gening	June 28-30, 1967		
Dingras	Mandaloque	Gening	June 28-30, 1967	2.00	Above the street level
Dingras	Mandaloque	Kuring	June 20-24, 1985	1.60	Above the street level
Dingras	Mandaloque	Goring	July 20-26, 1977	1.10	Above the street level
Dingras	Medina	Pepang	October 21-25, 1987	0.60	Above the existing provincial road
Dingras	Peralta (Pob.)	Pepang	October 21-25, 1987	1.00	Above the national road
Dingras	Puruganan (Pob.)	Gening	June 28-30, 1967		
Dingras	Puruganan (Pob.)	Pepang	October 21-25, 1987	0.45	Above the national road
Dingras	Root (Baldias)	Pepang	October 21-25, 1987	1.00	Above the barangay road
Dingras	Sagpatan	Goring	July 20-26, 1977	1.50	Above the road level
Dingras	Sagpatan	Pepang	October 21-25, 1987	1.50	Above the road level
Dingras	San Esteban	Pepang	October 21-25, 1987	1.00	Above the road level
Dingras	San Esteban	Goring	July 20-26, 1977	1.00	Above the road level
Dingras	Francisco	Kuring	June 20-24, 1985		Flood affected the farmlands along the river.
Dingras	Francisco	Maring	August 27-30, 1984		Flood affected the farmlands along the river.

Table 13 Name and date of occurrence of big typhoons and inundation depth experienced in the survey area. (6/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	FLOODWATER LEVEL (meters)	REFERENCE
Dingras	San Marcelino (Padong)	Maring	August 27-30, 1984		Flood water flow along the river bank
Dingras	San Marcelino (Padong)	Kuring	June 20-24, 1985		Flood water flow along the river bank
Dingras	San Marcos	Goring	July 20-26, 1977	0.30	Above the road level
Dingras	San Marcos	Pepang	October 21-25, 1987	0.30	Above the road level
Dingras	Sulquiano	Kuring	June 20-24, 1985	0.30	Above the road level
Dingras	Sulquiano	Pepang	October 21-25, 1987	0.30	Above the road level
Dingras	Suyo (3)	Pepang	October 21-25, 1987	1.20	Above the national road
Dingras	Ver	Maring	August 27-30, 1984	0.20	Above the road level
Dingras	Ver	Trining	October 27, 1991	0.20	Above the road level
Dingras	Ver	Gening	June 28-30, 1967		
Solsona	Aguitap	Gening	June 28-30, 1967	0.70	Above the groundfloor of barangay hall
Solsona	Aguitap	Goring	July 20-26, 1977	1.00	Above the groundfloor of barangay hall
Solsona	Aguitap	Pepang	October 21-25, 1987	1.00	Above the groundfloor of barangay hall
Solsona	Bagbag	Pepang	October 21-25, 1987	1.00	Above the barangay street
Solsona	Bagbago	Pepang	October 21-25, 1987	0.65	Above the existing road
Solsona	Barcelona	Gening	June 28-30, 1967	2.00	Above the existing street level
Solsona	Barcelona	Herming	July 25-29, 1979	1.00	Above the existing street level
Solsona	Barcelona	Pepang	October 21-25, 1987	2.00	Above the existing street level
Solsona	Bubuos	Pepang	October 21-25, 1987	1.00	Above the barangay road
Solsona	Capurictan	Pepang	October 21-25, 1987		Some portions of the barangay
Solsona	Catangraran	Pepang	October 21-25, 1987	1.50	Above the farmland
Solsona	Darasdas	Weling	September 10, 1994		
Solsona	Darasdas	Maring	September 20, 1992	0.15	Above the basketball court infront of B.H.
Solsona	Darasdas	Pepang	October 21-25, 1987		
Solsona	Juan (Pob.) (1)	Pepang	October 21-25, 1987	0.65	Above the existing road
Solsona	Laureta (Pob.)	Pepang	October 21-25, 1987	0.50	Above the street level
Solsona	Lipay	Miding	August 17-19, 1986	0.30	Above the groundfloor of barangay hall
Solsona	Lipay	Kuring	June 20-24, 1985	0.30	Above the groundfloor of barangay hall
Solsona	Lipay	Openg	September 10, 1989	0.30	Above the groundfloor of barangay hall
Solsona	Lipay	Pepang	October 21-25, 1987	0.70	Above the groundfloor of barangay hall
Solsona	Maananteng	Miding	August 17-19, 1986		Flood affected only the farmlands.

Table 13 Name and date of occurrence of big typhoons and inundation depth experienced in the survey area. (7/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	FLOODWATER LEVEL (meters)	REFERENCE
Solsona	Maananteng	Pepang	October 21-25, 1987		Flood affected only the farmlands.
Solsona	Maananteng	Guring	July 15, 1989		Flood affected only the farmlands.
Solsona	Manalpac	Pepang	October 21-25, 1987	0.60	Above the national road
Solsona	Mariquet	Pepang	October 21-25, 1987	0.30	Above the existing road
Solsona	Mariquet	Gening	June 28-30, 1967	0.30	Above the existing road
Solsona	Mariquet	Trining	October 27, 1991	0.30	Above the existing road
Solsona	Nagpatpatan	Pepang	October 21-25, 1987	0.30	Above the provincial road
Solsona	Nalasin	Maring	September 20, 1992	0.70	Above the farmland
Solsona	Nalasin	Pepang	October 21-25, 1987	1.00	Above the farmland
Solsona	Puttao	Pepang	October 21-25, 1987	0.50	Above the road level
Solsona	Puttao	Goring	July 20-26, 1977	0.50	Above the road level
Solsona	Puttao	Gening	June 28-30, 1967	0.50	Above the road level
Solsona	San Juan	Maring	September 20, 1992	0.10	Above the groundfloor of barangay hall
Solsona	San Juan	Pepang	October 21-25, 1987	0.60	Above the groundfloor of barangay hall
Solsona	San Juan	Trining	October 27, 1991	0.30	Above the groundfloor of barangay hall
Solsona	San Julian	Goring	July 20-26, 1977	0.30	Above the existing road level
Solsona	San Julian	Gening	June 28-30, 1967	0.30	Above the existing road level
Solsona	San Julian	Pepang	October 21-25, 1987	0.70	Above the existing road level
Solsona	Santa Ana	Gening	June 28-30, 1967	0.30	Above the farmland
Solsona	Santa Ana	Pepang	October 21-25, 1987	0.30	Above the farmland
Solsona	Santa Ana	Goring	July 20-26, 1977	0.30	Above the farmland
Solsona	Santiago	Isang	August 29, 1992	0.65	Above the existing road
Solsona	Talugtog	Maring	August 27-30, 1984	0.70	Above the groundfloor of barangay hall
Solsona	Talugtog	Pepang	October 21-25, 1987	1.20	Above the groundfloor of barangay hall
Nueva Era	Acnam	Gening	June 28-30, 1967		
Nueva Era	Acnam	Pepang	October 21-25, 1987		
Nueva Era	Cabittauran	Gening	June 28-30, 1967		
Nueva Era	Cabittauran	Maring	September 20, 1992		
Nueva Era	Caray	Pepang	October 21-25, 1987	1.00	Above the street level
Nueva Era	Caray	Weling	September 10, 1994	1.00	Above the street level
Nueva Era	Caray	Gening	June 28-30, 1967	1.00	Above the street level

Table 13 Name and date of occurrence of big typhoons and inundation depth experienced in the survey area.(8/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	FLOODWATER LEVEL (meters)	REFERENCE
Nueva Ecija	Poblacion	Pepang	October 21-25, 1987		
Nueva Ecija	Santo Nino	Maring	August 27-30, 1984	0.70	Above the street level
Nueva Ecija	Santo Nino	Gening	June 28-30, 1967	1.30	Above the street level
Nueva Ecija	Santo Nino	Pepang	October 21-25, 1987	0.60	Above the street level

Table 14 Characteristics of big floods experienced in the surveyed barangays. (1/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	CAUSE OF FLOODING	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY	PERCENTAGE OF FARMLAND FLOODED	FLOODWATER LEVEL (meters) ABOVE FARMLAND	FLOODWATER LEVEL (meters) ABOVE GROUND-FLOOR	FLOODWATER LEVEL (meters) ABOVE ROAD
Piddig	Bimmanga	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		1.20	1.20
Piddig	Callusa	Gening	June 28-30, 1967	Overflow of river	48	Flowing/moderate	1.00		1.20	1.20
Piddig	Dupitac	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		0.70	0.70
Piddig	Estancia	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		0.30	0.30
Piddig	Gayamat	Gening	June 28-30, 1967	Overflow of river	1	Flowing/very fast	1.00	0.30	0.30	0.30
Piddig	Libnaoan	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		1.50	2.00
Piddig	Mangitayag	Pepang	October 21-25, 1987	Overflow of river	48	Flowing/moderate	1.00		2.50	1.50
Laoag City	1 San Lorenzo (Pob.)	Gening	June 28-30, 1967	Overflow of river	7	Flowing/very fast	1.00		2.50	1.50
Laoag City	30-a Suyo	Gening	June 28-30, 1967	Overflow of river	2	Flowing/very fast	1.00		0.50	0.50
Laoag City	30-b Santa Maria	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00		1.80	1.50
Laoag City	34-b Gabu Norte East	Gening	June 28-30, 1967	Overflow of river	48	Flowing/moderate	1.00		1.20	0.70
Laoag City	43 Cavit (4)	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		1.30	0.65
Laoag City	45 Tangid	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		0.30	0.60
Laoag City	51-a Nangalisan East	Pepang	October 21-25, 1987	Overflow of river	1	Flowing/very fast	1.00		1.00	1.00
Laoag City	51-b Nangalisan West	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		0.80	0.80
Laoag City	53 Rioeng	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00		0.70	0.70
Laoag City	54-b Camangaan	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		1.00	0.50
San Nicolas	1 San Francisco (Pob.)	Gening	June 28-30, 1967	Poor drainage system	12	Flowing/very fast	1.00		4.00	3.00
San Nicolas	24 Santa Monica (Nagrebcan)	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00		1.40	0.80
San Nicolas	San Baltazar (Bo.2) (Pob.)	Gening	June 28-30, 1967	Poor drainage system	12	Flowing/very fast	1.00		1.80	1.50
San Nicolas	San Bartolome (Bo.4) (Pob.)	Gening	June 28-30, 1967	Poor drainage system	12	Flowing/very fast	1.00		1.20	1.20
San Nicolas	San Ildefonso (Bo.3) (Pob.)	Gening	June 28-30, 1967	Poor drainage system	3	Flowing/very fast	1.00		1.50	1.20
San Nicolas	San Juan Bautista	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	0.70		1.00	1.00
Sarrat	San Agustin (Pob.)	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		1.50	1.00
Sarrat	San Andres	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		0.30	0.30
Sarrat	San Antonio	Gening	June 28-30, 1967	Overflow of river	48	Flowing/moderate	1.00		0.70	0.70
Sarrat	San Cristobal	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00		4.50	4.00
Sarrat	San Felipe	Gening	June 28-30, 1967	Overflow of river	1	Flowing/very fast	1.00		2.00	2.00
Sarrat	San Francisco (Pob.)	Openg	September 10, 1989	Overflow of river	3	Flowing/very fast	1.00		1.20	1.20

Table 14 Characteristics of big floods experien (2/8)

MUNICIPALITY	BARANGAY	SEDIMENT DEPOSITS AT FARMLANDS	RESIDENTIAL AREAS	ROADS
Piddig	Bimmanga	gravel	gravel	gravel
Piddig	Callusa	sand	sand	sand
Piddig	Dupitac	gravel	sand	sand
Piddig	Estancia	sand	silt	silt
Piddig	Gayamat	sand	silt	silt
Piddig	Libnaoan	gravel	gravel	gravel
Piddig	Mangitayag	gravel	gravel	gravel
Laoag City	1 San Lorenzo (Pob.)	silt	silt	silt
Laoag City	30-a Suyo	silt	silt	silt
Laoag City	30-b Santa Maria	silt	silt	silt
Laoag City	34-b Gabu Norte East	silt	silt	silt
Laoag City	43 Cavit (4)	sand	sand	sand
Laoag City	45 Tangid	silt	silt	silt
Laoag City	51-a Nangalisan East	gravel	gravel	gravel
Laoag City	51-b Nangalisan West	silt	silt	silt
Laoag City	53 Rioeng	silt	silt	silt
Laoag City	54-b Camangaan	silt	silt	silt
San Nicolas	1 San Francisco (Pob.)	sand	silt	silt
San Nicolas	24 Santa Monica (Nagrebcan)	sand	silt	silt
San Nicolas	San Baltazar (Bo 2) (Pob.)	sand	silt	silt
San Nicolas	San Bartolome (Bo.4) (Pob.)	sand	silt	silt
San Nicolas	San Ildefonso (Bo.3) (Pob.)	sand	silt	silt
San Nicolas	San Juan Bautista	sand	silt	silt
Sarrat	San Agustin (Pob.)	gravel	gravel	silt
Sarrat	San Andres	silt	silt	silt
Sarrat	San Antonio	gravel	sand	sand
Sarrat	San Cristobal	sand	sand	sand
Sarrat	San Felipe	gravel	gravel	silt
Sarrat	San Francisco (Pob.)	silt	silt	silt

