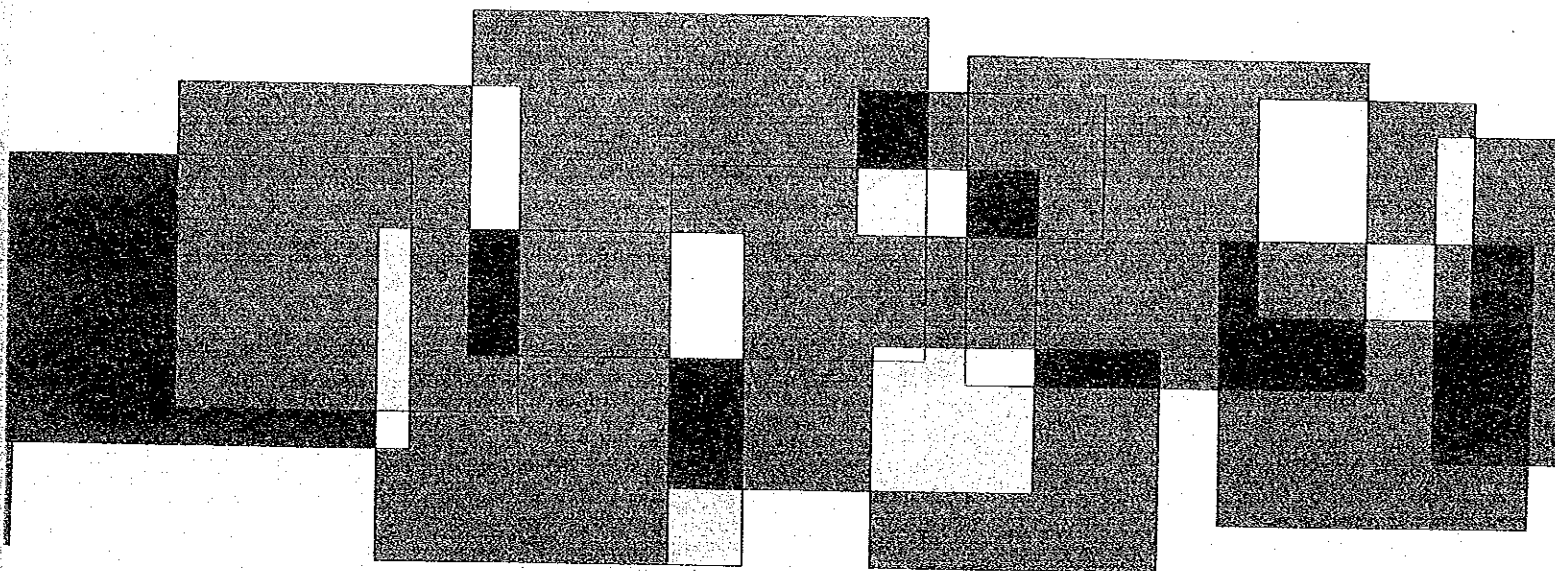


THE REPUBLIC OF THE PHILIPPINES

THE STUDY OF THE MASTER PLAN  
FOR  
THE NATIONWIDE ICE PLANTS  
AND  
COLD STORAGES NETWORK SYSTEM



FINAL REPORT  
(SUMMARY)

MARCH, 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

F D T
CR (5)
85-06

ARY



JICA LIBRARY

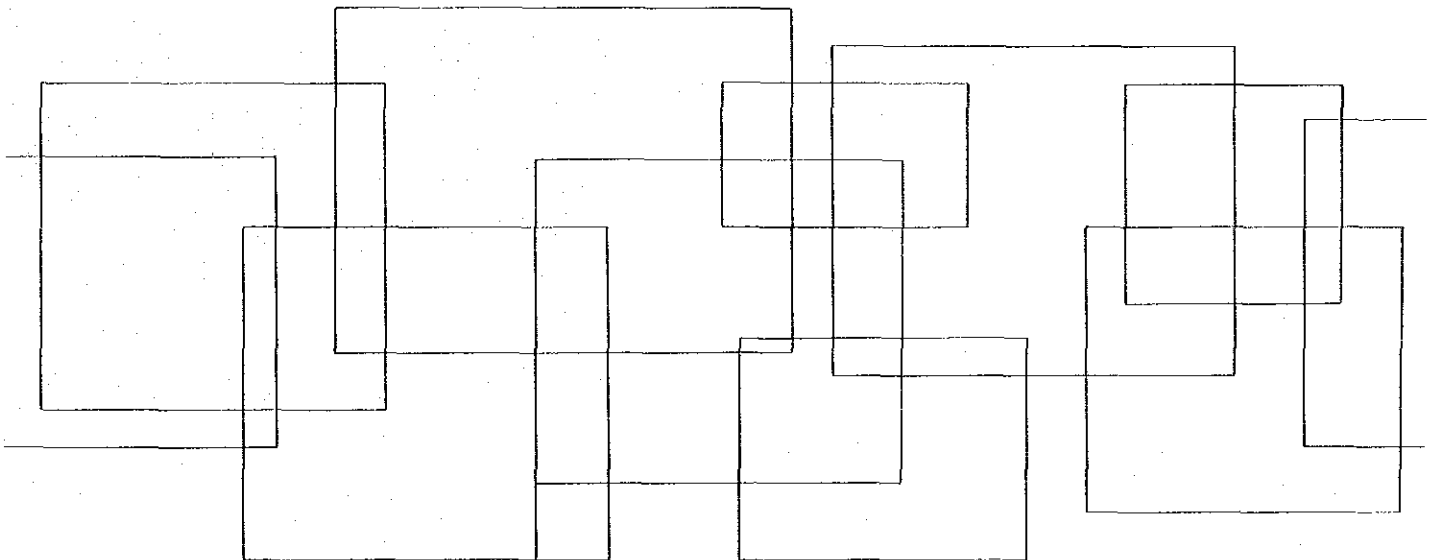


1030595[1]



**THE REPUBLIC OF THE PHILIPPINES**

**THE STUDY OF THE MASTER PLAN  
FOR  
THE NATIONWIDE ICE PLANTS  
AND  
COLD STORAGES NETWORK SYSTEM**



**FINAL REPORT  
(SUMMARY)**

**MARCH, 1985**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

国際協力事業団	
受入 月日 '85. 8. 14	118
登録No. 11817	89
	FDT

## Preface

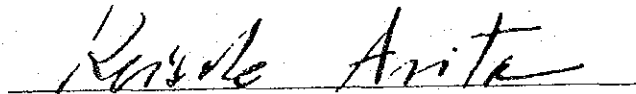
In response to the request of the Government of the Republic of the Philippines, the Japanese Government decided to conduct a survey on the Master Plan for the Nationwide Ice Plants and Cold Storages Network System and entrusted the survey to the Japan International Cooperation Agency (JICA). The JICA sent to the Philippines a survey team headed by Mr. Tateo Kusano (System Science Consultants Inc. Ltd.) in 1983 and 1984.

The team exchanged views on the Project with the officials concerned of the Government of the Philippines and conducted a field survey for seven and a half months. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of fisheries in the Philippines and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of the Philippines for their close cooperation extended to the team.

