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		AC-06	Inlet, Outlet and Openings of Box Culvert
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ABBREVIATION AND UNIT

1. Abbreviations :

ASTM:	American Society for Testing and Materials
AWWA:	American Water Works Association
BM:	Bench Marks
BP:	Beginning Points
DCIP:	Ductile Cast Iron Pipe
EC:	Electrical Conductance
EEA:	Egyptian Electrical Authority
EI:	Environmental Impact Assessment
EIRR:	Economic Internal Rate of Return
EP:	End Points
FRP:	Fiberglass Reinforced Plastic Mortar Pipe
FWSL:	Full Water Supply Level
GIA:	Gross Irrigation Area
GOE:	Government of Egypt
IEC:	International Electrical Commission
IEE:	Institution of Electrical Engineers
IP:	Intersection Points
ISO:	International Standardization Organization
JICA:	Japan International Cooperation Agency
JIS:	Japan Industrial Standard
KM:	Kilo Meter
MCC:	Motor Control Center
MCM:	Million Cubic Meter
MED:	Mechanical and Electrical Department under MWRI
MOAFFJ:	Ministry of Agriculture, Forestry and Fisheries of Japan
MOCJ:	Ministry of Construction of Japan
MSL:	Mean Sea Level
MVA:	Mega Volt Ampere
MW:	Mega Watt
MWRI:	Ministry of Water Resources and Irrigation
NSDO:	North Sinai Development Organization
O/M, O&M:	Operation and Maintenance
P.S.:	Pumping Station
PCCP:	Prestressed Concrete Cylinder Pipe
PMC:	Project Management Committee
PPD:	Project Preparation Department under MWRI
PSC:	Project Steering Committee
PVC:	Unplasticized Polyvinyl Chloride Pipe
REA:	Rural Electrification Authority
RTD:	Resistance Temperature Detector
SP:	Steel Pipe
TDS:	Total Dissolved Solid

USCS: Unified Soil Classification System
VVVF: Variable Voltage Variable Frequency

2. Unit :

°C : degree centigrade
%: percent
cm: centimeter
cm/s: centimeter per second
Fed.: Feddans
ha: hectare
hp: horsepower
hr: hour
kg: kilogram
kg/cm²: kilogram per square centimeter
km: kilometer
km/hr: kilometer per hour
km² : square kilometer
kV: kilovolt
kW : kilowatt
LE: Egyptian Pounds
m: meter
m/sec: meter per second
m²: square meter
m³: cubic meter
m³/day: cubic meter per day
m³/hr: cubic meter per hour
m³/sec: cubic meter per second
m³/year: cubic meter per year
MCM: million cubic meter
mg/l: Milligram per liter
m: millimeter
MSL: mean sea level
MW: mega-watt
Nos: numbers
pH: poetical of hydrogen
ppm: parts per million
sec: second
US\$: US Dollar

CHAPTER I INTRODUCTION

1.1 Brief of Overall Project

1.2 Scope of Works

1.3 Contents of the Report

1.4 Detailed Design and Schedules

CHAPTER I INTRODUCTION

1.1 Brief of Overall Project

The socio-economic development of Egypt has been greatly dependent on the development of its agricultural sector. In order to achieve better food security and contribute more to the economic development of the country whose population is growing at a rate of more than two percent, the development of agriculture, especially horizontal expansion of farm land, is particularly important. Because, 99 percent of population concentrate in the Delta area and along Nile river area. there are no room more expansion of farm land in these area.

The Nile river is the main source of irrigation water. Given limited water resources, the MPWWR is making every endeavor to increase the rate of growth in agriculture through the improvement of water use in the existing irrigation systems and effective recycling of water usage.

The expansion of the El Shikh Gaber El Sabah Canal lower reach of the Suez Canal siphon is urged to make the Nile water available for use in North Sinai. Under the situation, the Government of Egypt (GOE) gives high priority to reclamation and cultivation of 400,000 feddans in the northern part of Sinai with broad objectives of ensuring food security for rapidly growing population and generation of rural employment.