Table 14 Characteristics of big floods experienced in the surveyed barangays. (3/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	CAUSE OF FLOODING	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY	PERCENTAGE OF FARMLAND FLOODED	FLOODWATER LEVEL (meters) ABOVE FARMLAND	FLOODWATER LEVEL (meters) ABOVE GROUND-FLOOR	FLOODWATER LEVEL (meters) ABOVE ROAD
Sarrat	San Isidro	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00		2.00	2.00
Sarrat	San Joaquin (Pob.)	Gening	June 28-30, 1967	Overflow of river	1	Flowing/very fast	1.00		1.30	0.30
Sarrat	San Jose	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00		3.00	3.00
Sarrat	San Leandro (Pob.)	Gening	June 28-30, 1967	Overflow of river	6	Flowing/very fast	1.00		2.00	2.00
Sarrat	San Lorenzo	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00		1.50	0.50
Sarrat	San Manuel	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		0.70	0.70
Sarrat	San Marcos	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00		3.50	3.00
Sarrat	San Nicolas	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	1.00		2.50	0.50
Sarrat	San Roque	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	1.00			1.00
Sarrat	San Vicente (Pob.)	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	no farmland		1.65	1.00
Sarrat	Santa Barbara (Pob.)	Goring	July 20-26, 1977	Overflow of river	6	Flowing/very fast	1.00		1.30	1.20
Sarrat	Santo Tomas	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00		1.00	1.00
Espiritu	Balioeg	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	1.00		1.30	1.00
Espiritu	Bugasi	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		1.50	0.50
Espiritu	Caestebanan	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		0.95	0.65
Espiritu	Caribquib	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	0.30	2.50	below	below
Espiritu	Catagtaguen	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		1.00	0.70
Espiritu	Hilario (Pob.)	Pepang	October 21-25, 1987	Poor drainage system	12	Flowing/very fast	1.00		1.50	1.50
Espiritu	Lorenzo (Pob.)	Pepang	October 21-25, 1987	Poor drainage system	12	Flowing/very fast	1.00		0.80	0.30
Espiritu	Macayepyep	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		0.50	0.50
Espiritu	Sinamar	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		0.30	0.65
Espiritu	Tabtabagan	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00	2.00	0.30	0.60
Espiritu	Valdez	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		0.83	0.50
Marcos	Cucafean	Gening	June 28-30, 1967	Overflow of river	48	Flowing/moderate	1.00		1.75	1.75
Marcos	Daquioag	Gening	June 28-30, 1967	Overflow of river	48	Flowing/moderate	1.00		0.80	0.80
Marcos	Elizabeth (Culao)	Gening	June 28-30, 1967	Poor drainage system	12	Flowing/very fast	1.00	2.40	below	below
Marcos	Escoda	Gening	June 28-30, 1967	Overflow of river	168	Flowing/slow	1.00			0.80
Marcos	Ferdinand	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00		0.70	0.70
Marcos	Fortuna	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00		0.10	0.10

Table 14 Characteristics of big floods experien (4/8)

MUNICIPALITY	BARANGAY	SEDIMENT DEPOSITS AT FARMLANDS	RESIDENTIAL AREAS	ROADS
Sarrat	San Isidro	gravel	silt	silt
Sarrat	San Joaquin (Pob.)	gravel	gravel	sand
Sarrat	San Jose	silt	silt	silt
Sarrat	San Leandro (Pob.)	gravel	silt	sand
Sarrat	San Lorenzo	gravel	silt	sand
Sarrat	San Manuel	gravel	sand	sand
Sarrat	San Marcos	silt	silt	silt
Sarrat	San Nicolas	gravel	silt	gravel
Sarrat	San Roque	sand	gravel	sand
Sarrat	San Vicente (Pob.)	none	silt	silt
Sarrat	Santa Barbara (Pob.)	sand	sand	sand
Sarrat	Santo Tomas	silt	silt	silt
Espiritu	Balloeg	gravel	silt	silt
Espiritu	Bugasi	gravel	sand	sand
Espiritu	Cuestebanan	gravel	silt	silt
Espiritu	Curibquib	gravel	none	none
Espiritu	Cutagtaguen	sand	silt	silt
Espiritu	Hilario (Pob.)	gravel	sand	sand
Espiritu	Lorenzo (Pob.)	gravel	silt	silt
Espiritu	Macayepyep	gravel	sand	sand
Espiritu	Sinamar	gravel	sand	sand
Espiritu	Tubtabagan	gravel	silt	silt
Espiritu	Valdez	gravel	sand	sand
Marcos	Cicafcan	gravel	gravel	gravel
Marcos	Daquioag	sand	silt	silt
Marcos	Elizabeth (Culao)	gravel	none	none
Marcos	Escoda	gravel	sand	sand
Marcos	Ferdinand	gravel	sand	sand
Marcos	Fortuna	gravel	none	none

Table 14 Characteristics of big floods experienced in the surveyed barangays. (5/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	CAUSE OF FLOODING	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY	PERCENTAGE OF FARMLAND FLOODED	FLOODWATER LEVEL (meters) ABOVE FARMLAND	GROUNDFLOOR	ROAD
Marcos	Pacifico (Agunit)	Gening	June 28-30, 1967	Overflow of river	120	Flowing/slow	1.00		0.10	0.10
Marcos	Santiago	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00			1.50
Marcos	Tabucbuc (Ragas)	Gening	June 28-30, 1967	Overflow of river	48	Flowing/moderate	1.00		1.50	1.50
Marcos	Valdez	Gening	June 28-30, 1967	Overflow of river	48	Flowing/moderate	1.00		1.10	1.10
Dingras	Albano (Pob.)	Pepang	October 21-25, 1987	Poor drainage system	3	Flowing/very fast	1.00	1.60	1.60	1.00
Dingras	Bagut	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	1.00		1.00	1.00
Dingras	Parado(Bangay)	Kuring	June 20-24, 1985	Overflow of river	3	Flowing/very fast	1.00		0.60	0.60
Dingras	Baresbes	Miding	August 17-19, 1986	Overflow of river	3	Flowing/very fast	1.00	1.20	2.65	2.65
Dingras	Barong	Rosing	July 19-21, 1971	Overflow of river	12	Flowing/very fast	0.22		1.20	1.20
Dingras	Bungcag	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	0.70	1.80	1.80	1.35
Dingras	Dancel	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00	1.75	1.75	1.50
Dingras	Elizabeth	Goring	July 20-26, 1977	Overflow of river	48	Flowing/moderate	1.00	1.50	below	below
Dingras	Foz	Trining	October 27, 1991	Overflow of river	3	Flowing/very fast	1.00		0.60	0.60
Dingras	Guerrero (Pob.)	Pepang	October 21-25, 1987	Poor drainage system	3	Flowing/very fast	1.00	2.00	1.50	1.50
Dingras	Lanas	Maring	August 27-30, 1984	Overflow of river	24	Flowing/fast	1.00		0.80	0.80
Dingras	Lumbad	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	1.00	0.60	0.60	0.30
Dingras	Madamba (Pob.)	Pepang	October 21-25, 1987	Poor drainage system	12	Flowing/very fast	1.00	1.10	1.10	0.50
Dingras	Mandaloque	Gening	June 28-30, 1967	Overflow of river	12	Flowing/very fast	1.00	2.20	2.00	2.00
Dingras	Medina	Pepang	October 21-25, 1987	Poor drainage system	3	Flowing/very fast	1.00		0.60	0.60
Dingras	Peralta (Pob.)	Pepang	October 21-25, 1987	Poor drainage system	12	Flowing/very fast	1.00	1.45	1.45	1.30
Dingras	Puruganan (Pob.)	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00	1.05	1.05	0.75
Dingras	Root (Baldias)	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	0.98	1.65	1.65	1.00
Dingras	Sagpatan	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		1.50	1.50
Dingras	San Esteban	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		1.00	1.00
Dingras	Francisco	Maring	August 27-30, 1984	Overflow of river	3	Flowing/very fast	0.04			no data
Dingras	San Marcelino (Padong)	Maring	August 27-30, 1984	Overflow of river	3	Flowing/very fast	0.17			no data
Dingras	San Marcos	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		0.30	0.30
Dingras	Sulquiano	Pepang	October 21-25, 1987	Overflow of river	48	Flowing/moderate	0.30		0.30	0.30
Dingras	Suyo (3)	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	0.90	1.95	1.95	1.20

Table 14 Characteristics of big floods experien (6/8)

MUNICIPALITY	BARANGAY	SEDIMENT DEPOSITS AT FARMLANDS	RESIDENTIAL AREAS	ROADS
Marcos	Pacifico (Agunit)	sand	sand	sand
Marcos	Santiago	sand	sand	sand
Marcos	Tabucbuc (Ragas)	gravel	silt	silt
Marcos	Valdez	sand	silt	silt
Dingras	Albano (Pob.)	silt	silt	silt
Dingras	Bagut	silt	silt	silt
Dingras	Parado(Bangay)	silt	silt	silt
Dingras	Baresbes	debris	debris	debris
Dingras	Barong	debris	debris	debris
Dingras	Bungcag	silt	silt	silt
Dingras	Dancel	silt	silt	silt
Dingras	Elizabeth	debris	none	none
Dingras	Foz	silt	silt	silt
Dingras	Guerrero (Pob.)	silt	silt	silt
Dingras	Lanas	gravel	gravel	gravel
Dingras	Lumbad	silt	silt	silt
Dingras	Madamba (Pob.)	silt	silt	silt
Dingras	Mandaloque	gravel	sand	sand
Dingras	Medina	silt	silt	silt
Dingras	Peralta (Pob.)	silt	silt	silt
Dingras	Puruganan (Pob.)	silt	silt	silt
Dingras	Root (Baldias)	silt	silt	silt
Dingras	Sagpatan	silt	silt	silt
Dingras	San Esteban	gravel	gravel	gravel
Dingras	Francisco	debris	none	none
Dingras	San Marcelino (Padong)	debris	none	none
Dingras	San Marcos	gravel	gravel	gravel
Dingras	Sulquiano	sand	sand	sand
Dingras	Suyo (3)	silt	silt	silt

Table 14 Characteristics of big floods experienced in the surveyed barangays.(7/8)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	CAUSE OF FLOODING	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY	PERCENTAGE OF FARMLAND FLOODED	FLOODWATER LEVEL (meters) ABOVE FARMLAND	GROUNDFLOOR	ROAD
Dingras	Ver	Maring	August 27-30, 1984	Overflow of river	3	Flowing/very fast	1.00		0.20	0.20
Solsona	Aguitap	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		1.00	1.00
Solsona	Bagbag	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	1.00		1.00	1.00
Solsona	Bagbago	Pepang	October 21-25, 1987	Overflow of river	120	Flowing/slow	1.00		1.50	0.65
Solsona	Barcelona	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		2.00	2.00
Solsona	Bubuos	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	0.70		1.00	1.00
Solsona	Capurietan	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	0.60		1.20	1.20
Solsona	Catangraran	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	0.40	1.50	0.90	0.30
Solsona	Darasdas	Maring	September 20, 1992	Overflow of river	3	Flowing/very fast	0.90		0.15	0.15
Solsona	Juan (Pob.) (1)	Pepang	October 21-25, 1987	Poor drainage system	12	Flowing/very fast	1.00		0.30	0.65
Solsona	Laureta (Pob.)	Pepang	October 21-25, 1987	Poor drainage system	3	Flowing/very fast	0.05		0.50	0.50
Solsona	Lipay	Pepang	October 21-25, 1987	Overflow of river	48	Flowing/moderate	0.30		0.70	0.70
Solsona	Maananteng	Pepang	October 21-25, 1987	Overflow of river	120	Flowing/slow	0.40			no data
Solsona	Manalpac	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	0.80	1.20	1.20	1.20
Solsona	Mariquet	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		0.30	0.30
Solsona	Nagpatpatan	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	0.40	1.80	1.80	0.30
Solsona	Nalasin	Pepang	October 21-25, 1987	Overflow of river	168	Flowing/slow	1.00	1.00	1.00	1.00
Solsona	Puttao	Pepang	October 21-25, 1987	Overflow of river	100	Flowing/slow	1.00		0.50	0.50
Solsona	San Juan	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	1.00		0.60	0.60
Solsona	San Julian	Pepang	October 21-25, 1987	Overflow of river	12	Flowing/very fast	1.00		0.70	0.70
Solsona	Santa Ana	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	1.00	0.30	0.30	0.30
Solsona	Santiago	Isang	August 29, 1992	Overflow of river	12	Flowing/very fast	1.00		1.65	1.00
Solsona	Talugtog	Pepang	October 21-25, 1987	Overflow of river	168	Flowing/slow	1.00		0.70	0.70
Nueva Era	Acnam	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	1.00			no data
Nueva Era	Cabittauran	Gening	June 28-30, 1967	Overflow of river	48	Flowing/moderate	1.00			no data
Nueva Era	Caray	Pepang	October 21-25, 1987	Overflow of river	3	Flowing/very fast	1.00		1.00	1.00
Nueva Era	Poblacion	Pepang	October 21-25, 1987	Poor drainage system	168	Flowing/slow	1.00			no data
Nueva Era	Santo Nino	Gening	June 28-30, 1967	Overflow of river	3	Flowing/very fast	1.00		1.30	1.30

Table 14 Characteristics of big floods experien(8/8)

MUNICIPALITY	BARANGAY	SEDIMENT DEPOSITS AT FARMLANDS	RESIDENTIAL AREAS	ROADS
Dingras	Ver	debris	debris	debris
Solsona	Aguitap	gravel	gravel	gravel
Solsona	Bagbag	gravel	gravel	gravel
Solsona	Bagbago	gravel	gravel	gravel
Solsona	Barcelona	gravel	gravel	gravel
Solsona	Bubuos	gravel	gravel	gravel
Solsona	Capurictan	silt	silt	silt
Solsona	Catangraran	gravel	gravel	gravel
Solsona	Darasdas	gravel	gravel	gravel
Solsona	Juan (Pob.) (1)	silt	silt	silt
Solsona	Laureta (Pob.)	silt	silt	silt
Solsona	Lipay	debris	debris	debris
Solsona	Maananteng	debris	none	none
Solsona	Manalpac	gravel	gravel	gravel
Solsona	Mariquet	gravel	gravel	gravel
Solsona	Nagpatpatan	gravel	gravel	gravel
Solsona	Nalasin	debris	debris	debris
Solsona	Puttao	gravel	gravel	gravel
Solsona	San Juan	sand	sand	sand
Solsona	San Julian	debris	debris	debris
Solsona	Santa Ana	debris	silt	silt
Solsona	Santiago	sand	silt	silt
Solsona	Talugtog	debris	debris	debris
Nueva Era	Acnam	sand	none	none
Nueva Era	Cabittauran	gravel	none	none
Nueva Era	Caray	silt	silt	silt
Nueva Era	Poblacion	gravel	none	none
Nueva Era	Santo Nino	gravel	sand	sand