March, 1985



Keisuke Arita  
President

Japan International Cooperation Agency

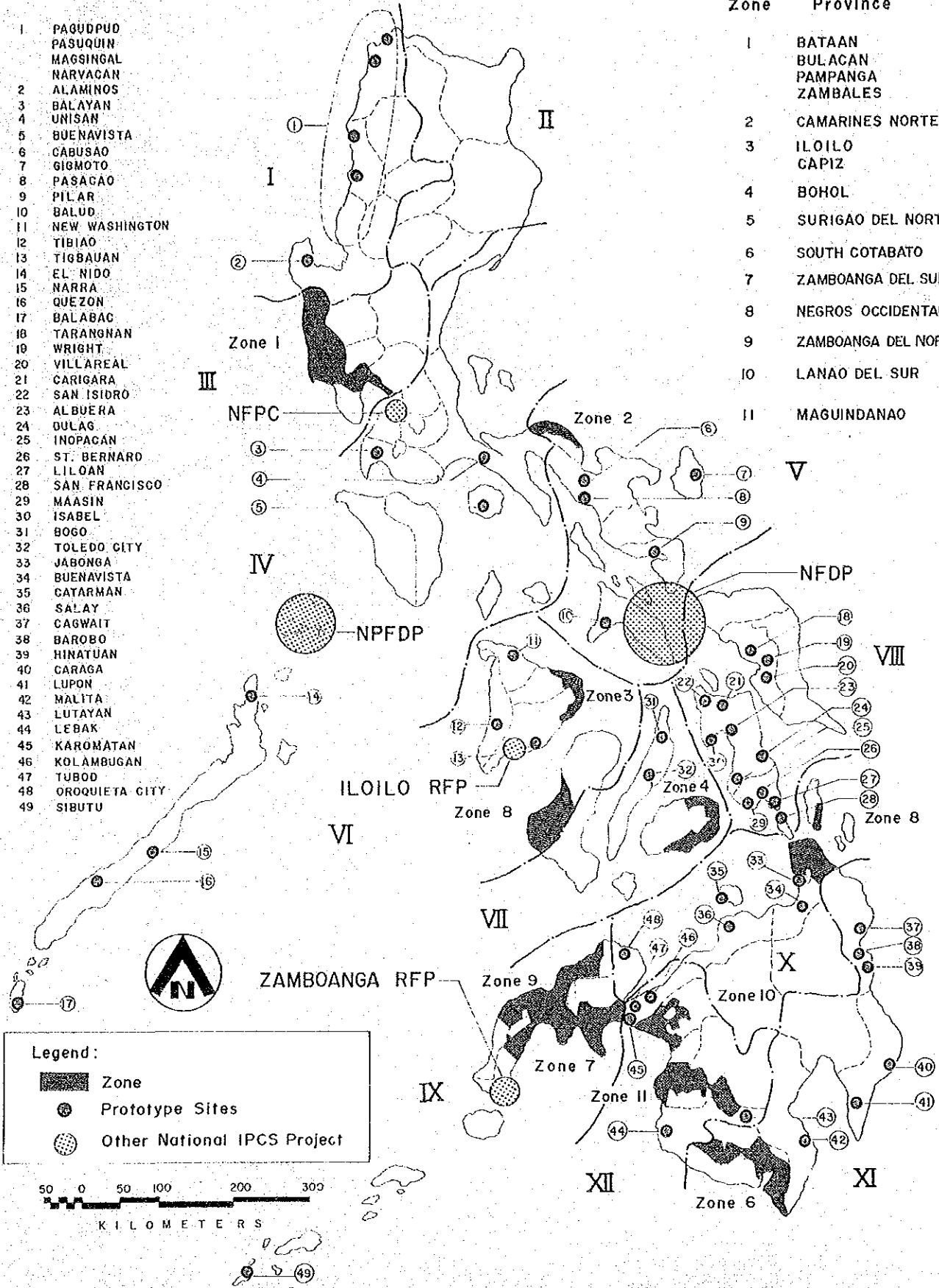




**Prototype Sites**

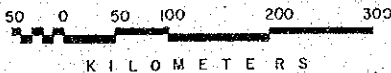
- 1 PAGUDPUD
- 2 PASUQUIN
- 3 MAGSINGAL
- 4 NARYAGAN
- 5 ALAMINOS
- 6 BALAYAN
- 7 UNISAN
- 8 BUENAVIDA
- 9 CABUSAO
- 10 GIGMOTO
- 11 PASAGAO
- 12 PILAR
- 13 BALUD
- 14 NEW WASHINGTON
- 15 TIBIAO
- 16 TIGBAUAN
- 17 EL NIDO
- 18 NARRA
- 19 QUEZON
- 20 BALABAC
- 21 TARANGNAN
- 22 WRIGHT
- 23 VILLAREAL
- 24 CARIGARA
- 25 SAN ISIDRO
- 26 ALBUERA
- 27 OULAG
- 28 INOPACAN
- 29 ST. BERNARD
- 30 LILLOAN
- 31 SAN FRANCISCO
- 32 MAASIN
- 33 ISABEL
- 34 BOGO
- 35 TOLEDO CITY
- 36 JABONGA
- 37 BUENAVIDA
- 38 CATARMAN
- 39 SALAY
- 40 CAGWAIT
- 41 BAROBO
- 42 HINATUAN
- 43 CARAGA
- 44 LUPON
- 45 MALITA
- 46 LUTAYAN
- 47 LEBAK
- 48 KAROMATAN
- 49 KOLAMBUGAN
- 50 TUBOD
- 51 OROQUIETA CITY
- 52 SIBUTU

Zone	Province
1	BATAAN BULACAN PAMPANGA ZAMBALES
2	CAMARINES NORTE
3	ILOILO CAPIZ
4	BOHOL
5	SURIGAO DEL NORTE
6	SOUTH COTABATO
7	ZAMBOANGA DEL SUR
8	NEGROS OCCIDENTAL
9	ZAMBOANGA DEL NORTE
10	LANAO DEL SUR
11	MAGUINDANAO



**Legend:**

- Zone
- Prototype Sites
- Other National IPCS Project



LOCATION OF SELECTED ZONES AND PROTOTYPE SITES

REPUBLIC OF THE PHILIPPINES  
 THE STUDY OF MASTER PLAN FOR THE NATIONWIDE  
 ICE PLANTS AND COLD STORAGES NETWORK SYSTEM  
 JAPAN INTERNATIONAL COOPERATION AGENCY



## CONTENTS

Abbreviations .....	1
Terminology .....	4
1. Background .....	5
2. Study Objective .....	5
3. Executing Agencies .....	5
4. Method of Study .....	6
5. Fishing Port Development .....	6
6. Assessment of Existing Ice Plants and Cold Storages .....	7
7. Supply and Demand for Fish .....	10
8. Shortage of Ice Plants and Cold Storages .....	13
9. Selection of Priority Areas .....	15
10. Formulation of IPCS System .....	16
11. Cost Estimation .....	20
12. Economic and Financial Evaluation .....	20
13. Implementation Program .....	22
14. Conclusions and Recommendations .....	22
References .....	25
Annex 1. Implementing Arrangement .....	A-1
Annex 2. List of Persons Involved .....	A-11



## ABBREVIATIONS

### I. Public Agencies and Organizational Units

#### (1) Government of the Philippines

BAECON	: Bureau of Agricultural Economics, MAF
BC	: Bureau of Construction, MPWH
BFAR	: Bureau of Fisheries and Aquatic Resources, MAF
DBP	: Development Bank of the Philippines
FIDC	: Fishery Industry Development Council
FNRI	: Food and Nutrition Research Institute
LWUA	: Local Water Utilities Administration
MAF	: Ministry of Agriculture and Food
MNR	: Ministry of Natural Resources
MPWH	: Ministry of Public Works and Highways
MWSS	: Metropolitan Waterworks and Sewerage System
NCSO	: National Census and Statistics Office
NEA	: National Electrification Administration
NEDA	: National Economic and Development Authority
NPC	: National Power Corporation
NWRC	: National Water Resources Council
PAGASA	: Philippine Atmospheric Geophysical and Astronomical Services Administration
PFDA	: Philippine Fisheries Development Authority
PMO-FPP I	: Project Management Office - Fishing Port Package I, MPWH
PPA	: Philippine Ports Authority
RWDC	: Rural Waterworks Development Corporation

#### (2) Government of Japan

OECD	: Overseas Economic Cooperation Fund
JICA	: Japan International Cooperation Agency

#### (3) International Organizations

ADB	: Asian Development Bank
FAO	: Food and Agriculture Organization, United Nations
IBRD	: International Bank for Reconstruction and Development
ICLARM	: International Center for Living Aquatic Resources Management

(4) Internal Units of PFDA

AOC	: Area Operation Center
NFPC	: Navotas Fishing Port Complex
OMD	: Operations Management Development

II. Plans/Programs/Projects

CIADP	: Cagayan Integrated Agriculture Development Project
FPP	: Fishing Port Package (I and II)
IFDP	: Integrated Fisheries Development Program
MFPDP	: Municipal Fishing Port Development Program
NFDP	: National Fisheries Development Project
NPFDP	: Northern Palawan Fisheries Development Project
NTPDP	: Nationwide Tertiary Ports Development Program
FTS	: Fish Transport System

III. Private Sector

APICSO	: Association of Private Ice Plants and Cold Storage Operators
MERALCO	: Manila Electric Company
MIPOA	: Metro Lloilo Ice Plant Operators Association

IV. Technical Terms

B/C	: Benefit/Cost Ratio
CIF	: Cost, Insurance and Freight
EEA	: Emergency Employment Administration
EEZ	: Exclusive Economic Zone
EIRR	: Economic Internal Rate of Return
GDP	: Cross Domestic Products
IPCS	: Ice Plant and Cold Storage
MCT	: Multi-cylindder type
MFP	: Municipal Fishing Port
NCR	: National Capital Region
NPV	: Net Present Value
RFP	: Regional Fishing Port
SCT	: Screw-compressor type
VOT	: Vertical-open type

## V. Metric Units

ha	:	hectare
km	:	kilometer
km <sup>2</sup>	:	square kilometer
m <sup>3</sup>	:	cubic meter
mm	:	millimeter
10 <sup>3</sup>	:	thousand
10 <sup>6</sup>	:	million
10 <sup>9</sup>	:	billion
MT	:	metric ton
°C	:	degree (in centigrade)

## VI. Symbols

No.	:	number
—	:	Not available
%	:	per cent

## TERMINOLOGY

1. Commercial fisheries  
Fishing for commercial purposes in waters more than seven fathoms deep with the use of fishing boats more than three gross tons (P.D. No. 704)
2. Municipal fisheries  
Fishing utilizing fishing boats of three gross tons or less, or using gear not requiring the use of boats (P.D. No. 704)
3. Commercial fishing ports  
Fishing ports serving as main fish collection and distribution centers.
4. Municipal fishing ports  
Fishing ports serving as the satellite sub-collection points of fish
5. Rated capacity  
Maximum capacity of ice production based upon the certain design conditions, which are raw water temperature, ambient temperature and brine or refrigerant evaporating temperature (tons/day)
6. Operational capacity  
Actual capacity of ice production (tons/day)
7. Operational ratio  
 $\text{Operational capacity} / \text{Rated capacity}$



## **1. Background**

In October 1981, FIDC established the Integrated Fisheries Development Program (IFDP) as the basic policies and strategies for the development of the fisheries sector on a long term basis. The plan covers the period of 1981 through 1990.

PFDA, in line with the above IFDP, has prepared and launched the Nationwide Fish Marketing Infrastructure Program. The program includes the following sub-programs:

- (i) Fishing Port Development
- (ii) Fish Transport System
- (iii) Ice Plant and Cold Storage Network System (IPCS Network System)

The role of the IPCS Network System is to support the fishing port system with the supply of ice required in fishing, harvesting and transport/marketing of fish. It will also help in rationalizing fish prices through storage and preservation of the surplus of fish catch.

The idea to establish the IPCS network system together with the Fishing Port and Transport System at a nationwide level is rather unique. There are no similar ambitious programs in other developing countries. The idea comes from sound judgement and looks quite promising.

## **2. Study Objective**

The objective of the Study is to formulate a Master Plan for the Nationwide IPCS Network System (Master Plan) which is closely related to the municipal fishing port system.

## **3. Executing Agencies**

PFDA is the executing agency of the Government of the Philippines for the establishment of the Nationwide IPCS Network System, while JICA is the executing agency of the Japanese Government for the execution of the study of the Master Plan. Both agencies have set up the Advisory Committees for the effective execution of the Study.

During the course of the study period, however, PFDA was transferred from MNR to MAF. As a result, the members of the committee were changed as follows:

- (i) Phase I Study : MNR, FIDC, PFDA and BFAR
- (ii) Phase II Study : MAF, PFDA, BFAR and NEDA

#### **4. Method of Study**

The Study of the Master Plan was carried out in two phases during the period of November 1983 to March 1985. The Study Team was in the Philippines from December 1983 to March 1984 for Phase I and from June to October 1984 for Phase II of the Study. The Team collected data and information in collaboration with the following organizations:

- (i) MNR, MAF, PFDA, MPWH, BFAR, NEDA and DBP,
- (ii) Other relevant government agencies, and
- (iii) Several associations in the private sector concerned with ice plants and cold storages.

Field surveys were conducted on existing ice plants and cold storages and on other prospective areas/sites for IPCS for about one month during the Phase I Study period and for two months in the Phase II period.