Table 15 Crop damage and livestock damage in terms of percentage of total production. (1/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF CROP DAMAGED	PERCENTAGE OF LIVESTOCK DAMAGED	FLOODWATER LEVEL (meters) ABOVE FARMLAND	FLOODWATER LEVEL (meters) ABOVE ROAD	PERCENTAGE OF FARMLAND FLOODED	SEDIMENT DEPOSITS AT FARMLANDS
Piddig	Bimmanga	Gening	June 28-30, 1967	1.00	1.00		1.20	1.00	gravel
Piddig	Callusa	Gening	June 28-30, 1967	1.00	0.30		1.20	1.00	sand
Piddig	Dupitac	Gening	June 28-30, 1967	0.40	0.10		0.70	1.00	gravel
Piddig	Estancia	Pepang	October 21-25, 1987	0.20	-		0.30	1.00	sand
Piddig	Gayamat	Gening	June 28-30, 1967	-	-	0.30	0.30	1.00	sand
Piddig	Libnaoan	Pepang	October 21-25, 1987	0.75	-		2.00	1.00	gravel
Piddig	Mangitayag	Pepang	October 21-25, 1987	0.95	0.70		1.50	1.00	gravel
Laoag City	1 San Lorenzo (Pob.)	Gening	June 28-30, 1967	0.60	0.15		1.50	1.00	silt
Laoag City	30-a Suyo	Gening	June 28-30, 1967	0.05	-		0.50	1.00	silt
Laoag City	30-b Santa Maria	Gening	June 28-30, 1967	1.00	0.60		1.50	1.00	silt
Laoag City	34-b Gabu Norte East	Gening	June 28-30, 1967	-	-		0.70	1.00	silt
Laoag City	43 Cavit (4)	Gening	June 28-30, 1967	0.40	0.02		0.65	1.00	sand
Laoag City	45 Tangid	Gening	June 28-30, 1967	0.10	-		0.60	1.00	silt
Laoag City	51-a Nangalisan East	Pepang	October 21-25, 1987	1.00	0.05		1.00	1.00	gravel
Laoag City	51-b Nangalisan West	Gening	June 28-30, 1967	0.90	0.30		0.80	1.00	silt
Laoag City	55 Rioeng	Gening	June 28-30, 1967	0.75	0.50		0.70	1.00	silt
Laoag City	54-b Camangaan	Gening	June 28-30, 1967	0.65	0.35		0.50	1.00	silt
San Nicolas	1 San Francisco (Pob.)	Gening	June 28-30, 1967	1.00	0.30		3.00	1.00	sand
San Nicolas	24 Santa Monica (Nagrebcan)	Gening	June 28-30, 1967	0.95	0.80		0.80	1.00	sand
San Nicolas	San Baltazar (Bo.2) (Pob.)	Gening	June 28-30, 1967	1.00	0.50		1.50	1.00	sand
San Nicolas	San Bartolome (Bo.4) (Pob.)	Gening	June 28-30, 1967	1.00	0.05		1.20	1.00	sand
San Nicolas	San Ildefonso (Bo.3) (Pob.)	Gening	June 28-30, 1967	1.00	0.10		1.20	1.00	sand
San Nicolas	San Juan Bautista	Gening	June 28-30, 1967	0.63	0.20		1.00	0.70	sand
Sarrat	San Agustin (Pob.)	Gening	June 28-30, 1967	0.10	0.05		1.00	1.00	gravel
Sarrat	San Andres	Gening	June 28-30, 1967	0.50	-		0.30	1.00	silt
Sarrat	San Antonio	Gening	June 28-30, 1967	1.00	0.15		0.70	1.00	gravel
Sarrat	San Cristobal	Gening	June 28-30, 1967	0.70	0.10		4.00	1.00	sand
Sarrat	San Felipe	Gening	June 28-30, 1967	0.90	0.50		2.00	1.00	gravel
Sarrat	San Francisco (Pob.)	Openg	September 10, 1989	0.60	0.03		1.20	1.00	silt

Table 15 Crop damage and livestock damage in terms of percentage of total production. (2/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF CROP DAMAGED	PERCENTAGE OF LIVESTOCK DAMAGED	FLOODWATER LEVEL (meters) ABOVE FARMLAND	FLOODWATER LEVEL (meters) ABOVE ROAD	PERCENTAGE OF FARMLAND FLOODED	SEDIMENT DEPOSITS AT FARMLANDS
Sarrat	San Isidro	Gening	June 28-30, 1967	0.50	-		2.00	1.00	gravel
Sarrat	San Joaquin (Pob.)	Gening	June 28-30, 1967	0.90	0.05		0.30	1.00	gravel
Sarrat	San Jose	Gening	June 28-30, 1967	1.00	-		3.00	1.00	silt
Sarrat	San Leandro (Pob.)	Gening	June 28-30, 1967	0.60	0.40		2.00	1.00	gravel
Sarrat	San Lorenzo	Gening	June 28-30, 1967	0.80	0.10		0.50	1.00	gravel
Sarrat	San Manuel	Gening	June 28-30, 1967	-	0.10		0.70	1.00	gravel
Sarrat	San Marcos	Gening	June 28-30, 1967	0.50	0.10		3.00	1.00	silt
Sarrat	San Nicolas	Pepang	October 21-25, 1987	0.40			0.50	1.00	gravel
Sarrat	San Roque	Pepang	October 21-25, 1987	0.20	0.05		no data	1.00	sand
Sarrat	San Vicente (Pob.)	Gening	June 28-30, 1967	-	0.50		1.00	no farmland	none
Sarrat	Santa Barbara (Pob.)	Goring	July 20-26, 1977	0.80	0.40		1.20	1.00	sand
Sarrat	Santo Tomas	Gening	June 28-30, 1967	0.60	0.05		1.00	1.00	silt
Espiritu	Balioeg	Pepang	October 21-25, 1987	0.80	0.05		1.00	1.00	gravel
Espiritu	Bugasi	Pepang	October 21-25, 1987	0.75	0.70		0.50	1.00	gravel
Espiritu	Caestebanan	Gening	June 28-30, 1967	0.50	0.05		0.65	1.00	gravel
Espiritu	Caribquib	Pepang	October 21-25, 1987	0.30	-	2.50	below	0.30	gravel
Espiritu	Catagtaguen	Pepang	October 21-25, 1987	0.75	0.05		0.70	1.00	sand
Espiritu	Hilario (Pob.)	Pepang	October 21-25, 1987	0.60	0.20		1.50	1.00	gravel
Espiritu	Lorenzo (Pob.)	Pepang	October 21-25, 1987	0.60	0.10		0.30	1.00	gravel
Espiritu	Macayepyep	Pepang	October 21-25, 1987	0.60	0.20		0.50	1.00	gravel
Espiritu	Sinamar	Pepang	October 21-25, 1987	0.60	0.10		0.65	1.00	gravel
Espiritu	Tabtabagan	Pepang	October 21-25, 1987	1.00	0.50	2.00	0.60	1.00	gravel
Espiritu	Valdez	Gening	June 28-30, 1967	0.60	0.30		0.50	1.00	gravel
Marcos	Cacafean	Gening	June 28-30, 1967	1.00	-		1.75	1.00	gravel
Marcos	Daquioag	Gening	June 28-30, 1967	0.80	0.05		0.80	1.00	sand
Marcos	Elizabeth (Culao)	Gening	June 28-30, 1967	1.00	0.05	2.40	below	1.00	gravel
Marcos	Encoda	Gening	June 28-30, 1967	1.00	0.10		0.80	1.00	gravel
Marcos	Ferdinand	Gening	June 28-30, 1967	1.00	0.10		0.70	1.00	gravel
Marcos	Fortuna	Gening	June 28-30, 1967	1.00	0.30		0.10	1.00	gravel

Table 15 Crop damage and livestock damage in terms of percentage of total production. (3/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF CROP DAMAGED	PERCENTAGE OF LIVESTOCK DAMAGED	FLOODWATER LEVEL (meters) ABOVE FARMLAND	FLOODWATER LEVEL (meters) ABOVE ROAD	PERCENTAGE OF FARMLAND FLOODED	SEDIMENT DEPOSITS AT FARMLANDS
Marcos	Pacifico (Agunit)	Gening	June 28-30, 1967	1.00	0.50		0.10	1.00	sand
Marcos	Santiago	Gening	June 28-30, 1967	1.00	0.04		1.50	1.00	sand
Marcos	Tabucbuc (Ragas)	Gening	June 28-30, 1967	1.00	0.30		1.50	1.00	gravel
Marcos	Valdez	Gening	June 28-30, 1967	1.00	0.75		1.10	1.00	sand
Dingras	Albano (Pob.)	Pepang	October 21-25, 1987	0.65	0.05	1.60	1.00	1.00	silt
Dingras	Bagut	Pepang	October 21-25, 1987	0.80	0.10		1.00	1.00	silt
Dingras	Barado(Bangay)	Kuring	June 20-24, 1985	0.95	0.60		0.60	1.00	silt
Dingras	Baresbes	Miding	August 17-19, 1986	0.40	-	1.20	below	1.00	debris
Dingras	Barong	Rosing	July 19-21, 1971	0.20	0.25		1.20	0.22	debris
Dingras	Bungcag	Pepang	October 21-25, 1987	0.70	0.10	1.80	1.35	0.70	silt
Dingras	Dancel	Pepang	October 21-25, 1987	1.00	0.01	1.75	1.50	1.00	silt
Dingras	Elizabeth	Goring	July 20-26, 1977	0.90	0.10	1.50	below	1.00	debris
Dingras	Foz	Trining	October 27, 1991	0.70	0.50		0.60	1.00	silt
Dingras	Guerrero (Pob.)	Pepang	October 21-25, 1987	0.50	0.15	2.00	1.50	1.00	silt
Dingras	Lunas	Maring	August 27-30, 1984	1.00	0.60		0.80	1.00	gravel
Dingras	Lumbad	Pepang	October 21-25, 1987	0.60	0.05	0.60	0.30	1.00	silt
Dingras	Madamba (Pob.)	Pepang	October 21-25, 1987	0.70	0.10	1.10	0.50	1.00	silt
Dingras	Manalaoque	Gening	June 28-30, 1967	0.80	0.15	2.20	2.00	1.00	gravel
Dingras	Medina	Pepang	October 21-25, 1987	0.90	0.50		0.60	1.00	silt
Dingras	Peralta (Pob.)	Pepang	October 21-25, 1987	0.80	0.10	1.45	1.30	1.00	silt
Dingras	Puruganan (Pob.)	Pepang	October 21-25, 1987	0.50	0.05	1.05	0.75	1.00	silt
Dingras	Root (Baldias)	Pepang	October 21-25, 1987	0.40	0.05	1.65	1.00	0.98	silt
Dingras	Sagpatan	Pepang	October 21-25, 1987	0.40	0.10		1.50	1.00	silt
Dingras	San Esteban	Pepang	October 21-25, 1987	0.40	0.05		1.00	1.00	gravel
Dingras	Francisco	Maring	August 27-30, 1984	0.04	0.01		no data	0.04	debris
Dingras	San Marcelino (Padong)	Maring	August 27-30, 1984	0.17	-		no data	0.17	debris
Dingras	San Marcos	Pepang	October 21-25, 1987	0.50	0.05		0.30	1.00	gravel
Dingras	Sulquiano	Pepang	October 21-25, 1987	0.30	0.03		0.30	0.30	sand
Dingras	Suyo (3)	Pepang	October 21-25, 1987	0.90	0.10	1.95	1.20	0.90	silt

Table 15 Crop damage and livestock damage in terms of percentage of total production. (4/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF CROP DAMAGED	PERCENTAGE OF LIVESTOCK DAMAGED	FLOODWATER LEVEL (meters) ABOVE FARMLAND	FLOODWATER LEVEL (meters) ABOVE ROAD	PERCENTAGE OF FARMLAND FLOODED	SEDIMENT DEPOSITS AT FARMLANDS
Dingras	Ver	Maring	August 27-30, 1984	1.00	0.10		0.20	1.00	debris
Solsona	Aguitap	Pepang	October 21-25, 1987	0.80	0.10		1.00	1.00	gravel
Solsona	Bagbag	Pepang	October 21-25, 1987	0.30	0.05		1.00	1.00	gravel
Solsona	Bagbago	Pepang	October 21-25, 1987	0.70	0.30		0.65	1.00	gravel
Solsona	Barcelona	Pepang	October 21-25, 1987	1.00	-		2.00	1.00	gravel
Solsona	Bubuos	Pepang	October 21-25, 1987	0.70	0.10		1.00	0.70	gravel
Solsona	Capurictan	Pepang	October 21-25, 1987	0.60	0.05		1.20	0.60	silt
Solsona	Catungraran	Pepang	October 21-25, 1987	0.40	-	1.50	0.30	0.40	gravel
Solsona	Darasdas	Maring	September 20, 1992	0.75	0.10		0.15	0.90	gravel
Solsona	Juan (Pob.) (1)	Pepang	October 21-25, 1987	1.00	0.05		0.65	1.00	silt
Solsona	Laureta (Pob.)	Pepang	October 21-25, 1987	0.05	0.01		0.50	0.05	silt
Solsona	Lipay	Pepang	October 21-25, 1987	0.27	0.10		0.70	0.30	debris
Solsona	Maananteng	Pepang	October 21-25, 1987	0.40	0.10		no data	0.40	debris
Solsona	Manalpac	Pepang	October 21-25, 1987	0.80	0.10	1.20	1.20	0.80	gravel
Solsona	Mariquet	Pepang	October 21-25, 1987	0.90	0.10		0.30	1.00	gravel
Solsona	Nagpatpatan	Pepang	October 21-25, 1987	0.40	0.30	1.80	0.30	0.40	gravel
Solsona	Nalasin	Pepang	October 21-25, 1987	0.80	0.25	1.00	1.00	1.00	debris
Solsona	Puro	Pepang	October 21-25, 1987	0.75	-		0.50	1.00	gravel
Solsona	San Juan	Pepang	October 21-25, 1987	0.75	0.05		0.60	1.00	sand
Solsona	San Julian	Pepang	October 21-25, 1987	0.70	0.05		0.70	1.00	debris
Solsona	Santa Ana	Pepang	October 21-25, 1987	1.00	0.10	0.30		1.00	debris
Solsona	Santiago	Isang	August 29, 1992	0.70	0.10		1.00	1.00	sand
Solsona	Talugteg	Pepang	October 21-25, 1987	0.20	0.02		0.70	1.00	debris
Nueva Era	Acrium	Pepang	October 21-25, 1987	0.30	0.05		no data	1.00	sand
Nueva Era	Cabittauran	Gening	June 28-30, 1967	1.00	0.03		no data	1.00	gravel
Nueva Era	Carey	Pepang	October 21-25, 1987	1.00	0.20		1.00	1.00	silt
Nueva Era	Poblacion	Pepang	October 21-25, 1987	1.00	0.05		no data	1.00	gravel
Nueva Era	Santo Nino	Gening	June 28-30, 1967	1.00	0.20		1.30	1.00	gravel

Table 16 Building damage in terms of percentage of total number of houses.(1/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF HOUSES DAMAGED		FLOODWATER LEVEL (meters) ABOVE GROUNDFLOOR	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY
				TOTALLY	PARTIALLY			
Piddig	Bimmanga	Gening	June 28-30, 1967	0.40	0.28	1.2	3	Flowing/very fast
Piddig	Callusa	Gening	June 28-30, 1967	-	-	1.2	48	Flowing/moderate
Piddig	Dupitac	Gening	June 28-30, 1967	-	-	0.7	3	Flowing/very fast
Piddig	Estancia	Pepang	October 21-25, 1987	-	-	0.3	12	Flowing/very fast
Piddig	Gayamat	Gening	June 28-30, 1967	-	-	0.3	1	Flowing/very fast
Piddig	Libnaoan	Pepang	October 21-25, 1987	0.09	-	1.5	12	Flowing/very fast
Piddig	Mangitayag	Pepang	October 21-25, 1987	-	-	2.5	48	Flowing/moderate
Laoag City	1 San Lorenzo (Pob.)	Gening	June 28-30, 1967	0.03	-	2.5	7	Flowing/very fast
Laoag City	30-a Suyo	Gening	June 28-30, 1967	-	0.04	0.5	2	Flowing/very fast
Laoag City	30-b Santa Maria	Gening	June 28-30, 1967	0.02	-	1.8	12	Flowing/very fast
Laoag City	34-b Gabu Norte East	Gening	June 28-30, 1967	0.82	-	1.2	48	Flowing/moderate
Laoag City	43 Cavit (4)	Gening	June 28-30, 1967	-	-	1.3	3	Flowing/very fast
Laoag City	45 Tangid	Gening	June 28-30, 1967	-	-	0.3	3	Flowing/very fast
Laoag City	51-a Nangalisan East	Pepang	October 21-25, 1987	-	-	1.0	1	Flowing/very fast
Laoag City	51-b Nangalisan West	Gening	June 28-30, 1967	-	-	0.8	3	Flowing/very fast
Laoag City	53 Rioeng	Gening	June 28-30, 1967	-	-	0.7	12	Flowing/very fast
Laoag City	54-b Camangaan	Gening	June 28-30, 1967	0.10	0.08	1.0	3	Flowing/very fast
San Nicolas	1 San Francisco (Pob.)	Gening	June 28-30, 1967	-	-	4.0	12	Flowing/very fast
San Nicolas	24 Santa Monica (Nagrebcan)	Gening	June 28-30, 1967	0.07	-	1.4	12	Flowing/very fast
San Nicolas	San Baltazar (Bo.2) (Pob.)	Gening	June 28-30, 1967	-	-	1.8	12	Flowing/very fast
San Nicolas	San Bartolome (Bo.4) (Pob.)	Gening	June 28-30, 1967	-	-	1.2	12	Flowing/very fast
San Nicolas	San Ildefonso (Bo.3) (Pob.)	Gening	June 28-30, 1967	-	-	1.5	3	Flowing/very fast
San Nicolas	San Juan Bautista	Gening	June 28-30, 1967	0.01	-	1.0	12	Flowing/very fast
Sarrat	San Agustin (Pob.)	Gening	June 28-30, 1967	-	-	1.5	3	Flowing/very fast
Sarrat	San Andres	Gening	June 28-30, 1967	-	-	0.3	3	Flowing/very fast
Sarrat	San Antonio	Gening	June 28-30, 1967	-	-	0.7	48	Flowing/moderate
Sarrat	San Cristobal	Gening	June 28-30, 1967	0.01	-	4.5	12	Flowing/very fast
Sarrat	San Felipe	Gening	June 28-30, 1967	0.05	-	2.0	1	Flowing/very fast
Sarrat	San Francisco (Pob.)	Openg	September 10, 1989	-	-	1.2	3	Flowing/very fast

Table 16 Building damage in terms of percentage of total number of houses.(2/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF HOUSES DAMAGED		FLOODWATER LEVEL (meters) ABOVE GROUNDFLOOR	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY
				TOTALLY	PARTIALLY			
Sarrat	San Isidro	Gening	June 28-30, 1967	-	-	2.0	12	Flowing/very fast
Sarrat	San Joaquin (Pob.)	Gening	June 28-30, 1967	-	-	1.3	1	Flowing/very fast
Sarrat	San Jose	Gening	June 28-30, 1967	-	-	3.0	12	Flowing/very fast
Sarrat	San Leandro (Pob.)	Gening	June 28-30, 1967	-	-	2.0	6	Flowing/very fast
Sarrat	San Lorenzo	Gening	June 28-30, 1967	-	-	1.5	12	Flowing/very fast
Sarrat	San Manuel	Gening	June 28-30, 1967	-	-	0.7	3	Flowing/very fast
Sarrat	San Marcos	Gening	June 28-30, 1967	-	-	3.5	12	Flowing/very fast
Sarrat	San Nicolas	Pepang	October 21-25, 1987	-	-	2.5	3	Flowing/very fast
Sarrat	San Roque	Pepang	October 21-25, 1987	-	-		3	Flowing/very fast
Sarrat	San Vicente (Pob.)	Gening	June 28-30, 1967	-	-	1.7	12	Flowing/very fast
Sarrat	Santa Barbara (Pob.)	Goring	July 20-26, 1977	-	-	1.3	6	Flowing/very fast
Sarrat	Santo Tomas	Gening	June 28-30, 1967	-	-	1.0	12	Flowing/very fast
Espiritu	Balioeg	Pepang	October 21-25, 1987	0.01	-	1.3	3	Flowing/very fast
Espiritu	Bugasi	Pepang	October 21-25, 1987	0.06	-	1.5	12	Flowing/very fast
Espiritu	Caestebanan	Gening	June 28-30, 1967	-	-	1.0	3	Flowing/very fast
Espiritu	Caribquib	Pepang	October 21-25, 1987	-	-	below	12	Flowing/very fast
Espiritu	Catagtaguen	Pepang	October 21-25, 1987	-	-	1.0	12	Flowing/very fast
Espiritu	Hilario (Pob.)	Pepang	October 21-25, 1987	-	-	1.5	12	Flowing/very fast
Espiritu	Lorenzo (Pob.)	Pepang	October 21-25, 1987	-	-	0.8	12	Flowing/very fast
Espiritu	Macayepyep	Pepang	October 21-25, 1987	0.01	-	0.5	12	Flowing/very fast
Espiritu	Sinamar	Pepang	October 21-25, 1987	0.01	-	0.3	12	Flowing/very fast
Espiritu	Tabtabagan	Pepang	October 21-25, 1987	0.02	-	0.3	12	Flowing/very fast
Espiritu	Valdez	Gening	June 28-30, 1967	-	-	0.8	3	Flowing/very fast
Marcos	Cacafean	Gening	June 28-30, 1967	-	0.08	1.8	48	Flowing/moderate
Marcos	Daquioag	Gening	June 28-30, 1967	0.01	-	0.8	48	Flowing/moderate
Marcos	Elizabeth (Culao)	Gening	June 28-30, 1967	-	-	below	12	Flowing/very fast
Marcos	Escoca	Gening	June 28-30, 1967	0.02	-		168	Flowing/slow
Marcos	Ferdinand	Gening	June 28-30, 1967	-	-	0.7	12	Flowing/very fast
Marcos	Fortuna	Gening	June 28-30, 1967	0.01	-	0.1	12	Flowing/very fast

Table 16 Building damage in terms of percentage of total number of houses.(3/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF HOUSES DAMAGED		FLOODWATER LEVEL (meters) ABOVE GROUNDFLOOR	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY
				TOTALLY	PARTIALLY			
Marcos	Pacifico (Agunit)	Gening	June 28-30, 1967	-	-	0.1	120	Flowing/slow
Marcos	Santiago	Gening	June 28-30, 1967	-	-		3	Flowing/very fast
Marcos	Tabuebuc (Ragas)	Gening	June 28-30, 1967	0.01	-	1.5	48	Flowing/moderate
Marcos	Valdez	Gening	June 28-30, 1967	-	-	1.1	48	Flowing/moderate
Dingras	Albano (Pob.)	Pepang	October 21-25, 1987	0.02	-	1.6	3	Flowing/very fast
Dingras	Bagut	Pepang	October 21-25, 1987	-	-	1.0	3	Flowing/very fast
Dingras	Parado(Bangay)	Kuring	June 20-24, 1985	-	-	0.6	3	Flowing/very fast
Dingras	Baresbes	Miding	August 17-19, 1986	0.05	0.01	2.7	3	Flowing/very fast
Dingras	Barong	Rosing	July 19-21, 1971	0.04	-	1.2	12	Flowing/very fast
Dingras	Bungcag	Pepang	October 21-25, 1987	-	-	1.8	3	Flowing/very fast
Dingras	Dancel	Pepang	October 21-25, 1987	-	-	1.8	12	Flowing/very fast
Dingras	Elizabeth	Goring	July 20-26, 1977	-	-	below	48	Flowing/moderate
Dingras	Foz	Trining	October 27, 1991	-	-	0.6	3	Flowing/very fast
Dingras	Guerrero (Pob.)	Pepang	October 21-25, 1987	0.02	-	1.5	3	Flowing/very fast
Dingras	Lanas	Maring	August 27-30, 1984	0.10	-	0.8	24	Flowing/fast
Dingras	Lumbad	Pepang	October 21-25, 1987	0.05	-	0.6	3	Flowing/very fast
Dingras	Madamba (Pob.)	Pepang	October 21-25, 1987	-	-	1.1	12	Flowing/very fast
Dingras	Mandaloque	Gening	June 28-30, 1967	-	-	2.0	12	Flowing/very fast
Dingras	Medina	Pepang	October 21-25, 1987	-	-	0.6	3	Flowing/very fast
Dingras	Peralta (Pob.)	Pepang	October 21-25, 1987	0.01	-	1.5	12	Flowing/very fast
Dingras	Puruganan (Pob.)	Pepang	October 21-25, 1987	-	-	1.1	12	Flowing/very fast
Dingras	Root (Baldias)	Pepang	October 21-25, 1987	-	-	1.7	3	Flowing/very fast
Dingras	Sagpatan	Pepang	October 21-25, 1987	-	-	1.5	12	Flowing/very fast
Dingras	San Esteban	Pepang	October 21-25, 1987	0.10	-	1.0	12	Flowing/very fast
Dingras	Francisco	Maring	August 27-30, 1984	-	-		3	Flowing/very fast
Dingras	San Marcelino (Padong)	Maring	August 27-30, 1984	-	-		3	Flowing/very fast
Dingras	San Marcos	Pepang	October 21-25, 1987	0.02	-	0.3	12	Flowing/very fast
Dingras	Sulquiano	Pepang	October 21-25, 1987	-	-	0.3	48	Flowing/moderate
Dingras	Suyo (3)	Pepang	October 21-25, 1987	-	-	2.0	3	Flowing/very fast

Table 16 Building damage in terms of percentage of total number of houses. (4/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF HOUSES DAMAGED		FLOODWATER LEVEL (meters) ABOVE GROUNDFLOOR	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY
				TOTALLY	PARTIALLY			
Dingras	Ver	Maring	August 27-30, 1984	-	0.07	0.2	3	Flowing/very fast
Solsona	Aguitap	Pepang	October 21-25, 1987	0.02	-	1.0	12	Flowing/very fast
Solsona	Bagbag	Pepang	October 21-25, 1987	-	-	1.0	3	Flowing/very fast
Solsona	Bagbago	Pepang	October 21-25, 1987	-	0.25	1.5	120	Flowing/slow
Solsona	Barcelona	Pepang	October 21-25, 1987	-	-	2.0	12	Flowing/very fast
Solsona	Bubuos	Pepang	October 21-25, 1987	0.18	-	1.0	12	Flowing/very fast
Solsona	Capurictan	Pepang	October 21-25, 1987	-	-	1.2	3	Flowing/very fast
Solsona	Catangraran	Pepang	October 21-25, 1987	-	-	0.9	3	Flowing/very fast
Solsona	Darasdas	Maring	September 20, 1992	-	-	0.2	3	Flowing/very fast
Solsona	Juan (Pob.) (1)	Pepang	October 21-25, 1987	-	-	0.3	12	Flowing/very fast
Solsona	Laureta (Pob.)	Pepang	October 21-25, 1987	-	-	0.5	3	Flowing/very fast
Solsona	Lipay	Pepang	October 21-25, 1987	0.34	-	0.7	48	Flowing/moderate
Solsona	Maananteng	Pepang	October 21-25, 1987	-	-		120	Flowing/slow
Solsona	Manalpac	Pepang	October 21-25, 1987	-	-	1.2	3	Flowing/very fast
Solsona	Mariquet	Pepang	October 21-25, 1987	-	-	0.3	12	Flowing/very fast
Solsona	Nagpatpatan	Pepang	October 21-25, 1987	0.43	-	1.8	3	Flowing/very fast
Solsona	Nalasin	Pepang	October 21-25, 1987	-	-	1.0	168	Flowing/slow
Solsona	Futtao	Pepang	October 21-25, 1987	-	-	0.5	100	Flowing/slow
Solsona	San Juan	Pepang	October 21-25, 1987	0.12	-	0.6	3	Flowing/very fast
Solsona	San Julian	Pepang	October 21-25, 1987	-	-	0.7	12	Flowing/very fast
Solsona	Santa Ana	Pepang	October 21-25, 1987	0.01	-	0.3	3	Flowing/very fast
Solsona	Santiago	Isang	August 29, 1992	-	-	1.7	12	Flowing/very fast
Solsona	Talugtog	Pepang	October 21-25, 1987	-	-	0.7	168	Flowing/slow
Nueva Era	Acnam	Pepang	October 21-25, 1987	-	-		3	Flowing/very fast
Nueva Era	Cabittauran	Gening	June 28-30, 1967	-	-		48	Flowing/moderate
Nueva Era	Caray	Pepang	October 21-25, 1987	0.02	-	1.0	3	Flowing/very fast
Nueva Era	Poblacion	Pepang	October 21-25, 1987	-	-		168	Flowing/slow
Nueva Era	Santo Nino	Gening	June 28-30, 1967	0.04	-	1.3	3	Flowing/very fast