Major work of these two Phases are summarized as follows:

- Phase I :
- (i) To review the Preliminary Study by PFDA and to assess the existing IPCS system.
  - (ii) To clarify the basic principles and study approaches for the formulation of the Master Plan .
- Phase II :
- (i) To select priority areas of the IPCS system.
  - (ii) To finalize the Master Plan in the form of the IPCS Network System covering the whole country regarding the sites proposed by PFDA.

#### **5. Fishing Port Development**

Fishing ports are classified into two categories, i.e., commercial and municipal fishing ports. The former is composed of the Navotas Fishing Port Complex (NFPC) as the National

Fishing Port and the Fishing Port Packages (FPP) I and II of Regional Fishing Ports. The commercial fishing ports serve as the main collection and distribution centers of fish. The municipal fishing ports (MFP) shall function as satellite sub-collection points of fish for the former as well as direct supply centers of fish to consuming areas. To support the commercial fishing ports, a network of MFP has been programmed and is being constructed in selected fishing villages throughout the country.

## **6. Assessment of Existing Ice Plants and Cold Storages**

### **6.1 General conditions**

At the end of 1983, the total production capacity of existing ice plants amounted to 15,171 tons/day, and there was a total capacity of 136,186 tons for cold storages throughout the Philippines. The capacity of ice plants owned by the private sector was 14,576 tons/day accounting for about 96 percent of the total, while the public sector could produce only 595 tons/day or 4 percent of the total production. Privately owned cold storages can store 74,003 tons of chilled food and 58,671 tons of frozen products, which accounted for 98 and 97 percent of the total storage capacity of the country, respectively.

However, the existing ice plants and cold storages are highly concentrated in Central Luzon particularly in NCR. Thus, the need for public IPCS is extremely great in other areas such as Visayas and Mindanao.

### **6.2 Assessment**

Though their total capacity is still small, there are a good number of public ice plants and cold storages which have been completed or are under planning.

Public ice plant and cold storage facilities are under various programs, i.e., NFPC, FPP I/II, NPFDP, NFDP and BFAR program. Of these programs, 35 ice plants and cold storages which have been recently handed over to PFDA from BFAR. Of these, however, only 10 are operational and the rest are either under trial operation or at the preparatory stage of construction.

So far, private ice plants and cold storages have been comparatively well operated. However, the recent economic crisis has caused considerable and serious effects on their operation. Nevertheless, they have much better experience in operation and maintenance of plants than those of the public sector.

As a result of the assessment of existing ice plants and cold storages, the following were noted:

(1) Technical aspect

Most of the existing ice plants and cold storages have suffered from power deficiency, such as frequent brown-outs and voltage fluctuation, even though stand-by generators are installed. In general, private ice plants and cold storages are located at advantageous sites to secure stable water supply. On the contrary, ice plants and cold storages formerly owned by BFAR (BFAR IPCS) have been, in many instances, badly affected by unstable water supply, resulting from low water pressure, frequent water suspension and salt water intrusion. For the operation and maintenance of machinery private ice plants and cold storages have established a comparatively effective system with immediate supply of spare parts, while BFAR IPCS has faced many difficulties due mainly to delays in the disbursement of budget which have often caused suspension in the continuous operation of plants.

(2) Marketing aspect

Private ice plants and cold storages have served a wider market in the pursuit of economy of scale. Some of them have regular customers and achieved satisfactory results through constant sales of ice.

On the contrary, the supply capacities of many BFAR IPCS plants exceed the current demand of ice, as their sizes were determined based on too optimistic outlook on the development of fisheries, and because small-sized ice plants were considered less viable.

BFAR IPCS produce mainly flake ice which is not always preferred by fishermen, while the private sector ice plants produce exclusively block ice. The demand for frozen fish is still low in most areas of the country except in NCR. This is a major factor contributing to the suspension of the operation of many cold storages.

(3) Financial aspect

In general, the energy cost accounts for 70 percent of the total production cost of ice, as ice making is a typically energy consuming process. However the present price of ice has been kept at an exceptionally low level in some areas where relatively cheap hydro or geothermal power is available, while it is quite expensive in other areas. If these

energy charges can be reduced to the level of hydro or geothermal power, demand for ice will likely increase.

With regard to BFAR IPCS, the extreme delay in budgetary appropriation to secure land for ice plants and to make provision of water and electric supply systems was another obstacle. The lack of budget for training engineers was also a constraint for the smooth operation of ice plants and cold storages.

The assessment of existing ice plants and cold storages has resulted in some worthy findings which have been taken into account in establishing the nationwide IPCS system. They are, among others, as follows:

- a. As the capacity of the ice plant is larger, the production cost of ice per ton is less. This means that in a given area, a single larger ice plant is more profitable than many smaller plants scattered in the area, when both have the same capacity of ice production.
- b. To meet a given amount of ice demand, a smaller ice plant with a larger ice storage capacity is more profitable than a larger ice plant with a smaller ice storage capacity, because:
  - (i) the ice storage is indispensable to meet the extremely seasonal change of ice requirement owing to the seasonality of fisheries, and
  - (ii) the initial investment cost for the construction as well as the operation cost for labor and energy for a smaller ice plant with a larger ice storage is less, as compared with that of a larger ice plant with a smaller ice storage.

#### (4) Management aspect

The locations of BFAR IPCS were often determined with no regard to the nationwide MFP system, resulting in the isolation of the ice plants and cold storages from the related MFP. This may present a big problem in ensuring an effective link between the BFAR IPCS and MFP.

The following various management systems of ice plants and cold storages were found in private enterprises:

Ownership and management: Local owner operators or local managers hired by non-resident owners

- Functions:
- (i) Only ice plant and cold storage
  - (ii) Ice/fish transport and machine repairing facilities in addition to (i)
  - (iii) Fish processing plant, wharf and fish carrier vessels in addition to (ii)
  - (iv) Self-supply of energy and other industrial activities in addition to (iii)

## 7. Supply and Demand for Fish

### (1) Socio-economic framework

GDP for 1983 amounted to  $100 \times 10^9$  pesos at the constant price of 1972, showing an annual growth rate of only 1.1% over the previous year. The Revised Five Year Plan supposes the negative growth rate from 1983 to 1984, but forecasts a gradual increase up to 3.8% from 1986 to 1987. In the Revised Plan the average annual growth rate of GDP during the Plan period from 1983 to 1987, was estimated at 0.8%, which is much smaller than that given in IFDP.

For the projection of fish demand in the study, therefore, the lower economic growth rate recently disclosed by NEDA and as given below as applied.

	1983	1990	2000	Annual growth rate (%)	
				1983–1990	1990–2000
GDP ( $10^9$ pesos)	100	116	168	2.1	3.8
Population ( $10^6$ )	52	62	75	2.4	2.0
Per Capita GDP ( $10^3$ pesos)	1.9	1.9	2.2	-0.3	1.7

Remarks: at the constant price of 1972

### (2) Demand and supply

Demand and supply of fish were projected as given below;

	Quantity (10 <sup>3</sup> MT)			Annual growth rate (%)	
	1983	1990	2000	1983-1990	1990-2000
1. Domestic consumption 1)	1,582	1,937	2,475	2.9	2.5
2. Export (plus) 2)	57	98	190	8.0	6.9
3. Import (less) 2)	29	34	31	2.2	-0.7
4. Domestic supply 3)	1,611	2,001	2,634	3.1	2.8

Remarks: 1) Projected based on the population growth rate and the growth rate of per capita GDP.  
2) Projected based on the past external trade of fish.  
3) The size of domestic fishery production

### (3) Fish production by sub-sector

Fish production in capture fisheries was projected based on the following:

- (i) The government promotion policy indicated in IFDP
- (ii) Maximum potential yield within the Exclusive Economic Zone (EEZ)
- (iii) Recent trends of fish catch according to BFAR statistics

Thus, in the present study the domestic supply of fish, i.e., 2,001 and 2,634 thousand tons are regarded as target production figures for 1990 and 2000 respectively.

The allocation of the target production figures to each sector of the fishery was made primarily in consideration of the estimated potentials as follows:

- (i) For both marine commercial and municipal fisheries: Potential as given in IFDP proposed by FIDC.
- (ii) For inland municipal fishery in Laguna de Bay : Potential estimated by International Center for Living Aquatic Resource Management (ICLARM).
- (iii) For inland municipal fishery for other waters : Standard potentials as often being used for tropical rivers and lakes
- (iv) For aquacultures : Maximum potential yield as given in IFDP proposed by FIDC