Table 17 Building contents damage in terms of percentage of total number of houses..(1/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF FURNITURE DAMAGED	FLOODWATER LEVEL (meters) ABOVE GROUNDFLOOR	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY
Piddig	Bimmanga	Gening	June 28-30, 1967	0.40	1.20	3	Flowing/very fast
Piddig	Callusa	Gening	June 28-30, 1967	-	1.20	48	Flowing/moderate
Piddig	Dupitac	Gening	June 28-30, 1967	0.15	0.70	3	Flowing/very fast
Piddig	Estancia	Pepang	October 21-25, 1987	-	0.30	12	Flowing/very fast
Piddig	Gayamat	Gening	June 28-30, 1967	-	0.30	1	Flowing/very fast
Piddig	Libnaoan	Pepang	October 21-25, 1987	-	1.50	12	Flowing/very fast
Piddig	Mangitayag	Pepang	October 21-25, 1987	0.20	2.50	48	Flowing/moderate
Laoag City	1 San Lorenzo (Pob.)	Gening	June 28-30, 1967	0.30	2.50	7	Flowing/very fast
Laoag City	30-a Suyo	Gening	June 28-30, 1967	-	0.50	2	Flowing/very fast
Laoag City	30-b Santa Maria	Gening	June 28-30, 1967	0.20	1.80	12	Flowing/very fast
Laoag City	34-b Gabu Norte East	Gening	June 28-30, 1967	0.30	1.20	48	Flowing/moderate
Laoag City	43 Cavit (4)	Gening	June 28-30, 1967	-	1.30	3	Flowing/very fast
Laoag City	45 Tangid	Gening	June 28-30, 1967	-	0.30	3	Flowing/very fast
Laoag City	51-a Nangalisan East	Pepang	October 21-25, 1987	-	1.00	1	Flowing/very fast
Laoag City	51-b Nangalisan West	Gening	June 28-30, 1967	0.30	0.80	3	Flowing/very fast
Laoag City	53 Rioeng	Gening	June 28-30, 1967	-	0.70	12	Flowing/very fast
Laoag City	54-b Camangaan	Gening	June 28-30, 1967	0.20	1.00	3	Flowing/very fast
San Nicolas	1 San Francisco (Pob.)	Gening	June 28-30, 1967	0.40	4.00	12	Flowing/very fast
San Nicolas	24 Santa Monica (Nagrebcan)	Gening	June 28-30, 1967	0.60	1.40	12	Flowing/very fast
San Nicolas	San Baltazar (Bo.2) (Pob.)	Gening	June 28-30, 1967	0.05	1.80	12	Flowing/very fast
San Nicolas	San Bartolome (Bo.4) (Pob.)	Gening	June 28-30, 1967	0.10	1.20	12	Flowing/very fast
San Nicolas	San Ildefonso (Bo.3) (Pob.)	Gening	June 28-30, 1967	0.05	1.50	3	Flowing/very fast
San Nicolas	San Juan Bautista	Gening	June 28-30, 1967	0.20	1.00	12	Flowing/very fast
Sarrat	San Agustin (Pob.)	Gening	June 28-30, 1967	-	1.50	3	Flowing/very fast
Sarrat	San Andres	Gening	June 28-30, 1967	-	0.30	3	Flowing/very fast
Sarrat	San Antonio	Gening	June 28-30, 1967	-	0.70	48	Flowing/moderate
Sarrat	San Cristobal	Gening	June 28-30, 1967	0.40	4.50	12	Flowing/very fast
Sarrat	San Felipe	Gening	June 28-30, 1967	-	2.00	1	Flowing/very fast
Sarrat	San Francisco (Pob.)	Openg	September 10, 1989	-	1.20	3	Flowing/very fast

Table 17 Building contents damage in terms of percentage of total number of houses.. (2/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF FURNITURE DAMAGED	FLOODWATER LEVEL (meters) ABOVE GROUNDFLOOR	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY
Sarrat	San Isidro	Gening	June 28-30, 1967	-	2.00	12	Flowing/very fast
Sarrat	San Joaquin (Pob.)	Gening	June 28-30, 1967	-	1.30	1	Flowing/very fast
Sarrat	San Jose	Gening	June 28-30, 1967	-	3.00	12	Flowing/very fast
Sarrat	San Leandro (Pob.)	Gening	June 28-30, 1967	-	2.00	6	Flowing/very fast
Sarrat	San Lorenzo	Gening	June 28-30, 1967	-	1.50	12	Flowing/very fast
Sarrat	San Manuel	Gening	June 28-30, 1967	-	0.70	3	Flowing/very fast
Sarrat	San Marcos	Gening	June 28-30, 1967	0.10	3.50	12	Flowing/very fast
Sarrat	San Nicolas	Pepang	October 21-25, 1987	-	2.50	3	Flowing/very fast
Sarrat	San Roque	Pepang	October 21-25, 1987	0.05		3	Flowing/very fast
Sarrat	San Vicente (Pob.)	Gening	June 28-30, 1967	0.10	1.65	12	Flowing/very fast
Sarrat	Santa Barbara (Pob.)	Goring	July 20-26, 1977	-	1.30	6	Flowing/very fast
Sarrat	Santo Tomas	Gening	June 28-30, 1967	0.10	1.00	12	Flowing/very fast
Espiritu	Balioeg	Pepang	October 21-25, 1987	0.15	1.30	3	Flowing/very fast
Espiritu	Bugasi	Pepang	October 21-25, 1987	0.30	1.50	12	Flowing/very fast
Espiritu	Caestebanan	Gening	June 28-30, 1967	0.05	0.95	3	Flowing/very fast
Espiritu	Caribquib	Pepang	October 21-25, 1987	-	below	12	Flowing/very fast
Espiritu	Catagtaguen	Pepang	October 21-25, 1987	0.10	1.00	12	Flowing/very fast
Espiritu	Hilario (Pob.)	Pepang	October 21-25, 1987	0.02	1.50	12	Flowing/very fast
Espiritu	Lorenzo (Pob.)	Pepang	October 21-25, 1987	-	0.80	12	Flowing/very fast
Espiritu	Macayepyep	Pepang	October 21-25, 1987	0.05	0.50	12	Flowing/very fast
Espiritu	Sinamar	Pepang	October 21-25, 1987	0.10	0.30	12	Flowing/very fast
Espiritu	Tabtabagan	Pepang	October 21-25, 1987	0.05	0.30	12	Flowing/very fast
Espiritu	Valdez	Gening	June 28-30, 1967	0.10	0.83	3	Flowing/very fast
Marcos	Cacafean	Gening	June 28-30, 1967	0.90	1.75	48	Flowing/moderate
Marcos	Daquioag	Gening	June 28-30, 1967	0.05	0.80	48	Flowing/moderate
Marcos	Elizabeth (Culao)	Gening	June 28-30, 1967	-	below	12	Flowing/very fast
Marcos	Escoda	Gening	June 28-30, 1967	-		168	Flowing/slow
Marcos	Ferdinand	Gening	June 28-30, 1967	-	0.70	12	Flowing/very fast
Marcos	Fortuna	Gening	June 28-30, 1967	0.03	0.10	12	Flowing/very fast

Table 17 Building contents damage in terms of percentage of total number of houses..(3/4)

MUNI-CIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF FURNITURE DAMAGED	FLOODWATER LEVEL (meters) ABOVE GROUNDFLOOR	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY
Marcos	Pacifico (Agunit)	Gening	June 28-30, 1967	0.01	0.10	120	Flowing/slow
Marcos	Santiago	Gening	June 28-30, 1967	-		3	Flowing/very fast
Marcos	Tabucbuc (Ragas)	Gening	June 28-30, 1967	0.25	1.50	48	Flowing/moderate
Marcos	Valdez	Gening	June 28-30, 1967	0.85	1.10	48	Flowing/moderate
Dingras	Albano (Pob.)	Pepang	October 21-25, 1987	0.10	1.60	3	Flowing/very fast
Dingras	Bagut	Pepang	October 21-25, 1987	0.10	1.00	3	Flowing/very fast
Dingras	Parado(Bangay)	Kuring	June 20-24, 1985	0.45	0.60	3	Flowing/very fast
Dingras	Baresbes	Miding	August 17-19, 1986	0.05	2.65	3	Flowing/very fast
Dingras	Barong	Rosing	July 19-21, 1971	0.04	1.20	12	Flowing/very fast
Dingras	Bungcag	Pepang	October 21-25, 1987	0.05	1.80	3	Flowing/very fast
Dingras	Dancel	Pepang	October 21-25, 1987	0.30	1.75	12	Flowing/very fast
Dingras	Elizabeth	Goring	July 20-26, 1977	-	below	48	Flowing/moderate
Dingras	Foz	Trining	October 27, 1991	-	0.60	3	Flowing/very fast
Dingras	Guerrero (Pob.)	Pepang	October 21-25, 1987	0.10	1.50	3	Flowing/very fast
Dingras	Lanas	Maring	August 27-30, 1984	0.90	0.80	24	Flowing/fast
Dingras	Lumbad	Pepang	October 21-25, 1987	0.10	0.60	3	Flowing/very fast
Dingras	Madamba (Pob.)	Pepang	October 21-25, 1987	0.15	1.10	12	Flowing/very fast
Dingras	Mandaloque	Gening	June 28-30, 1967	0.03	2.00	12	Flowing/very fast
Dingras	Medina	Pepang	October 21-25, 1987	0.40	0.60	3	Flowing/very fast
Dingras	Peralta (Pob.)	Pepang	October 21-25, 1987	0.10	1.45	12	Flowing/very fast
Dingras	Puruganan (Pob.)	Pepang	October 21-25, 1987	0.05	1.05	12	Flowing/very fast
Dingras	Root (Baldias)	Pepang	October 21-25, 1987	0.10	1.65	3	Flowing/very fast
Dingras	Sagpatan	Pepang	October 21-25, 1987	0.10	1.50	12	Flowing/very fast
Dingras	San Esteban	Pepang	October 21-25, 1987	0.10	1.00	12	Flowing/very fast
Dingras	Francisco	Maring	August 27-30, 1984	-		3	Flowing/very fast
Dingras	San Marcelino (Padong)	Maring	August 27-30, 1984	-		3	Flowing/very fast
Dingras	San Marcos	Pepang	October 21-25, 1987	0.60	0.30	12	Flowing/very fast
Dingras	Sulquiano	Pepang	October 21-25, 1987	-	0.30	48	Flowing/moderate
Dingras	Suyo (3)	Pepang	October 21-25, 1987	0.10	1.95	3	Flowing/very fast

Table 17 Building contents damage in terms of percentage of total number of houses..(4/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	PERCENTAGE OF FURNITURE DAMAGED	FLOODWATER LEVEL (meters) ABOVE GROUNDFLOOR	FLOOD DURATION IN THE BRGY (hrs)	FLOOD FLOW VELOCITY IN THE BRGY
Dingras	Ver	Maring	August 27-30, 1984	0.02	0.20	3	Flowing/very fast
Solsona	Aguitap	Pepang	October 21-25, 1987	0.20	1.00	12	Flowing/very fast
Solsona	Bagbag	Pepang	October 21-25, 1987	0.05	1.00	3	Flowing/very fast
Solsona	Bagbago	Pepang	October 21-25, 1987	0.30	1.50	120	Flowing/slow
Solsona	Barcelona	Pepang	October 21-25, 1987	-	2.00	12	Flowing/very fast
Solsona	Bubuos	Pepang	October 21-25, 1987	0.05	1.00	12	Flowing/very fast
Solsona	Capurictan	Pepang	October 21-25, 1987	-	1.20	3	Flowing/very fast
Solsona	Catangraran	Pepang	October 21-25, 1987	-	0.90	3	Flowing/very fast
Solsona	Darasdas	Maring	September 20, 1992	-	0.15	3	Flowing/very fast
Solsona	Juan (Pob.) (1)	Pepang	October 21-25, 1987	0.03	0.30	12	Flowing/very fast
Solsona	Laureta (Pob.)	Pepang	October 21-25, 1987	-	0.50	3	Flowing/very fast
Solsona	Lipay	Pepang	October 21-25, 1987	0.20	0.70	48	Flowing/moderate
Solsona	Maananteng	Pepang	October 21-25, 1987	-		120	Flowing/slow
Solsona	Manalpac	Pepang	October 21-25, 1987	0.10	1.20	3	Flowing/very fast
Solsona	Mariquet	Pepang	October 21-25, 1987	-	0.30	12	Flowing/very fast
Solsona	Nagpatpatan	Pepang	October 21-25, 1987	0.60	1.80	3	Flowing/very fast
Solsona	Nalasin	Pepang	October 21-25, 1987	-	1.00	168	Flowing/slow
Solsona	Puttao	Pepang	October 21-25, 1987	-	0.50	100	Flowing/slow
Solsona	San Juan	Pepang	October 21-25, 1987	0.10	0.60	3	Flowing/very fast
Solsona	San Julian	Pepang	October 21-25, 1987	-	0.70	12	Flowing/very fast
Solsona	Santa Ana	Pepang	October 21-25, 1987	0.05	0.30	3	Flowing/very fast
Solsona	Santiago	Isang	August 29, 1992	0.05	1.65	12	Flowing/very fast
Solsona	Talugtog	Pepang	October 21-25, 1987	-	0.70	168	Flowing/slow
Nueva Era	Acnam	Pepang	October 21-25, 1987	-		3	Flowing/very fast
Nueva Era	Cabittauran	Gening	June 28-30, 1967	-		48	Flowing/moderate
Nueva Era	Caray	Pepang	October 21-25, 1987	0.10	1.00	3	Flowing/very fast
Nueva Era	Poblacion	Pepang	October 21-25, 1987	-		168	Flowing/slow
Nueva Era	Santo Nino	Gening	June 28-30, 1967	0.35	1.30	3	Flowing/very fast

Table 18 Number of casualties in the survey area.