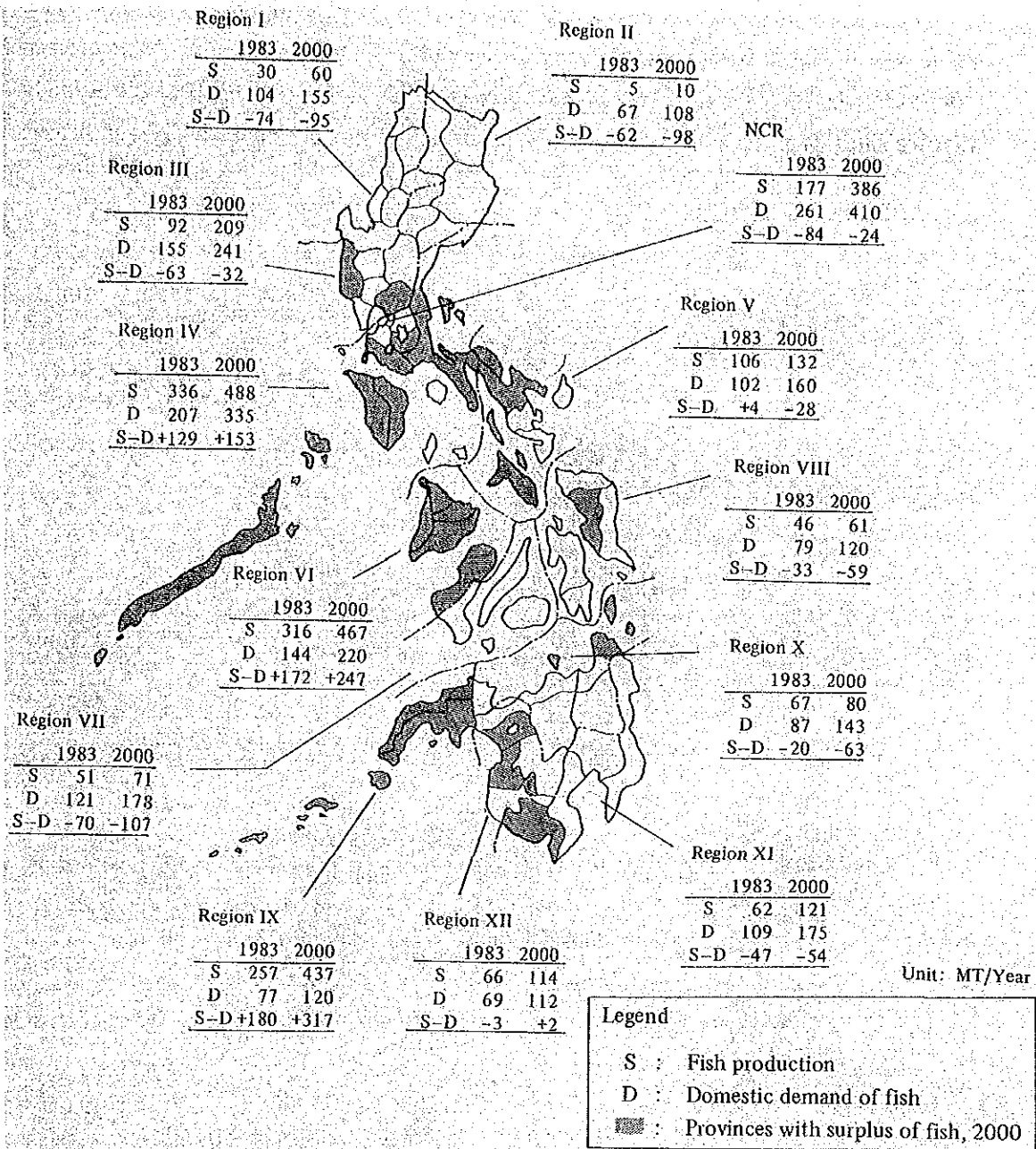
The above materials suggest that both the traditional commercial and the marine municipal fisheries may not have a good potential to increase the production, while both the oceanic commercial fisheries and aquaculture particularly brackish water fishpond culture may have a good possibility to increase their production. Above all, fishery production by sub-sector for 1990 and 2000 was projected as follows:

Sub-sector	Quantity (10 <sup>3</sup> MT)			Annual growth rate (%)	
	1983	1990	2000	1983-1990	1990-2000
1. Commercial fisheries	519	638	889	3.0	3.4
(1) Traditional	479	556	671	2.1	1.9
(2) Oceanic	40	82	218	10.8	10.2
2. Municipal fisheries	810	914	1,006	1.8	1.0
3. Aquaculture	282	448	739	6.9	5.1
Total (Domestic supply)	1,611	2,001	2,634	3.1	2.8

#### (4) Supply and demand gap of fish by Region and by Province

Regional or provincial gap of fish supply and demand situation may become a crucial problem over the period of 1983 and 2000. How to ensure effective transportation and distribution of fish between surplus areas and deficit areas will be a critical issue, as such area gaps will widen towards 2000. The Figure in the next page indicates the surplus or deficit of fish in various Regions and provinces by the year 2000.



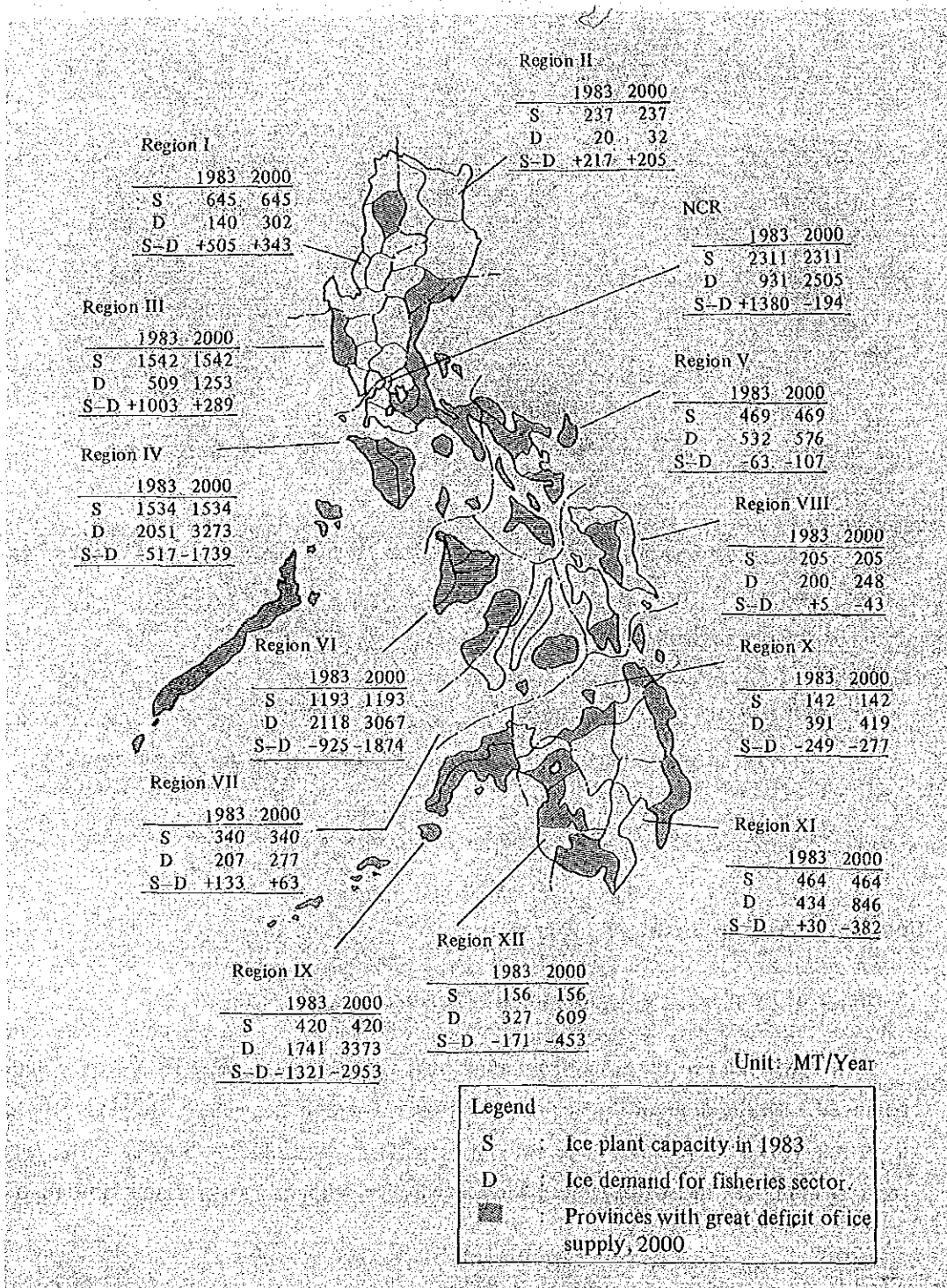


## 8. Shortage of Ice Plants and Cold Storages

### (1) Shortage of ice plants by Region and by Province

In 1983, the supply of ice from existing ice plants to the fisheries sector was almost balanced with the demand for ice if the nation was taken as a whole. However, there was a great surplus or deficit of ice supply depending on Regions. Supply of ice was extremely abundant in Luzon Island, while it was very short in Visayas and Mindanao.

Ice surplus in NCR was extremely high in 1983. Thus, without any increase of ice plant capacities the supply and demand of ice will be almost balanced in NCR even in 2000. On the other hand, if there is no increase in ice plants in other areas, it is likely that ice shortage at regional and provincial level will become critical issues as seen below.



## (2) Requirements of cold storages

Considering the government promotion policy for fish export, it has been projected that  $125 \times 10^3$  tons of fresh fish could be exported in 2000. The Government of the Philippines has established in line with IFDP cold storages through the schemes of NFPC, BFAR IPCS and Iloilo Fishing Port Complex and they are already operated partly. However the operational ratio of the existing cold storages is extremely low in both private and public sectors, because of consumers' little preference of frozen fish and because of inadequate cold chain facilities linking fish production and consumption centers in the country.

However, for the significant seasonal gap of supply and demand of fish, the surplus of fish caught during peak seasons will have to be stored and marketed during lean periods. It is anticipated that consumers will turn to frozen fish during the shortage period. In 1983, fish surplus in the domestic market was estimated to be  $120 \times 10^3$  tons during the January to July period, while the deficit was  $89 \times 10^3$  tons during the period from August to December. Thus, it appeared that there will be a surplus of about  $31 \times 10^3$  tons of fish in a year. Therefore, additional freezers with a capacity of 29 tons/day and cold storages with a capacity of 2,505 tons will be required by 2000.

## 9. Selection of Priority Areas

For the economy of the operation of IPCS as pointed out in a. of (3) of 6.2 of 6 above, many of IPCS sites proposed by PFDA are grouped into several zones, in order that each zone may have a center with an ice plant and several sub-centers with ice storages only. Both the center and sub-centers correspond more or less to the proposed IPCS sites. For the remaining proposed IPCS sites which are located outside the zones, independent prototype ice plants are distributed according to the necessity. The former is called "zone system" and the latter "prototype system" in this report.

Selection of areas for the zone system and sites for the prototype system was done for the project area, which excludes the areas covered by NFPC, FPP I/II, NPFDP and NFDP projects. Priority provinces were determined according to such criteria as the extent of shortage of ice plants, the scope of ice marketable area, the degree of internal transportation system developed and so on. As a result of this, 13 priority provinces were determined. In principle, a zone was formed for the area of each priority province so determined. However, some of neighbouring provinces were grouped so as to trade them as a single zone.

Based on the above criteria, 11 priority zones and 52 prototype sites have been selected in the project area as shown in the figure given right after the cover page of the summary. These 52 prototype sites have been selected based on the list of 101 sites proposed by PFDA.

For each zone so formed, the location of a zone center was identified according to the selection criteria such as fish landing, ice shortage, absence of private ice plants and cold storages and advantage of the site as a fish/ice distribution center to serve a wide market area.

## 10. Formulation of IPCS System

### (1) Additional requirement of the ice plants in the project area

In a table below, "supply of ice" refers to the daily capacity of ice plants for the fishery sector in 1983, whereas "demand for ice" refers to the daily average demand for ice required for fresh fish in the respective year. Therefore, the "balance" between those two figures indicates either the surplus or deficit in daily ice supply. As seen in the table, there may occur a great shortage in ice supply in 1990 and 2000 particularly in the project area, if no additional ice plant is constructed after 1983.

Unit: tons/day

	1983		1990		2000	
	Supply of ice	Demand for ice	Balance	Demand for ice	Balance	
Project Area	2,255	5,465	-3,210	6,595	-4,340	
Other Areas	7,403	7,335	+ 68	10,185	-2,782	
Total	9,658	12,800	-3,142	16,780	-7,122	

Remarks: Any negative figure under "balance" indicates additional requirements of ice plants in terms of the rated capacity.

### (2) Types of ice

Types of ice have been determined by the following economic, financial and technical criteria:

- a. For the long distance transportation of ice, block ice is basically superior to non-block ice such as flake, plate and tube ice.

- b. For small-scale ice plants, non-block ice is economically more viable than block ice.
- c. For strong large quantity of ice in storage rooms, non-block ice is inferior as it is quite difficult to prevent it from fusion when stored over a long period. It also causes complications in the conveying system when small volume of ice has to be supplied to many small consumers.
- d. For storing the same quantity of ice, non-block ice requires more space than block ice. Thus, the construction cost of non-block ice plants will be more expensive than that of block ice plants.

For the above reasons, it is generally recommended that the ice plants in the zones should produce exclusively block ice.

For the above reasons, it is generally recommended that the ice plants in the zones should produce exclusively block ice.

The prototype system is effective at remote areas, in which the zone system is not introduced. In these area, ice is mainly used for fishing without any significant volume of ice being distributed to the farther areas. Non-block ice will be more viable than block ice in case of the mini-prototype plants of 5 tonners and below, whereas the latter may be financially superior to the former for the prototype plants of 10 tonners and above.

However, for the final decision of ice type, a further study should be made, taking into account users' preferences and other factors.

### (3) Capacity of IPCS

#### a. Zone system

The optimum capacity of each of the ice plants and cold storages have been determined based mainly on the seasonal fluctuation of fish supply.

The ice plant capacity for the zone system will be increased by steps to meet the increased ice demand by 1990 and 2000 in accordance with their requirements. Conversely, cold storages with freezers will be completed between 1990 and 2000 so as to meet the possible demand for frozen fish by 2000.

b. Prototype system

The size of prototype ice plant will be classified into five categories of 1, 3, 5, 10 and 15 tons/day. The prototype sites will be composed of 19 sites for the 1 ton plants, 6 sites for the 3 tons, 3 sites for the 5 tons, 6 sites for the 10 tons, 14 sites for the 15 tons and 1 mobile plant serving the 4 neighbouring sites. All of the prototype plants will be constructed by 1990 as no significant increase of ice requirements will likely occur thereafter.

c. Planned capacity of additional IPCS

The planned capacity of additional IPCS to be constructed by 2000 in the project area will be as follows:

	By 1990				1991 - 2000				Total			
	IM	IS	FR	CS	IM	IS	FR	CS	IM	IS	FR	CS
<b>1. Zone System</b>												
(1) Zone Center	492	5,665	0	0	53	635	29	2,760	545	6,300	29	2,760
(2) Sub-center	0	1,423	0	0	0	0	0	0	0	1,423	0	0
Sub-total	492	7,088	0	0	53	635	29	2,760	545	7,723	29	2,760
<b>2. Prototype System</b>												
(1) 1 tonner	19	190	0	0	0	0	0	0	19	190	0	0
(2) 3 tonner	18	180	0	0	0	0	0	0	18	180	0	0
(3) 5 tonner	15	150	0	0	0	0	0	0	15	150	0	0
(4) 10 tonner	60	600	0	0	0	0	0	0	60	600	0	0
(5) 15 tonner	210	2,100	0	0	0	0	0	0	210	2,100	0	0
(6) 1 tonner (Mobile)	1	6	0	0	0	0	0	0	1	6	0	0
Sub-total	323	3,226	0	0	0	0	0	0	323	3,226	0	0
<b>Total</b>	<b>815</b>	<b>10,314</b>	<b>0</b>	<b>0</b>	<b>53</b>	<b>635</b>	<b>29</b>	<b>2,760</b>	<b>869</b>	<b>10,949</b>	<b>29</b>	<b>2,760</b>

Remarks 1) IM: Ice Making Plant, IS: Ice Storage, FR: Freezer, CS: Cold Storage.

2) Unit: tons/day for IM and FR, tons for IS and CS

3) Capacity of ice making plants and ice storages includes 20% allowance for other sectors such as home consumption and commercial use, while cold storage includes 10% allowance for agriculture products.

(4) Major component of the system

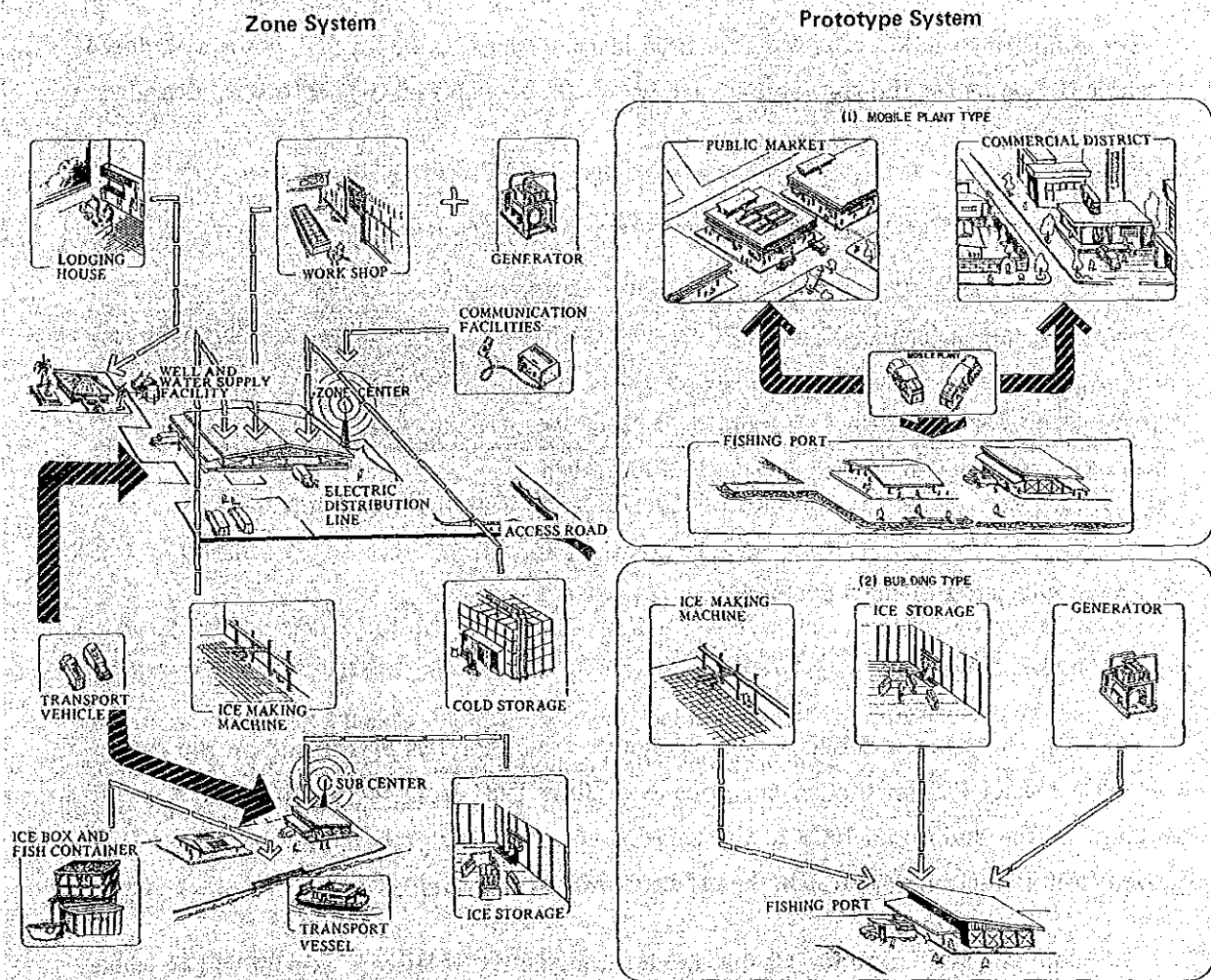
a. Zone system

The zone system is an integrated IPCS setup consisting of an ice plant to be established at a zone center and an ice storage to be set up at each sub-center near

fish landing sites or MFP. Cold storages will be built only at some selected zone centers.

Supporting facilities such as ice transport vehicles/vessels, a workshop with sufficient supply of spare parts and communication facilities will be provided to all zone centers, while there will be office rooms and communication facilities at all sub-centers.

Consolidation of land, water and electricity supply facilities and access roads will be implemented in each zone center. All sub-centers will be installed with electric wires and parking lots.



## b. Prototype system

The prototype system will be composed of ice plants, ice storages, generators, stores to keep spare parts and office rooms.

Infrastructures such as land, water and power supply facilities, access roads etc., should be fully developed by local governments and/or relevant agencies prior to the establishment of the prototype IPCS system in the area.

## 11. Cost Estimation

The construction cost was estimated on the basis of procurement through international competitive bidding at the constant price as of June 1984.

The total construction cost was estimated at the order of  $1,031 \times 10^3$  pesos, composed of  $640 \times 10^3$  pesos for the zone system and  $391 \times 10^3$  pesos for all the prototype sites.

Unit: Million pesos

System	By 1990	1990 2000	Total		
			Foreign Portion	Local Portion	Total
Zone system	479	161	554	86	640
Prototype	391	—	360	31	391
Total	870	161	914	117	1,031

Remarks: Estimated at the constant price as of June, 1984

## 12. Economic and Financial Evaluation

### (1) Economic evaluation

To assess the project viability rough economic evaluation has been made on the nationwide IPCS Master Plan at the current price as of June 1984 from the viewpoint of the contribution of the additional IPCS to the national economy. Major economic benefits will be derived from reduction of fish spoilage and upgrading of fish quality.

The economic evaluation reveals that the Nationwide IPCS Network System will be viable over the project life from 1989 to 2020, assuming that the construction of IPCS network systems will commence in 1989 and that the facilities will last for some 30 years up to 2020.