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	NUMBER OF CASUALTIES
San Nicolas	24 Santa Monica (Nagrebcan)	Gening	June 28-30, 1967	5
Marcos	Fortuna	Gening	June 28-30, 1967	2
Marcos	Tabucbuc (Ragas)	Gening	June 28-30, 1967	2
Marcos	Valdez	Gening	June 28-30, 1967	4
Dingras	Bagut	Pepang	October 21-25, 1987	3
Solsona	Bagbag	Pepang	October 21-25, 1987	5
Solsona	Bubuos	Pepang	October 21-25, 1987	2
Solsona	Catangraran	Pepang	October 21-25, 1987	1
Solsona	Lipay	Pepang	October 21-25, 1987	2
Solsona	Nagpatpatan	Pepang	October 21-25, 1987	9
Solsona	Nalasin	Pepang	October 21-25, 1987	1
Solsona	Santa Ana	Pepang	October 21-25, 1987	6

Table 19 Number of days farm and road operations suspended. (1/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	NUMBER OF DAYS OPERATION SUSPENDED		FLOOD DURATION IN THE BRGY (hrs)	FLOODWATER LEVEL (meters) ABOVE		SEDIMENT DEPOSITS AT	
				FARM	ROAD		FARMLAND	ROAD	FARMLANDS	ROADS
Pidig	Binmanga	Gening	June 28-30, 1967	30	4	3		1.20	gravel	gravel
Pidig	Callusa	Gening	June 28-30, 1967	2	1	48		1.20	sand	sand
Pidig	Dupitac	Gening	June 28-30, 1967	2	150	3		0.70	gravel	sand
Pidig	Estincia	Pepang	October 21-25, 1987	0	7	12		0.30	sand	silt
Pidig	Gayamat	Gening	June 28-30, 1967	1	1	1	0.30	0.30	sand	silt
Pidig	Libnaoan	Pepang	October 21-25, 1987	7	30	12		2.00	gravel	gravel
Pidig	Mangitayag	Pepang	October 21-25, 1987	90	30	48		1.50	gravel	gravel
Laoag City	1 San Lorenzo (Pob.)	Gening	June 28-30, 1967	60	0	7		1.50	silt	silt
Laoag City	30-a Suyo	Gening	June 28-30, 1967	60	1	2		0.50	silt	silt
Laoag City	30-b Santa Maria	Gening	June 28-30, 1967	90	2	12		1.50	silt	silt
Laoag City	34-b Gabu Norte East	Gening	June 28-30, 1967	7	0	48		0.70	silt	silt
Laoag City	43 Cavit (4)	Gening	June 28-30, 1967	30	0	3		0.65	sand	sand
Laoag City	45 Tangid	Gening	June 28-30, 1967	3	1	3		0.60	silt	silt
Laoag City	51-a Nangalisan East	Pepang	October 21-25, 1987	60	0	1		1.00	gravel	gravel
Laoag City	51-b Nangalisan West	Gening	June 28-30, 1967	7	3	3		0.80	silt	silt
Laoag City	53 Rioeng	Gening	June 28-30, 1967	15	30	12		0.70	silt	silt
Laoag City	54-b Camangaan	Gening	June 28-30, 1967	7	2	3		0.50	silt	silt
San Nicolas	1 San Francisco (Pob.)	Gening	June 28-30, 1967	7	0	12		3.00	sand	silt
San Nicolas	24 Santa Monica (Nagrebcan)	Gening	June 28-30, 1967	30	30	12		0.80	sand	silt
San Nicolas	San Baltazar (Bo.2) (Pob.)	Gening	June 28-30, 1967	90	0	12		1.50	sand	silt
San Nicolas	San Bartolome (Bo.4) (Pob.)	Gening	June 28-30, 1967	14	7	12		1.20	sand	silt
San Nicolas	San Ildefonso (Bo.3) (Pob.)	Gening	June 28-30, 1967	7	2	3		1.20	sand	silt
San Nicolas	San Juan Bautista	Gening	June 28-30, 1967	7	30	12		1.00	sand	silt
Sarrat	San Agustin (Pob.)	Gening	June 28-30, 1967	0	0	3		1.00	gravel	silt
Sarrat	San Andres	Gening	June 28-30, 1967	3	2	3		0.30	silt	silt
Sarrat	San Antonio	Gening	June 28-30, 1967	7	3	48		0.70	gravel	sand
Sarrat	San Cristobal	Gening	June 28-30, 1967	1	1	12		4.00	sand	sand
Sarrat	San Felipe	Gening	June 28-30, 1967	30	8	1		2.00	gravel	silt
Sarrat	San Francisco (Pob.)	Openg	September 10, 1989	2	2	3		1.20	silt	silt

Table 19 Number of days farm and road operations suspended. (2/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	NUMBER OF DAYS OPERATION SUSPENDED		FLOOD DURATION IN THE BRGY (hrs)	FLOODWATER LEVEL (meters) ABOVE		SEDIMENT DEPOSITS AT	
				FARM	ROAD		FARMLAND	ROAD	FARM-LANDS	ROADS
Sarrat	San Isidro	Gening	June 28-30, 1967	20	3	12		2.00	gravel	silt
Sarrat	San Joaquin (Pob.)	Gening	June 28-30, 1967	60	2	1		0.30	gravel	sand
Sarrat	San Jose	Gening	June 28-30, 1967	1	0	12		3.00	silt	silt
Sarrat	San Leandro (Pob.)	Gening	June 28-30, 1967	0	60	6		2.00	gravel	sand
Sarrat	San Lorenzo	Gening	June 28-30, 1967	3	1	12		0.50	gravel	sand
Sarrat	San Manuel	Gening	June 28-30, 1967	3	1	3		0.70	gravel	sand
Sarrat	San Marcos	Gening	June 28-30, 1967	2	7	12		3.00	silt	silt
Sarrat	San Nicolas	Pepang	October 21-25, 1987	14	1	3		0.50	gravel	gravel
Sarrat	San Roque	Pepang	October 21-25, 1987	2	7	3		1.00	sand	sand
Sarrat	San Vicente (Pob.)	Gening	June 28-30, 1967	0	7	12		1.00	none	silt
Sarrat	Santa Barbara (Pob.)	Goring	July 20-26, 1977	5	1	6		1.20	sand	sand
Sarrat	Santo Tomas	Gening	June 28-30, 1967	0	2	12		1.00	silt	silt
Espiritu	Balioeg	Pepang	October 21-25, 1987	3	5	3		1.00	gravel	silt
Espiritu	Bugasi	Pepang	October 21-25, 1987	7	0	12		0.50	gravel	sand
Espiritu	Caestebanan	Gening	June 28-30, 1967	7	2	3		0.65	gravel	silt
Espiritu	Caribquib	Pepang	October 21-25, 1987	2	0	12	2.50	below	gravel	none
Espiritu	Catagtuguen	Pepang	October 21-25, 1987	7	1	12		0.70	sand	silt
Espiritu	Hilario (Pob.)	Pepang	October 21-25, 1987	2	150	12		1.50	gravel	sand
Espiritu	Lorenzo (Pob.)	Pepang	October 21-25, 1987	1	0	12		0.30	gravel	silt
Espiritu	Macayepyep	Pepang	October 21-25, 1987	2	30	12		0.50	gravel	sand
Espiritu	Sinamar	Pepang	October 21-25, 1987	2	3	12		0.65	gravel	sand
Espiritu	Tabtabagan	Pepang	October 21-25, 1987	0	1	12	2.00	0.60	gravel	silt
Espiritu	Valdez	Gening	June 28-30, 1967	7	7	3		0.50	gravel	sand
Marcos	Cacafean	Gening	June 28-30, 1967	5	30	48		1.75	gravel	gravel
Marcos	Daquinag	Gening	June 28-30, 1967	365	30	48		0.80	sand	silt
Marcos	Elizabeth (Culao)	Gening	June 28-30, 1967	1	0	12	2.40	below	gravel	none
Marcos	Escoda	Gening	June 28-30, 1967	4	0	168		0.80	gravel	sand
Marcos	Ferdinand	Gening	June 28-30, 1967	0	7	12		0.70	gravel	sand
Marcos	Fortuna	Gening	June 28-30, 1967	365	3	12		0.10	gravel	none

Table 19 Number of days farm and road operations suspended.(3/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	NUMBER OF DAYS OPERATION SUSPENDED		FLOOD DURATION IN THE BRGY (hrs)	FLOODWATER LEVEL (meters) ABOVE		SEDIMENT DEPOSITS AT	
				FARM	ROAD		FARMLAND	ROAD	FARM-LANDS	ROADS
Marcos	Pacifico (Agunit)	Gening	June 28-30, 1967	2	1	120		0.10	sand	sand
Marcos	Santiago	Gening	June 28-30, 1967	2	7	3		1.50	sand	sand
Marcos	Tabucbuc (Ragas)	Gening	June 28-30, 1967	30	30	48		1.50	gravel	silt
Marcos	Valdez	Gening	June 28-30, 1967	7	2	48		1.10	sand	silt
Dingras	Albano (Pob.)	Pepang	October 21-25, 1987	180	7	3	1.60	1.00	silt	silt
Dingras	Bagut	Pepang	October 21-25, 1987	60	1460	3		1.00	silt	silt
Dingras	Parndo(Bangay)	Kuring	June 20-24, 1985	7	7	3		0.60	silt	silt
Dingras	Baresbes	Miding	August 17-19, 1986	0	14	3	1.20	2.65	debris	debris
Dingras	Bareng	Rosing	July 19-21, 1971	3	3	12		1.20	debris	debris
Dingras	Bungcag	Pepang	October 21-25, 1987	1	7	3	1.80	1.35	silt	silt
Dingras	Dancel	Pepang	October 21-25, 1987	365	7	12	1.75	1.50	silt	silt
Dingras	Elizabeth	Goring	July 20-26, 1977	365	0	48	1.50	below	debris	none
Dingras	Foz	Trining	October 27, 1991	0	0	3		0.60	silt	silt
Dingras	Guerrero (Pob.)	Pepang	October 21-25, 1987	120	7	3	2.00	1.50	silt	silt
Dingras	Lanas	Maring	August 27-30, 1984	1080	45	24		0.80	gravel	gravel
Dingras	Lumbad	Pepang	October 21-25, 1987	21	2	3	0.60	0.30	silt	silt
Dingras	Madamba (Pob.)	Pepang	October 21-25, 1987	14	3	12	1.10	0.50	silt	silt
Dingras	Mandaloque	Gening	June 28-30, 1967	3	2	12	2.20	2.00	gravel	sand
Dingras	Medina	Pepang	October 21-25, 1987	30	21	3		0.60	silt	silt
Dingras	Peralta (Pob.)	Pepang	October 21-25, 1987	7	7	12	1.45	1.30	silt	silt
Dingras	Puruganan (Pob.)	Pepang	October 21-25, 1987	3	3	12	1.05	0.75	silt	silt
Dingras	Root (Baldias)	Pepang	October 21-25, 1987	2	2	3	1.65	1.00	silt	silt
Dingras	Sagratan	Pepang	October 21-25, 1987	0	30	12		1.50	silt	silt
Dingras	San Esteban	Pepang	October 21-25, 1987	30	1	12		1.00	gravel	gravel
Dingras	Francisco	Maring	August 27-30, 1984	4	0	3		no data	debris	none
Dingras	San Marcelino (Padong)	Maring	August 27-30, 1984	90	0	3		no data	debris	none
Dingras	San Marcos	Pepang	October 21-25, 1987	14	21	12		0.30	gravel	gravel
Dingras	Sulquiano	Pepang	October 21-25, 1987	0	0	48		0.30	sand	sand
Dingras	Suyo (2)	Pepang	October 21-25, 1987	7	7	3	1.95	1.20	silt	silt

Table 19 Number of days farm and road operations suspended. (4/4)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	NUMBER OF DAYS OPERATION SUSPENDED		FLOOD DURATION IN THE BRGY (hrs)	FLOODWATER LEVEL (meters) ABOVE		SEDIMENT DEPOSITS AT	
				FARM	ROAD		FARMLAND	ROAD	FARM-LANDS	ROADS
Dingras	Ver	Maring	August 27-30, 1984	2555	2	3		0.20	debris	debris
Solsona	Agutap	Pepang	October 21-25, 1987	7	1	12		1.00	gravel	gravel
Solsona	Bagbag	Pepang	October 21-25, 1987	60	14	3		1.00	gravel	gravel
Solsona	Bagbago	Pepang	October 21-25, 1987	180	14	120		0.65	gravel	gravel
Solsona	Barcelona	Pepang	October 21-25, 1987	150	90	12		2.00	gravel	gravel
Solsona	Bubuos	Pepang	October 21-25, 1987	365	90	12		1.00	gravel	gravel
Solsona	Capurictan	Pepang	October 21-25, 1987	365	10	3		1.20	silt	silt
Solsona	Catangraran	Pepang	October 21-25, 1987	1	1	3	1.50	0.30	gravel	gravel
Solsona	Darasdas	Maring	September 20, 1992	2	3	3		0.15	gravel	gravel
Solsona	Juan (Pob.) (1)	Pepang	October 21-25, 1987	3	7	12		0.65	silt	silt
Solsona	Laureta (Pob.)	Pepang	October 21-25, 1987	0	2	3		0.50	silt	silt
Solsona	Lipay	Pepang	October 21-25, 1987		120	48		0.70	debris	debris
Solsona	Maaranteng	Pepang	October 21-25, 1987	14	4	120		no data	debris	none
Solsona	Manalpac	Pepang	October 21-25, 1987	15	20	3	1.20	1.20	gravel	gravel
Solsona	Mariquet	Pepang	October 21-25, 1987	3	7	12		0.30	gravel	gravel
Solsona	Nagpatpatan	Pepang	October 21-25, 1987	7	10	3	1.80	0.30	gravel	gravel
Solsona	Nalasin	Pepang	October 21-25, 1987	30	90	168	1.00	1.00	debris	debris
Solsona	Puttio	Pepang	October 21-25, 1987	30	30	100		0.50	gravel	gravel
Solsona	San Juan	Pepang	October 21-25, 1987	60	30	3		0.60	sand	sand
Solsona	San Julian	Pepang	October 21-25, 1987	90	7	12		0.70	debris	debris
Solsona	Santa Ana	Pepang	October 21-25, 1987	7	2	3	0.30	0.30	debris	silt
Solsona	Santiago	Isang	August 29, 1992	90	30	12		1.00	sand	silt
Solsona	Talugtog	Pepang	October 21-25, 1987	7	7	168		0.70	debris	debris
Nueva Era	Acnam	Pepang	October 21-25, 1987	2	0	3		no data	sand	none
Nueva Era	Cabittauran	Gening	June 28-30, 1967	3	0	48		no data	gravel	none
Nueva Era	Canty	Pepang	October 21-25, 1987	15	30	3		1.00	silt	silt
Nueva Era	Poblacion	Pepang	October 21-25, 1987	4	0	168		no data	gravel	none
Nueva Era	Santo Nino	Gening	June 28-30, 1967	60	90	3		1.30	gravel	sand