The net present value (NPV) i.e., the total accumulated incremental national income from 1989 to 2020 will be  $641 \times 10^6$  pesos at the current price as of June 1984. The benefit/cost ratio (B/C) is 1.50 and the economic internal rate of return (EIRR) was calculated at 33.9% which is much higher than the interest rate of long term loans in the Philippines.

The following benefits are also expected:

- (i) Increase of income of municipal fishermen
- (ii) Increase of employment opportunities
- (iii) Effective use of MFP

The project will also contribute partly to and motivate the improvement of fish and ice handling, development of fishermen's association, the overall development of rural areas as well as in nutritional improvement of consumers in general.

## (2) Financial evaluation

A preliminary financial evaluation has also been done to find out the profitability and fund requirements of the project through income statements and cash flow analysis.

The zone system can be sound and viable, assuming that the price of ice may increase in relation to the up-grading of fish quality through sufficient supply of ice. However, the prototype system will not always be financially viable because of the relatively high construction and operational costs in relation to the demand for ice.

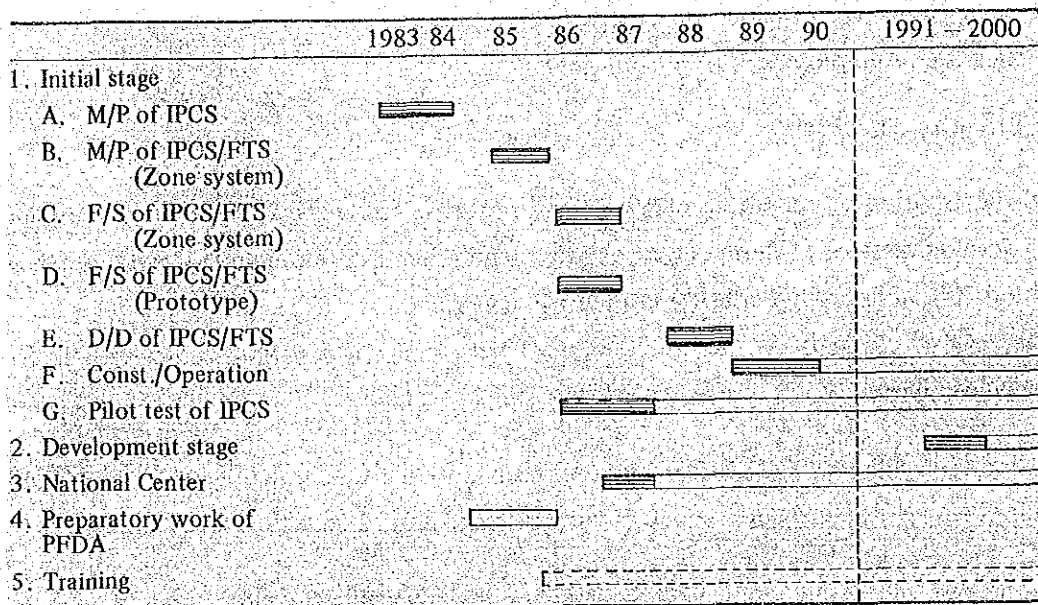
Since IPCS is only a part of an integrated program composed of MFP, IPCS and FTS, its financial viability might improve with the inclusion of MFP and FTS.

Both of the zone and the prototype systems should be constructed to achieve the national target, i.e., attainment of food self-sufficiency and income increase of municipal fishermen, even if the prototype system is not viable from the financial point of view. If the priority of the Government of the Philippines is placed on financial viability rather than on the achievement of the said national target, the following alternatives may be considered:

- (i) To delay the construction of the prototype system by 10 years.
- (ii) To construct 15 ton ice plants only.
- (iii) To exclude one (1) ton ice plants.
- (iv) To reduce construction costs by using indigenous building materials

### 13. Implementation Program

The whole IPCS system is expected to be completed by the target year of 2000. It is tentatively recommended that the Government of the Philippines will follow a stage-wise construction schedule including the initial stage up to 1990 and the development stage from 1990 to 2000 in accordance with the following work schedule:



Remarks: Preparatory work of PFDA includes organizing, financing and training of personnel.

▬▬▬ : Before operation (study and construction)

▬▬▬ : Operation

M/P: Master Plan, F/S: Feasibility Study, D/D: Detail Design

### 14. Conclusions and Recommendations

PFDA is expected to be the central executive body to monitor operational and financial conditions of the Nationwide IPCS Network System and individual bodies of IPCS.

Instead of PFDA or its subsidiary corporation, some organizations of the private sector which may act as a possible managing body for IPCS should be established, considering the recent change in the government policy to give the private sector the opportunity to manage and operate business enterprises similar to IPCS.

Regarding the management of IPCS, the following 3 options are considerable:

- (i) joint management through share-holding
- (ii) lease to the private sector
- (iii) lease-purchase to private sector

In any of the options, participation of fishermen concerned is expected to be highly encouraged for the management of IPCS.

PFDA may consider the establishment of a National Center for IPCS by expanding its functions so as to include the following elements:

- (i) training of IPCS plant managers and engineers
- (ii) centralization of information and communication of fish and ice distribution, and
- (iii) monitoring of financial and operational performances of IPCS in both zone and prototype systems.

It is recommended that, following the present study, measures as listed below be taken up by the government of the Philippines.

- a. According to I/A, the present study has been concentrated on the establishment of the IPCS system alone. However, the system is to be expanded and to be integrated with MFP, FTS and any other relevant projects. For these reasons, it is recommended that, following the present study, preparation of an expanded master plan in which all the above projects are incorporated should be started immediately after the present study.
- b. To accelerate the implementation of the project, it is recommended that feasibility studies be conducted in areas where necessity of IPCS is most urgently felt by the Government, simultaneously with the preparation of the expanded master plan.
- c. Pilot test plants should be established in one representative zone and in a few existing or priority prototype sites to develop the management system of the project.
- d. Training should be started before the plants become operational to meet the need for plant managers, engineers and other personnel. Such training must be undertaken regularly and periodically.

e. In relation to IPCS/FTS projects, studies should be made on:

- (i) development of fish handling systems to improve the quality of fish at various stages, e.g., fishing, marketing and distribution
- (ii) development of the cold storage system in consumption centers
- (iii) development of the transportation system from fish production centers to consumption areas
- (iv) use of IPCS for the sectors other than fisheries to raise their efficiency.

f. Major fields of overseas training

Training abroad of appropriate personnel is recommended for the following fields:

- (i) Fishery resources management
- (ii) Management of fisheries infrastructure preferably by fisheries cooperatives
- (iii) Refrigeration engineering
- (iv) Plant operation and maintenance
- (v) Fish handling, processing and quality control

## REFERENCES

1. Project Proposal for Ice Plant and Cold Storage System Related to the Municipal Fishing Port Development Program, November 1982, MNR
2. Municipal Fishing Port Development Project - Status Report, November 1983, PFDA
3. Municipal Fishing Ports Development Project - Schedule of Fund Allocation per Port per Region, CY 1980 - 1983, PFDA
4. Municipal Fishing Ports Development Project - Fund Releases per Site, CY 1983, PFDA
5. Municipal Fishing Ports Development Program - Project Site, 1980 - 1983, PFDA
6. Nationwide Tertiary Ports Development Program - Project Proposal, 1983, MPWH
7. Bicol Fishing Port Network - Update Studies, August 1983, PMO - FP, MPWH
8. Pangasinan Fishing Port Network - Update Studies, August 1983, PMO - FP, MPWH
9. Capacity of the Fishing Port Complex Facilities of Package II, December 1983, PMO - FP, MPWH
10. Navotas Fishing Port and Fish Market (NFPFM) Ice Plant and Cold Storage Facility - Executive Summary, December 1983, PFDA
11. Record of Discussions on Nationwide Tertiary Ports Development Program, 1983, Fact - Finding Mission of the ADB
12. Iloilo Fishing Port - Comparison of Refrigeration Facilities, January 1983, PMO - FP, MPWH
13. Sual Fishing Port - Comparison of Refrigeration Facilities, December 1982, PMO - FPP I, MPWH
14. Lucena Fishing Port - Comparison of Refrigeration Facilities, December 1982, PMO - FPP I, MPWH
15. Camaligan Fishing Port - Comparison of Refrigeration Facilities, December 1982, PMO - FPP I, MPWH

16. Zamooanga Fishing Port – Comparison of Refrigeration Facilities, January 1983, PMO – FP, MPWH
17. MPWH Infrastructure Atlas, 1983, MPWH
18. Philippine Annual Climatological Review for 1975, 1981, PAGASA
19. Rated Schedule in Use as of December 31, 1983, NEA
20. List of Cooperatives-Energized Municipalities as of November 1983, NEA
21. Status of Energization, December 1982, NEA
22. Groundwater of the Philippines, 1980, NWRC
23. Integrated Fisheries Development Plan for the 1980's, October 1981, FIDC
24. Technical Specifications of Navotas IPCS Facility, December 1978, PFDA
25. 1981 MPW Infrastructure Program, November 1980, MPW
26. CY 1982 Infrastructure Program, October 1981, MPWH
27. 1983 Infrastructure Program, by Region, November 1982, MPWH
28. 1984 MPWH Infrastructure Program, by Region, December 1983, MPWH
29. Project Status Report as of December 1983, MPWH (computer list)
30. Municipal Fishing Port Development Program – Infrastructure Program, CY 1984, PFDA (final list of recommended sites)
31. MPWH CY 1981 – 1982 – 1983 Infrastructure Program – Progress Report as of December 1983, BC, MPWH
32. 1983 – 1992 Medium Term Infrastructure Program, February 1984 Planning Service, MPWH (Alternative I - High)
33. Municipal Fishing Port Development Program – Briefing Kit. December 1983, PFDA
34. PFDA IPCS Final Report, December 1982, IPCS Task Force, PFDA
35. PFDA IPCS Status Report, December 1983, IPCS Task Force, PFDA

36. Nationwide Master List of IPCS as of January 1982, MNR/BFAR
37. List of the Existing Private IPCS in Metro Manila, January 1984, APICSO
38. List of the Existing Private IPCS in Luzon, February 1984, APICSO
39. Brief History of the IPCS Project, January 1984, PFDA
40. Background of BFAR IPCS, February 1984, PFDA
41. Ice in Fisheries, FAO Fisheries Report No. 59 (Revision I), January 1975, FAO
42. An Introduction to Fish Handling and Processing, I.J. Clucas and P.J. Sutcliffe, February 1981, Tropical Products Institute (partly obtained)
43. MFPDP Files, 1980 – 1983, Planning and Development Department, PFDA
44. Preliminary Data on the Proposed IPCS System, 1983 MNR/PFDA
45. Inventory of Fishery Units Household Survey, December 1977, MNR/BFAR/FIDC/NEDA/NCSO
46. Census of Fisheries, 1980, NCSO (special release)
47. Philippine 1980 – Population, Land Area and Density 1970, 1975 and 1980, NCSO
48. Fisheries Statistics of the Philippines, 1976 – 1982, BFAR
49. Preliminary Data of the 1983 Fisheries Statistics of the Philippines, BFAR
50. Expanded Fish Production Program, 1983 – 1987 Five-year Plan, 1983, BFAR
51. Expanded Fish Production Program, Operational Plan, 1983, BFAR
52. A Preliminary Report on the 1980 Workshop on the Assessment of Marine Fishery Resources, 1980, FIDC/NRMC
53. Record of Monthly Unloadings and Wholesale Price by Fish Type in Area Operation Center, NCR, REGION I, IV, V, VI and IX, 1980 – 1983, PFDA
54. Five-year Philippine Development Plan, 1983 – 1987, May 1982, NEDA
55. Preliminary Revised Five-year Development Plan, August 1984, NEDA (not yet published)

56. 1983 Philippine Statistical Yearbook, June 1983, NEDA
57. Population Projection by Single Year Interval and by Region, 1960 – 2030, NEDA (not yet published)
58. Philippine Economic Indicators, August 1984, NEDA
59. Philippine Ice and Cold Storage Industry Study, December 1982, DBP
60. Nationwide Nutrition Survey Philippines 1982, 1984, FNRI (partly obtained)
61. PFDA IPCS Fact Sheets, August 1983, PFDA
62. Philippine Fish Marketing and Distribution Study. Vols. 1, 2, 4 and 5 (A and B), July 1975, BFAR
63. Fish Marketing in Three Landing Areas – Iloilo, Bacolod and Zamboanga, February 1978, BAECON/BFAR
64. Locally Transported Fish and Fishery Products, 1983, BFAR
65. Fish Distribution Study, 1981 and 1982, PFDA
66. Presidential Decree No. 704
67. Presidential Decree No. 977
68. Presidential Decree No. 1700
69. Executive Order No. 772
70. New PFDA Organizational Chart, 1984, PFDA (As approved by the Management Office, CY 1983)
71. Staffing Pattern of the PFDA for the Calendar Year 1983, Office of Compensation and Classification
72. National Appropriation Act, 1981 – 1984, Office of Budget and Management
73. Staff Appraisal Report, Philippines National Fisheries Development Project, March 1981, IBRD
74. Appraisal of the Northern Palawan Fisheries Development Project in the Republic of the Philippines, September 1979, ADB



75. Navotas Fishing Port and Fish Market Ice Plant and Cold Storage Facility; Marketing Plan, 1982, PFDA
76. Socio-economic and Marketing Study of Municipal Fishing Households, Bayawan, Negros Oriental, Philippines, September 1983, BFAR and South China Sea Fisheries Development and Coordinating Programme
77. Report of the FAO World Conference on Fisheries Management and Development, Rome, 27 June – 6 July 1984, FAO



ANNEX 1 - IMPLEMENTATION ARRANGEMENT

IMPLEMENTING ARRANGEMENT ON TECHNICAL COOPERATION  
BETWEEN JAPAN INTERNATIONAL COOPERATION AGENCY  
AND MINISTRY OF NATURAL RESOURCES FOR THE STUDY  
OF THE MASTER PLAN FOR THE NATIONWIDE ICE PLANTS  
AND COLD STORAGE NETWORK SYSTEM IN THE  
REPUBLIC OF THE PHILIPPINES

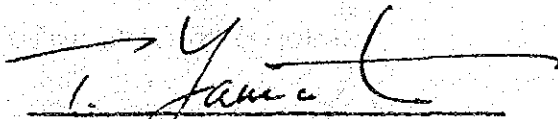
Agreed upon by:

JAPAN INTERNATIONAL COOPERATION AGENCY

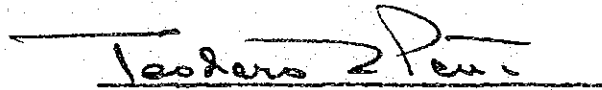
AND

MINISTRY OF NATURAL RESOURCES

September 1, 1983  
at Quezon City, Philippines

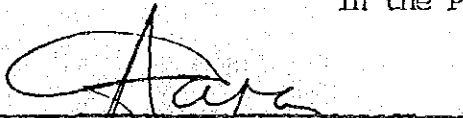


Prof. & Dr. Tadashi Yamamoto  
Leader of the Implementing  
Arrangement Team, Japan  
International Cooperation Agency

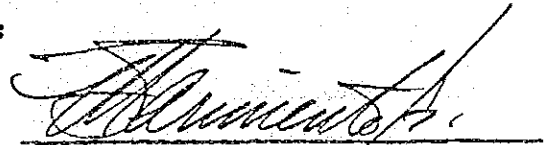


Hon. Teodoro Q. Peña  
Minister of Natural Resources  
Republic of the Philippines

In the Presence of:



Asst. Min. Antonio Y. Capay  
Ministry of Natural Resources  
Republic of the Philippines



Att. Malcolm I. Sarmiento, Jr.  
Assistant General Manager for  
Atty. Benito Q. Bengzon  
General Manager, Philippine  
Fisheries Development Authority  
Philippines

## I. INTRODUCTION

In response to the request of the Government of the Republic of the Philippines (hereinafter referred to as GOP), the Government of Japan (hereinafter referred to as GOJ) has decided to conduct a study of a master plan for the nationwide ice plants and cold storages network system (hereinafter referred to as the Study of IPCS), and exchanged the Notes Verbales with GOP concerning the implementation of the Study.

The Japan International Cooperation Agency (hereinafter referred to as JICA), the official agency responsible for the implementation of technical cooperation programs of GOJ, will undertake the Study, in accordance with the relevant laws and regulations in force in Japan.

On the part of GOP, the Ministry of Natural Resources, through the Philippine Fisheries Development Authority (hereinafter referred to as MNR-PFDA) shall act as the counterpart agency to the Japanese study team (hereinafter referred to as The Study Team), and also the coordinating body in relation with other governmental and non-governmental organization concerned for the smooth implementation of the Study.

This document constitutes the implementing arrangements between JICA and MNR-PFDA under the above-mentioned Notes Verbales exchanged between the two governments.

## II. IMPLEMENTATION OF THE STUDY

The Study shall be implemented in accordance with the Scope of Work attached herewith (See Appendix I).

## III. UNDERTAKING OF GOP

In accordance with the Notes Verbales exchanged between GOJ and GOP, GOP shall accord privileges, immunities and other benefits to the Study Team and shall take necessary measures to facilitate smooth implementation of the study through the authorities concerned.

T. G.

Toshio 2 Pen.

A

Arminio

A-2

M

1. The MNR-PFDA shall be responsible for dealing with claims which may be brought about by third parties against the members of the Study Team and shall hold them harmless in respect to claims or liabilities arising in the course of or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims or liabilities arise from the gross negligence or willful misconduct of the above-mentioned members.
2. The MNR-PFDA, at its own expense, in cooperation with other agencies concerned, shall provide the Study Team with the following:
  - (1) Available data and information needed for the Study.
  - (2) Project officer and assistant project officer on full time basis for the whole period of the Study.
  - (3) Counterpart personnel in the following field whenever their participation is required.
    - a. Fishery resources
    - b. Fishery-economics
    - c. Fish marketing
    - d. Fishery institutions
    - e. Ice Plant and Cold Storage
    - f. Civil engineering
  - (4) Suitable office space with necessary equipment.
  - (5) Credentials or identification cards for the members of the Study Team.
  - (6) One (1) service vehicle with driver.
3. The MNR-PFDA shall make necessary arrangements with the governmental and non-governmental organizations concerned for the following:
  - (1) To secure the safety of the Study Team
  - (2) To exempt the members of the Study Team from taxes, duties, fees and other charges on equipment, machinery and other materials brought into the Philippines necessary for the conduct of the Study.

*T. J.*  
*[Signature]*

*Teodoro Z. [Signature]*

- (3) To exempt the members of the Study Team from income tax and charges or any kind imposed on or in connection with the allowances remitted from abroad.
  - (4) To secure permission for entry into private properties or restricted areas for the conduct of the Study.
  - (5) To provide medical facilities as needed, however, any expense will be chargeable to the members of the Study Team.
  - (6) To arrange the hiring of additional personnel as needed, however, wages will be chargeable to JICA funds.
  - (7) To secure permission to take all data and documents related to the Study out of the Philippines to Japan by the Study Team.
  - (8) To arrange accommodations required during field work however its expenses will be chargeable to the members of the Study Team.
4. MNR-PFDA shall undertake, in close collaboration with the Study Team, the collection of data and information necessary for the assessment of the existing IPCS in the vicinity of the 100 proposed sites.

#### IV. UNDERTAKING OF GOJ

In accordance with the Notes Verbales exchanged between GOJ and GOP, GOJ shall take necessary measures through JICA for the implementation of the Study.

- (1) To dispatch, at its own expense, the Study Team to the Republic of the Philippines to carry out all activities specified in the scope of work (See Appendix 1).
- (2) To pursue technology transfer to the Philippine counterpart personnel in the course of the Study.

*T. G.* *Member 2 Team*  
*[Signature]*  
*A*

SCOPE OF WORK FOR THE STUDY OF THE MASTER PLAN FOR  
THE NATIONWIDE ICE PLANTS AND COLD STORAGES NETWORK SYSTEM

X. Objective of the Study :

The objective of the study is to formulate the master plan for the nationwide IPCS network system, which may be completed during the period 1985 to 2000, for the purpose of contributing to the effective utilization of fishery products in the Philippines.

IX. Scope of the Study :

The study shall be conducted in two phases:

1. Phase I - Preparation of Preliminary Master Plan :

1.1 Review of the PFDA Preliminary Study of IPCS ;

1.2 Collection and collation of data needed for the Study ;

1.3 Field Survey I :

To be acquainted with overall situation of major areas/sites and to collect additional data and information lacking in 1.1 and 1.2 above.