Table 20 Hectarage and present land use of river washed areas. (1/3)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	RIVER WASHED AREA	
				HECTARAGE	PRESENT LAND USE
Piddig	Bimmanga	Gening	June 28-30, 1967	30.00	Watercourse
Piddig	Callusa	Gening	June 28-30, 1967	5.00	Rivercourse
Piddig	Dupitac	Gening	June 28-30, 1967	15.00	Rivercourse
Piddig	Estancia	Pepang	October 21-25, 1987	-	
Piddig	Gayamat	Gening	June 28-30, 1967	5.00	Rivercourse
Piddig	Libnaoan	Pepang	October 21-25, 1987	-	
Piddig	Mangitayag	Pepang	October 21-25, 1987	10.00	Watercourse
Laoag City	1 San Lorenzo (Pob.)	Gening	June 28-30, 1967	-	
Laoag City	30-a Suyo	Gening	June 28-30, 1967	2.00	Bare
Laoag City	30-b Santa Maria	Gening	June 28-30, 1967	5.00	Bare
Laoag City	34-b Gabu Norte East	Gening	June 28-30, 1967	1.50	Fishpond
Laoag City	43 Cavit (4)	Gening	June 28-30, 1967	0.04	Watercourse
Laoag City	45 Tangid	Gening	June 28-30, 1967	-	
Laoag City	51-a Nangalisan East	Pepang	October 21-25, 1987	1.00	Bare
Laoag City	51-b Nangalisan West	Gening	June 28-30, 1967	-	
Laoag City	53 Rioeng	Gening	June 28-30, 1967	-	
Laoag City	54-b Camangaan	Gening	June 28-30, 1967	-	
San Nicolas	1 San Francisco (Pob.)	Gening	June 28-30, 1967	-	
San Nicolas	24 Santa Monica (Nagrebcan)	Gening	June 28-30, 1967	20.00	Bare
San Nicolas	San Baltazar (Bo.2) (Pob.)	Gening	June 28-30, 1967	-	
San Nicolas	San Bartolome (Bo.4) (Pob.)	Gening	June 28-30, 1967	-	
San Nicolas	San Ildefonso (Bo.3) (Pob.)	Gening	June 28-30, 1967	-	
San Nicolas	San Juan Bautista	Gening	June 28-30, 1967	2.50	Bare
Sarrat	San Agustin (Pob.)	Gening	June 28-30, 1967	-	
Sarrat	San Andres	Gening	June 28-30, 1967	-	
Sarrat	San Antonio	Gening	June 28-30, 1967	120.00	Bare
Sarrat	San Cristobal	Gening	June 28-30, 1967	10.00	Bare
Sarrat	San Felipe	Gening	June 28-30, 1967	2.00	Rivercourse
Sarrat	San Francisco (Pob.)	Openg	September 10, 1989	10.00	Bare
Sarrat	San Isidro	Gening	June 28-30, 1967	10.00	Rivercourse
Sarrat	San Joaquin (Pob.)	Gening	June 28-30, 1967	5.00	Rivercourse
Sarrat	San Jose	Gening	June 28-30, 1967	-	
Sarrat	San Leandro (Pob.)	Gening	June 28-30, 1967	-	
Sarrat	San Lorenzo	Gening	June 28-30, 1967	2.00	Rivercourse
Sarrat	San Manuel	Gening	June 28-30, 1967	3.00	Bare
Sarrat	San Marcos	Gening	June 28-30, 1967	20.00	Bare
Sarrat	San Nicolas	Pepang	October 21-25, 1987	0.05	Bare
Sarrat	San Roque	Pepang	October 21-25, 1987	-	
Sarrat	San Vicente (Pob.)	Gening	June 28-30, 1967	-	
Sarrat	Santa Barbara (Pob.)	Goring	July 20-26, 1977	3.00	Rivercourse
Sarrat	Santo Tomas	Gening	June 28-30, 1967	35.00	Bare
Espiritu	Balloeg	Pepang	October 21-25, 1987	35.00	Bare
Espiritu	Bugasi	Pepang	October 21-25, 1987	30.00	Bare
Espiritu	Caestebanan	Gening	June 28-30, 1967	0.40	Bare
Espiritu	Caribquib	Pepang	October 21-25, 1987	2.50	Bare
Espiritu	Catagtaguen	Pepang	October 21-25, 1987	17.00	Bare
Espiritu	Hilario (Pob.)	Pepang	October 21-25, 1987	30.00	20-ha farmland
Espiritu	Lorenzo (Pob.)	Pepang	October 21-25, 1987	-	
Espiritu	Macayepyep	Pepang	October 21-25, 1987	35.00	Bare
Espiritu	Sinamar	Pepang	October 21-25, 1987	30.00	Bare

Table 20 Hectarage and present land use of river washed areas. (2/3)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	RIVER WASHED AREA	
				HECTARAGE	PRESENT LAND USE
Espiritu	Tabtabagan	Pepang	October 21-25, 1987	30.00	Bare
Espiritu	Valdez	Gening	June 28-30, 1967	30.00	Bare
Marcos	Cacafean	Gening	June 28-30, 1967	0.50	Bare
Marcos	Daquioag	Gening	June 28-30, 1967	15.00	8-ha peanut & mango farmland
Marcos	Elizabeth (Culao)	Gening	June 28-30, 1967	30.00	Bare
Marcos	Escoda	Gening	June 28-30, 1967	120.00	Bare
Marcos	Ferdinand	Gening	June 28-30, 1967	10.00	Bare
Marcos	Fortuna	Gening	June 28-30, 1967	7.00	Rivercourse
Marcos	Pacifico (Agunit)	Gening	June 28-30, 1967	70.00	Bare
Marcos	Santiago	Gening	June 28-30, 1967	10.00	Bare
Marcos	Tabucbuc (Ragas)	Gening	June 28-30, 1967	15.00	4-ha rootcrop farmland
Marcos	Valdez	Gening	June 28-30, 1967	5.00	Bare
Dingras	Albano (Pob.)	Pepang	October 21-25, 1987	0.25	Bare
Dingras	Bagut	Pepang	October 21-25, 1987	-	
Dingras	Parado(Bangay)	Kuring	June 20-24, 1985	-	
Dingras	Baresbes	Miding	August 17-19, 1986	30.00	Bare
Dingras	Barong	Rosing	July 19-21, 1971	100.00	Bare
Dingras	Burgcag	Pepang	October 21-25, 1987	-	
Dingras	Dancel	Pepang	October 21-25, 1987	-	
Dingras	Elizabeth	Goring	July 20-26, 1977	10.00	Bare
Dingras	Foz	Trining	October 27, 1991	2.00	Fishpond
Dingras	Guerrero (Pob.)	Pepang	October 21-25, 1987	50.00	Bare
Dingras	Lanas	Maring	August 27-30, 1984	20.00	Bare
Dingras	Lumbad	Pepang	October 21-25, 1987	38.00	10-ha corn farmland
Dingras	Madamba (Pob.)	Pepang	October 21-25, 1987	-	
Dingras	Mandaloque	Gening	June 28-30, 1967	20.00	Bare
Dingras	Medina	Pepang	October 21-25, 1987	1.00	Bare
Dingras	Peralta (Pob.)	Pepang	October 21-25, 1987	3.00	Bare
Dingras	Puruganan (Pob.)	Pepang	October 21-25, 1987	-	
Dingras	Root (Baldias)	Pepang	October 21-25, 1987	20.00	Farmland in 1 year
Dingras	Sagpatan	Pepang	October 21-25, 1987	25.00	Bare
Dingras	San Esteban	Pepang	October 21-25, 1987	1.00	0.2-ha farmland
Dingras	Francisco	Maring	August 27-30, 1984	27.00	Bare
Dingras	San Marcelino (Padong)	Maring	August 27-30, 1984	50.00	Bare
Dingras	San Marcos	Pepang	October 21-25, 1987	100.00	Bare
Dingras	Sulquiano	Pepang	October 21-25, 1987	-	
Dingras	Suyo (3)	Pepang	October 21-25, 1987	-	
Dingras	Ver	Maring	August 27-30, 1984	30.00	Bare
Solsona	Aguitap	Pepang	October 21-25, 1987	25.00	Bare
Solsona	Bagbag	Pepang	October 21-25, 1987	125.00	Bare
Solsona	Bagbago	Pepang	October 21-25, 1987	8.00	4-ha farmland
Solsona	Barcelona	Pepang	October 21-25, 1987	30.00	Bare
Solsona	Bubuos	Pepang	October 21-25, 1987	59.00	1-ha farmland
Solsona	Capurictan	Pepang	October 21-25, 1987	2.00	Bare
Solsona	Catangraran	Pepang	October 21-25, 1987	0.50	Bare
Solsona	Darasdas	Maring	September 20, 1992	15.00	Bare
Solsona	Juan (Pob.) (1)	Pepang	October 21-25, 1987	1.50	Restoration in 1 year
Solsona	Laureta (Pob.)	Pepang	October 21-25, 1987	30.00	15-ha farmland
Solsona	Lipay	Pepang	October 21-25, 1987	75.00	Bare
Solsona	Maananteng	Pepang	October 21-25, 1987	15.00	Bare

Table 20 Hectarage and present land use of river washed areas.(3/3)

MUNICIPALITY	BARANGAY	TYPHOON NAME	DATE OF OCCURRENCE	RIVER WASHED AREA	
				HECTARAGE	PRESENT LAND USE
Solsona	Manalpac	Pepang	October 21-25, 1987	15.00	Bare
Solsona	Mariquet	Pepang	October 21-25, 1987	8.00	Bare
Solsona	Nagpatpatan	Pepang	October 21-25, 1987	20.00	Bare
Solsona	Nalasin	Pepang	October 21-25, 1987	120.00	Some planted with vegetables.
Solsona	Puttao	Pepang	October 21-25, 1987	20.00	Bare
Solsona	San Juan	Pepang	October 21-25, 1987	25.00	Bare
Solsona	San Julian	Pepang	October 21-25, 1987	10.00	Bare
Solsona	Santa Ana	Pepang	October 21-25, 1987	10.00	Bare
Solsona	Santiago	Isang	August 29, 1992	30.00	Bare
Solsona	Talugtog	Pepang	October 21-25, 1987	24.00	Bare
Nueva Era	Acnam	Pepang	October 21-25, 1987	5.00	Bare
Nueva Era	Cabittauran	Gening	June 28-30, 1967	70.00	20-ha farmland
Nueva Era	Caray	Pepang	October 21-25, 1987	30.00	Bare
Nueva Era	Poblacion	Pepang	October 21-25, 1987	15.00	Bare
Nueva Era	Santo Nino	Gening	June 28-30, 1967	8.00	Bare
	TOTAL			2,162.74	

Table 21 Flood preparedness and flood fighting systems.(1/6)

MUNICIPALITY	BARANGAY	FLOOD PREPAREDNESS
Piddig	Bimmanga	Bgy . officials instruct people to transfer to higher areas.
Piddig	Callusa	Bgy. people construct temporary river bank protection.
Piddig	Dupitac	Bgy. people construct temporary river bank protection.
Piddig	Estancia	Bgy. people construct temporary river bank protection.
Piddig	Gayamat	DPWH constructed spurdikes.
Piddig	Libnaoan	Bgy. officials advise people to prepare for possible evacuation.
Piddig	Mangitayag	Bgy. officials instruct people to evacuate.
Laoag City	1 San Lorenzo (Pob.)	Bgy. officials instruct people to evacuate.
Laoag City	30-a Suyo	Bgy. officials instruct people to evacuate.
Laoag City	30-b Santa Maria	Bgy. officials advise people to prepare for possible evacuation.
Laoag City	34-b Gabu Norte East	Bgy. officials advise people to prepare for possible evacuation.
Laoag City	43 Cavit (4)	Bgy. officials advise people to prepare for possible evacuation.
Laoag City	45 Tangid	Bgy. officials advise people to prepare for possible evacuation.
Laoag City	51-a Nangalisan East	Bgy. officials advise people to prepare for possible evacuation.
Laoag City	51-b Nangalisan West	Bgy. officials advise people to prepare for possible evacuation.
Laoag City	53 Rioeng	Bgy. officials advise people to prepare for possible evacuation.
Laoag City	54-b Camangaan	Bgy. officials advise people to prepare for possible evacuation.
San Nicolas	1 San Francisco (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
San Nicolas	24 Santa Monica (Nagrebcan)	None
San Nicolas	San Baltazar (Bo.2) (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
San Nicolas	San Bartolome (Bo.4) (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
San Nicolas	San Ildefonso (Bo.3) (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
San Nicolas	San Juan Bautista	None
Sarrat	San Agustin (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
Sarrat	San Andres	None
Sarrat	San Antonio	Bgy. officials advise people to prepare for possible evacuation.
Sarrat	San Cristobal	Bgy. officials advise people to prepare for possible evacuation.
Sarrat	San Felipe	Bgy. officials advise people to prepare for possible evacuation.
Sarrat	San Francisco (Pob.)	Bgy. people construct temporary river bank protection.
Sarrat	San Isidro	None
Sarrat	San Joaquin (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
Sarrat	San Jose	None
Sarrat	San Leandro (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
Sarrat	San Lorenzo	Bgy. officials advise people to prepare for possible evacuation.
Sarrat	San Manuel	None
Sarrat	San Marcos	None
Sarrat	San Nicolas	Bgy. officials advise people to prepare for possible evacuation.
Sarrat	San Roque	Bgy. officials advise people to prepare for possible evacuation.
Sarrat	San Vicente (Pob.)	LGU declogs drainage canals.
Sarrat	Santa Barbara (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
Sarrat	Santo Tomas	None
Espiritu	Balioeg	People construct temporary trench made of bamboo and stones.
Espiritu	Bugasi	People construct temporary trench made of bamboo and stones.
Espiritu	Caestebanan	None
Espiritu	Caribquib	None
Espiritu	Catagtaguen	People construct temporary trench made of bamboo and stones.
Espiritu	Hilario (Pob.)	None
Espiritu	Lorenzo (Pob.)	People construct temporary trench made of bamboo and stones.
Espiritu	Macayepyep	None
Espiritu	Sinamar	Bgy. people construct temporary river bank protection.