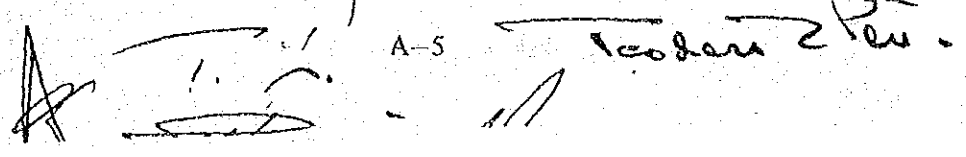
1.4 Assessment of the existing IPCS system in terms of :

- ice supply-demand analysis ;
- types of ice products being produced ;
- pricing system/structure ;
- availability of water and power ;
- <sup>(and)</sup> rated (official) and operating capacities.

1.5 Formulation of a preliminary master plan :

A preliminary master plan for the nationwide IPCS network system will be prepared based on the results of the above-mentioned studies taking into account the following factors for each region or appropriate area:

- (X) Future demand and supply projection for ice and cold storage requirement in each proposed site ;

 A-5  
Rodrigo P. Per.

- (2) Implementation schedule of municipal fishing port development program ;
- (3) Accessibility to the market for ice ;
- (4) Availability of raw materials (water, electricity, etc.)
- (5) Economic and financial viability.

## 2. Phase II - Finalization of Master Plan :

### ~~2.1~~ Field Survey II :

To ascertain the appropriateness of the preliminary master plan as studied in 1.5 above, a further field survey will be made.

### ~~2.2~~ Formulation of the Master Plan :

The master plan of the nationwide IPCS network system will be prepared with respect to the following four (4) items taking into consideration economic, financial, and technical factors as listed under 1.5 above.

- (1) Establishment of several prototypes of IPCS suited to the different conditions, specifying capacities, type of ice, ice transportation means, etc.;
- (2) Determination of the priority for each of the proposed IPCS site, depending on urgency of need;
- (3) Formulation of the final master plan, based on the study results in (1) and (2) above;
- (4) Recommendation for the effective operation of the nationwide IPCS network system.

## III. Study Schedule

The Study will be executed in accordance with the schedule as indicated in Appendix II.

*T. G. Anderson*  
*A. J. [Signature]*



#### IV. Reports


The following reports shall be submitted during the study period.

- (1) Inception Report (10 copies): Within one (1) month after the commencement of the Study
- (2) Interim Report (20 copies): Within one (1) month after the end of the phase I study
- (3) Draft Final Report (20 copies): Within two (2) months after the end of the Phase II study
- (4) Final Report (50 copies): Within two (2) months after receiving the comments of MNR on Draft Final Report,

*T. G. ...*      *Reshoro 2 Rev.*  
*A*      *Dr. Prasad*

Tentative Schedule

Work Item	1983			1984			1985														
	Year	Month	Month	Month	Month	Month	Month	Month	Month												
(Philippine side)																					
Works relating to the inventory list																					
(Japan side)																					
1. Phase I																					
Assembly of data, Assessment of the existing IPCS, Review of the Preliminary Study of IPCS and Field Survey I																					
Formulation of a preliminary master plan																					
2. Phase II																					
Field survey II and Formulation of a master plan																					
3. Reports																					

Legend:  in the Philippines  
 in Japan  
 Inception report  
 Interim report  
 Comment report  
 Draft final report  
 Final report

*(Signatures)*

MINUTES OF THE MEETING

In concluding the Implementing Arrangement for the study of the master plan for the Nationwide Ice Plants and Cold Storages Network System in the Republic of the Philippines, the JICA Implementing Arrangement Team (JICA Team) and the MNR-PFDA exchanged their views on the following points:

1. Office Space for the Study Team

The MNR-PFDA agreed to provide at least desks, chairs and filing cabinets, and also to make every possible effort to provide a telephone set.

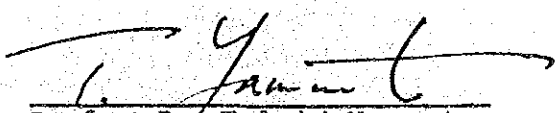
2. Technology Transfer

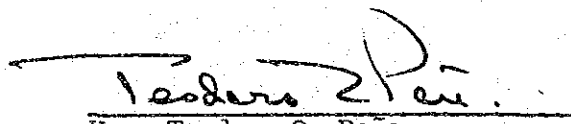
As far as the Study of IPCS is concerned, the meaning of "technological transfer" as stated in (2) of IV of the Implementing Arrangement is understood by MNR-PFDA and the JICA team as follows:

To effect transfer of technical knowledge by permitting active participation of local counterpart staff and making available to them relevant information and techniques pertaining to the study.


3. To further implement the transfer of technical knowledge as stated above, the MNR-PFDA earnestly proposed to allow at least two (2) PFDA representatives to participate in the master planning work in Japan. In this regard, the JICA Team assured that the proposal will be conveyed to Japanese authorities concerned for consideration.


September 1, 1983  
at Quezon City, Philippines

  
Prof. & Dr. Tadashi Yamamoto  
Leader of the Implementing  
Arrangement Team, Japan  
International Cooperation  
Agency

  
Hon. Teodoro Q. Peña  
Minister of Natural Resources  
Republic of the Philippines

In the Presence of:

  
Asst. Min. Antonib Y. Capay  
Ministry of Natural Resources  
Republic of the Philippines

  
Atty. Malcolm I. Sarmiento, Jr.  
Assistant General Manager for  
Atty. Benito Q. Bengzon  
General Manager, Philippine Fisheries  
Development Authority  
Philippines

IMPLEMENTING ARRANGEMENT ON TECHNICAL COOPERATION  
BETWEEN JAPAN INTERNATIONAL COOPERATION AGENCY  
AND MINISTRY OF NATURAL RESOURCES FOR THE STUDY  
OF THE MASTER PLAN FOR THE NATIONWIDE ICE PLANTS  
AND COLD STORAGES NETWORK SYSTEM IN THE  
REPUBLIC OF THE PHILIPPINES

Negotiating Panel

JICA TEAM

Prof. & Dr. Tadashi Yamamoto	--	Head
Mr. Aritune Furukawa	--	Member
Mr. Kenichi Hamada	--	Member
Mr. Kunihiro Shinoda	--	Member

PHILIPPINE TEAM

Atty. Malcolm I. Sarmiento, Jr.	-	Asst. General Manager PFDA
Mr. Facundo R. Yeneza, Jr.	-	Manager, Planning and Development Department PFDA
Mr. Leonides T. Samaniego	-	Representative, Ministry of Natural Resources
Ms. Victoria Taasan	-	Representative, National Economic and Development Authority
Mr. Nelson M. Davila	-	Chief, Physical Planning Division, PFDA
Ms. Grace G. Santibañez	-	Chief, Corporate Planning Division, PFDA
Mr. Antonio Dagdagan	-	OIC, Institutional Services Department, PFDA
Mr. Rodrigo Bulaon	-	Chief, Engineering and Maintenance Division, Navotas Fishing Port Complex, PFDA
Ms. Linda J. Po	-	Commercial Development Officer, IPCS Task Force, PFDA

## ANNEX 2. LIST OF PERSONS INVOLVED

Name	Specialty	Office & Title
<b>1. Japanese Side</b>		
<b>1.1 Advisory Committee</b>		
(1) Dr. Tadashi Yamamoto (Chairman)		Professor, College of Economics, Nihon University
(2) Mr. Tohru Morikawa		Exec. Director, Japan Marine Products Importers Association
(3) Mr. Aritsune Furukawa		Div. of Statistics, Ministry of Agriculture Forestry and Fisheries
(4) Mr. Junichi Hasegawa		Overseas Economic Cooperation Fund
<b>1.2 Study Team</b>		
(1) Mr. Tateo Kusano	Team Leader	System Science Consultants Inc., Ltd.
(2) Dr. Tamotsu Tomiyama	Fisheries Export	-- do --
(3) Mr. Toshifumi Maruta	Market and Transport Planner	-- do --
(4) Mr. Masanori Doi	-- do --	-- do --
(5) Mr. Teruo Yabana	Plant Engineer -- Design	-- do --
(6) Mr. Soichi Takai	Plant Engineer -- Management	-- do --
(7) Mr. Kyoichi Sugiyama	Architect & Civil Engineer	-- do --
(8) Mr. Nobuo Tsuchihashi	Institutional Expert	-- do --
(9) Mr. Takashi Inoue	Project Economist	-- do --
(10) Mr. Tetsuhiko Hirawasa	Port Planner	-- do --
(11) Mr. Koichi Fukurono	Civil Engineer	-- do --
<b>2. Philippine Side</b>		
<b>2.1 Advisory Committee</b>		
<b>Phase I</b>		
(1) Mr. Antonio Y. Capay (Chairman)		Asst. Minister, MNR
(2) Atty. Malcom I. Sarmiento, Jr.		Asst. General Manager, PFDA
(3) Mr. Felix R. Gonzales		Director, BFAR, MNR
(4) Ms. Elizabeth D. Samson		Exec. Director, FIDC
<b>Phase II</b>		
(1) Atty. Aurora B. Marcos (Chairman)		Asst. Secretary, MAF
(2) Atty. Malcom I. Sarmiento, Jr.		Asst. General Manager, PFDA
(3) Mr. Felix R. Gonzales		Director, BFAR, MAF
(4) Mr. Jesus Alix		Director, BAECON, MAF
(5) Mr. Manuel de Leon		Asst. Director, Agriculture Staff, NEDA
<b>2.2 Coordinator</b>		
Mr. Facundo R. Yeneza, Jr.		Manager, Planning & Development Dept., PFDA
<b>2.3 Counterparts</b>		
(1) Mr. Nelson M. Davila (Leader)		PFDA
(2) Mr. Linda J. Po (Asst. Leader)		PFDA
(3) Mr. Josue D. Agustin		PFDA
(4) Mr. Constante T. Pascua		PFDA
(5) Mr. Teodoro C. Catalla		PFDA
(6) Mr. Rustico R. Castro		PFDA
(7) Ms. Nancy Lynn Estoesta		PFDA
(8) Ms. Ma. Lisa B. Cruz		PFDA
(9) Ms. Nanette Kampitan		FIDC