Table 21 Flood preparedness and flood fighting (2/6)

MUNICIPALITY	BARANGAY	FLOOD FIGHTING
Piddig	Bimmanga	Evacuation of affected families to higher grounds.
Piddig	Callusa	None
Piddig	Dupitac	None
Piddig	Estancia	Evacuation of affected families to higher grounds.
Piddig	Gayamat	None
Piddig	Libnaoan	Evacuation of affected families to higher grounds.
Piddig	Mangitayag	Evacuation of affected families to higher grounds.
Laoag City	1 San Lorenzo (Pob.)	Evacuation of affected families to higher grounds.
Laoag City	30-a Suyo	Evacuation of affected families to higher grounds.
Laoag City	30-b Santa Maria	Evacuation of affected families to higher grounds.
Laoag City	34-b Gabu Norte East	Evacuation of affected families to higher grounds.
Laoag City	43 Cavit (4)	None
Laoag City	45 Tangid	Evacuation of affected families to higher grounds.
Laoag City	51-a Nangalisan East	Evacuation of affected families to higher grounds.
Laoag City	51-b Nangalisan West	Evacuation of affected families to higher grounds.
Laoag City	53 Rioeng	Evacuation of affected families to higher grounds.
Laoag City	54-b Camangaan	Evacuation of affected families to higher grounds.
San Nicolas	1 San Francisco (Pob.)	Evacuation of affected families to higher grounds.
San Nicolas	24 Santa Monica (Nagrebcan)	Evacuation of affected families to higher grounds.
San Nicolas	San Baltazar (Bo.2) (Pob.)	Evacuation of affected families to higher grounds.
San Nicolas	San Bartolome (Bo.4) (Pob.)	Evacuation of affected families to higher grounds.
San Nicolas	San Ildefonso (Bo.3) (Pob.)	Evacuation of affected families to higher grounds.
San Nicolas	San Juan Bautista	Evacuation of affected families to higher grounds.
Sarrat	San Agustin (Pob.)	Evacuation of affected families to higher grounds.
Sarrat	San Andres	None
Sarrat	San Antonio	None
Sarrat	San Cristobal	Evacuation of affected families to higher grounds.
Sarrat	San Felipe	None
Sarrat	San Francisco (Pob.)	None
Sarrat	San Isidro	None
Sarrat	San Joaquin (Pob.)	Evacuation of affected families to higher grounds.
Sarrat	San Jose	None
Sarrat	San Leandro (Pob.)	Evacuation of affected families to higher grounds.
Sarrat	San Lorenzo	Evacuation of affected families to higher grounds.
Sarrat	San Manuel	None
Sarrat	San Marcos	Evacuation of affected families to higher grounds.
Sarrat	San Nicolas	None
Sarrat	San Roque	None
Sarrat	San Vicente (Pob.)	Evacuation of affected families to higher grounds.
Sarrat	Santa Barbara (Pob.)	None
Sarrat	Santo Tomas	Evacuation of affected families to higher grounds.
Espiritu	Balioeg	Evacuation of affected families to higher grounds.
Espiritu	Bugasi	Evacuation of affected families to higher grounds.
Espiritu	Caestebanan	Evacuation of affected families to higher grounds.
Espiritu	Caribquib	None
Espiritu	Catagtaguen	Evacuation of affected families to higher grounds.
Espiritu	Hilario (Pob.)	Evacuation of affected families to higher grounds.
Espiritu	Lorenzo (Pob.)	None
Espiritu	Macayepyep	Evacuation of affected families to higher grounds.
Espiritu	Sinamar	Evacuation of affected families to higher grounds.

Table 21 Flood preparedness and flood fighting systems. (3/6)

MUNICIPALITY	BARANGAY	FLOOD PREPAREDNESS
Espiritu	Tabtabagan	None
Espiritu	Valdez	People construct temporary trench made of bamboo and stones.
Marcos	Cacafean	Bgy. people construct temporary river bank protection.
Marcos	Daquioag	None
Marcos	Elizabeth (Culao)	Bgy. people construct temporary river bank protection.
Marcos	Escoda	None
Marcos	Ferdinand	Bgy. people construct temporary river bank protection.
Marcos	Fortuna	Bgy. people construct temporary river bank protection.
Marcos	Pacifico (Agunit)	Bgy. people construct temporary river bank protection. Bgy. people construct temporary river bank protection.
Marcos	Santiago	Bgy. people construct temporary river bank protection.
Marcos	Tabuebue (Ragas)	Bgy. people construct temporary river bank protection.
Marcos	Valdez	People transfer furnitures to higher places. Bgy. people construct temporary river bank protection.
Dingras	Albano (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
Dingras	Bagut	Bgy. officials advise people to prepare for possible evacuation.
Dingras	Parado(Bangay)	DPWH constructed spurdikes and ripraps.
Dingras	Baresbes	DPWH constructed spurdikes and ripraps. DPWH dredged Bumay River and constructed temporary dikes.
Dingras	Barong	Bgy. people construct temporary river bank protection. DPWH dredged Bumay River and constructed temporary dikes.
Dingras	Bungcag	Bgy. officials advise people to prepare for possible evacuation.
Dingras	Dancel	Bgy. officials advise people to prepare for possible evacuation.
Dingras	Elizabeth	Bgy. people construct temporary river bank protection.
Dingras	Foz	Bgy. people construct temporary river bank protection.
Dingras	Guerrero (Pob.)	Bgy. people construct temporary river bank protection.
Dingras	Lanas	Bgy. people construct temporary river bank protection.
Dingras	Lumbad	Bgy. people construct temporary river bank protection.
Dingras	Madamba (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
Dingras	Mandaloque	Bgy. people construct temporary river bank protection.
Dingras	Medina	DPWH constructed spurdikes and ripraps.
Dingras	Peralta (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
Dingras	Puruganan (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
Dingras	Root (Baldias)	None
Dingras	Sagpatan	None
Dingras	San Esteban	People transfer commodities and livestocks to higher places. Bgy. people construct temporary river bank protection.
Dingras	Francisco	DPWH constructed spurdikes and ripraps.
Dingras	San Marcelino (Padong)	Bgy. people construct temporary river bank protection.
Dingras	San Marcos	Bgy. people construct temporary river bank protection.
Dingras	Sulquiano	None
Dingras	Suyo (3)	None
Dingras	Ver	Bgy. people construct temporary river bank protection.
Solsona	Aguitap	Bgy. people construct temporary river bank protection.
Solsona	Bagbag	Bgy. people construct temporary river bank protection.
Solsona	Bagbago	People construct temporary trench made of bamboo and stones.
Solsona	Barcelona	Bgy. people construct temporary river bank protection.
Solsona	Bubuos	Bgy. officials advise people to prepare for possible evacuation.
Solsona	Capurictan	None
Solsona	Catangraran	People construct temporary trench made of bamboo and stones.

Table 21 Flood preparedness and flood fighting (4/6)

MUNICIPALITY	BARANGAY	FLOOD FIGHTING
Espiritu	Tabtabagan	None
Espiritu	Valdez	Evacuation of affected families to higher grounds.
Marcos	Cacafean	None
Marcos	Daquioag	None
Marcos	Elizabeth (Culao)	None
Marcos	Escoda	None
Marcos	Ferdinand	None
Marcos	Fortuna	None
Marcos	Pacifico (Agunit)	Transfer of furnitures to higher grounds.
Marcos	Santiago	None
Marcos	Tabucbuc (Ragas)	None
Marcos	Valdez	None
Dingras	Albano (Pob.)	Evacuation of affected families to higher grounds.
Dingras	Bagut	Evacuation of affected families to higher grounds.
Dingras	Parado(Bangay)	None
Dingras	Baresbes	Construction of emergency river bank protection.
Dingras	Barong	None
Dingras	Bungcag	Evacuation of affected families to higher grounds.
Dingras	Dancel	Evacuation of affected families to higher grounds.
Dingras	Elizabeth	None
Dingras	Foz	None
Dingras	Guerrero (Pob.)	Evacuation of affected families to higher grounds.
Dingras	Lanas	None
Dingras	Lumbad	None
Dingras	Madamba (Pob.)	Evacuation of affected families to higher grounds.
Dingras	Mandaloque	None
Dingras	Medina	None
Dingras	Peralta (Pob.)	Evacuation of affected families to higher grounds.
Dingras	Puruganan (Pob.)	Evacuation of affected families to higher grounds.
Dingras	Root (Baldias)	Evacuation of affected families to higher grounds.
Dingras	Sagpatan	Evacuation of affected families to higher grounds.
Dingras	San Esteban	None
Dingras	Francisco	Construction of emergency river bank protection.
Dingras	San Marcelino (Padong)	None
Dingras	San Marcos	None
Dingras	Sulquiano	Transfer of furnitures to higher grounds.
Dingras	Suyo (3)	Evacuation of affected families into higher areas.
Dingras	Ver	None
Solsona	Aguitap	Construction of emergency river bank protection.
Solsona	Bagbag	Evacuation of affected families to higher grounds.
Solsona	Bagbago	Evacuation of affected families to higher grounds.
Solsona	Barcelona	None
Solsona	Bubuos	None
Solsona	Capurictan	Evacuation of affected families to higher grounds.
Solsona	Catangraran	None

Table 21 Flood preparedness and flood fighting systems.(5/6)

MUNICIPALITY	BARANGAY	FLOOD PREPAREDNESS
Solsona	Darasdas	Bgy. people construct temporary river bank protection.
Solsona	Juan (Pob.) (I)	None
Solsona	Laureta (Pob.)	Bgy. officials advise people to prepare for possible evacuation.
Solsona	Lipay	Bgy. people construct temporary river bank protection.
Solsona	Maananteng	Bgy. people construct temporary river bank protection.
Solsona	Manalpac	Bgy. officials advise people to prepare for possible evacuation.
Solsona	Mariquet	None
Solsona	Nagpatpatan	Bgy. people construct temporary river bank protection.
Solsona	Nalasin	Bgy. people construct temporary river bank protection.
Solsona	Puttao	Bgy. people construct temporary river bank protection.
Solsona	San Juan	Bgy. people construct temporary river bank protection.
Solsona	San Julian	Bgy. people construct temporary river bank protection.
Solsona	Santa Ana	Bgy. people construct temporary river bank protection.
Solsona	Santiago	Bgy. people construct temporary river bank protection.
Solsona	Talugtog	Bgy. people construct temporary river bank protection.
Nueva Era	Acnam	None
Nueva Era	Cabittauran	Bgy. people construct temporary river bank protection.
Nueva Era	Caray	Bgy. people construct temporary river bank protection.
Nueva Era	Poblacion	Bgy. people construct temporary river bank protection.
Nueva Era	Santo Nino	Bgy. people construct temporary river bank protection.

Table 21 Flood preparedness and flood fighting (6/6)

MUNICIPALITY	BARANGAY	FLOOD FIGHTING
Solsona	Darasdas	Construction of emergency river bank protection.
Solsona	Juan (Pob.) (1)	Evacuation of affected families to higher grounds.
Solsona	Laureta (Pob.)	Evacuation of affected families to higher grounds.
Solsona	Lipay	Construction of emergency river bank protection.
Solsona	Maananteng	Evacuation of affected families to higher grounds.
Solsona	Manalpac	None
Solsona	Mariquet	None
Solsona	Nagpatpatan	Evacuation of affected families to higher grounds.
Solsona	Nalasin	Evacuation of affected families to higher grounds.
Solsona	Puttao	None
Solsona	San Juan	Construction of emergency river bank protection.
Solsona	San Julian	None
Solsona	Santa Ana	None
Solsona	Santiago	Evacuation of affected families to higher grounds.
Solsona	Talugtog	Construction of emergency river bank protection.
Nueva Era	Acnam	None
Nueva Era	Cabittauran	None
Nueva Era	Caray	Evacuation of affected families to higher grounds.
Nueva Era	Poblacion	None
Nueva Era	Santo Nino	Evacuation of affected families to higher grounds.

Table 22 Number of requests for structural measures of flood mitigation by municipality.

REQUEST	PIDDIG	LAOAG CITY	SAN NICOLAS	SARRAT	ESPIRITU	MARCOS	DINGRAS	SOLSONA	NUEVA ERA	TOTAL
Construction of embankment			3	1		1	2	2		9
Construction of spur dike	4	2				2	6	1		15
Dredging of the river	4	5	5	13	9	9	23	21	5	94
Forestation of mountain area		1						4		5
Bank protection	3		2	10	7	5	15	14	3	59
Cut-off channel or re-channelling of river			4	7	1	3	3	5		23
General river control	2	8	3	9	9	2	5	5	2	45
Maintenance of present bank and river		1					3	2		6
Construction of sabo dam						1		3		4
Repair of irrigation channel		2			3					5
Others	1			4	1					6