In line with the policies of the national plan, the North Sinai Integrated Rural Development Project has proposed to develop the new land of 135,000 feddans for agriculture. Development plans will be implemented in an integrated manners so as to establish new rural community in North Sinai. This development plan has also proposed to implement the settlement plan with construction of social infrastructure, and develop small scale industries related to agriculture which will provide opportunities for the private sector to contribute employment.

Through series of discussion meetings and official requests from the GOE, NSDO has been finally decided to implement project with two stage development approaches, such as stage I area covers 85,000 feddans under the geographic elevation of below 90m and stage II area of 50,000 feddans between 90m and 110m elevation, respectively. Development policy of the overall project implementation, however, was changed to involve private sectors for project implementation and post project management in the stage II area instead of stage I area which will be implemented by the government initiatives.

1.2 Scope of Works

The scope of works in the periods were to finalize Basic Design of the Water Conveyance Infrastructures based on the results of topographic survey, geo-technical investigation and

technical discussion with Egyptian government officials concerned in the subject section of conveyance canal.

1.3 Contents of the Report

This report was incorporated the basic design of conveyance systems on the lower reach of El Shikh Gaber El Sabah canal for El Sir and El Kawareer Zones. Contents of the reports are mainly summary of revised development plans including staged development plan and project dimension, design standards, basic design of subject infrastructures and its general design drawings, preliminary bases implementation plan and project evaluations.

1.4 Detailed Design and Schedules

Detailed design phase (herein call Phase II) will be started from early October 1999 and will be terminated in early February 2000 after the discussion and confirmation of the basic design for the subject facilities was made by the both parties. JICA study team will send the Interim Report (3) with related detailed design drawings to the MPWWR by the middle of February 2000.

In early May 2000, as the 4th field survey works, JICA study team will commence discussions and confirmations with NSDO officials concerned on the Interim Report (3) with draft detailed design drawing which was submitted in advance, at the Kantara site office.

Draft design reports (Interim reports (3)) will be compiled incorporating the following items.

- Detailed design reports
- Design drawings
- Bill of quantity
- Construction planning
- Post project management programs
- Project implementation plans

CHAPTER II PROJECT DEVELOPMENT PLAN

2.1 Background of Stage Development Plan

2.2 Brief of El Sir and El Kawareer Zone Sub-Project

2.3 Water Requirement and Water Distribution Plan

2.4 Proposed Farming Categories and Cropping Pattern

CHAPTER II PROJECT DEVELOPMENT PLAN

2.1 Background of Stage Development Plan

The project implementation plan has been remarkably changed since the Scope of Works was concluded by the both governments in 4th August 1998. In January 24th, 1999, the Government of Egypt has been requested Japanese Government to modify project development plan dividing into two stages, such as stage I area covers 76,000 feddans gross irrigation area below 90m geographical elevation above mean sea level, and remaining 59,000 feddans area was included in the stage II area.

Through careful study and discussions within NSDO officials concerned, NSDO was decided final conclusion at the meeting held on June 5th, 1999 that the government policy of the stage I development area is mainly to allocate the land approximately 67,500 feddans out of total 135,000 feddans to the small farmers, graduates and small investors as well as 17,500 feddans for large investors. Remainder of 50,000 feddans for large investors was determined as stage II development area. Major reasons for this modification are financial constraints and policy formulation of appropriate privatization schemes for stage II development.

Design discharges of respective stages were decided 32.48 cu.m/sec for stage I and 20.18 cum./sec for stage II based on allocation of the gross irrigation development area and appropriate distribution of industrial water.

Project development plan was illustrated in the Figure 2.1-1.

2.2 Brief of El Sir and El Kawareer Sub-Project

2.2.1 Land Use Plan

NSDO judged that the land with 12,200 feddans envisaged by the El Arish Governorate was included into the gross irrigation development area of NSDO project. Therefore, "gross irrigation area" was inevitably increased to 147,200 feddans from 135,000 feddans.

GOE, however, has a policy that the maximum gross irrigation area of the El Sir & El Kawareer project is fixed 135,000 feddans, so incremental gross irrigation area was reserved in the second stage development area. New land use plans are tabulated in the Table 2.2-1.

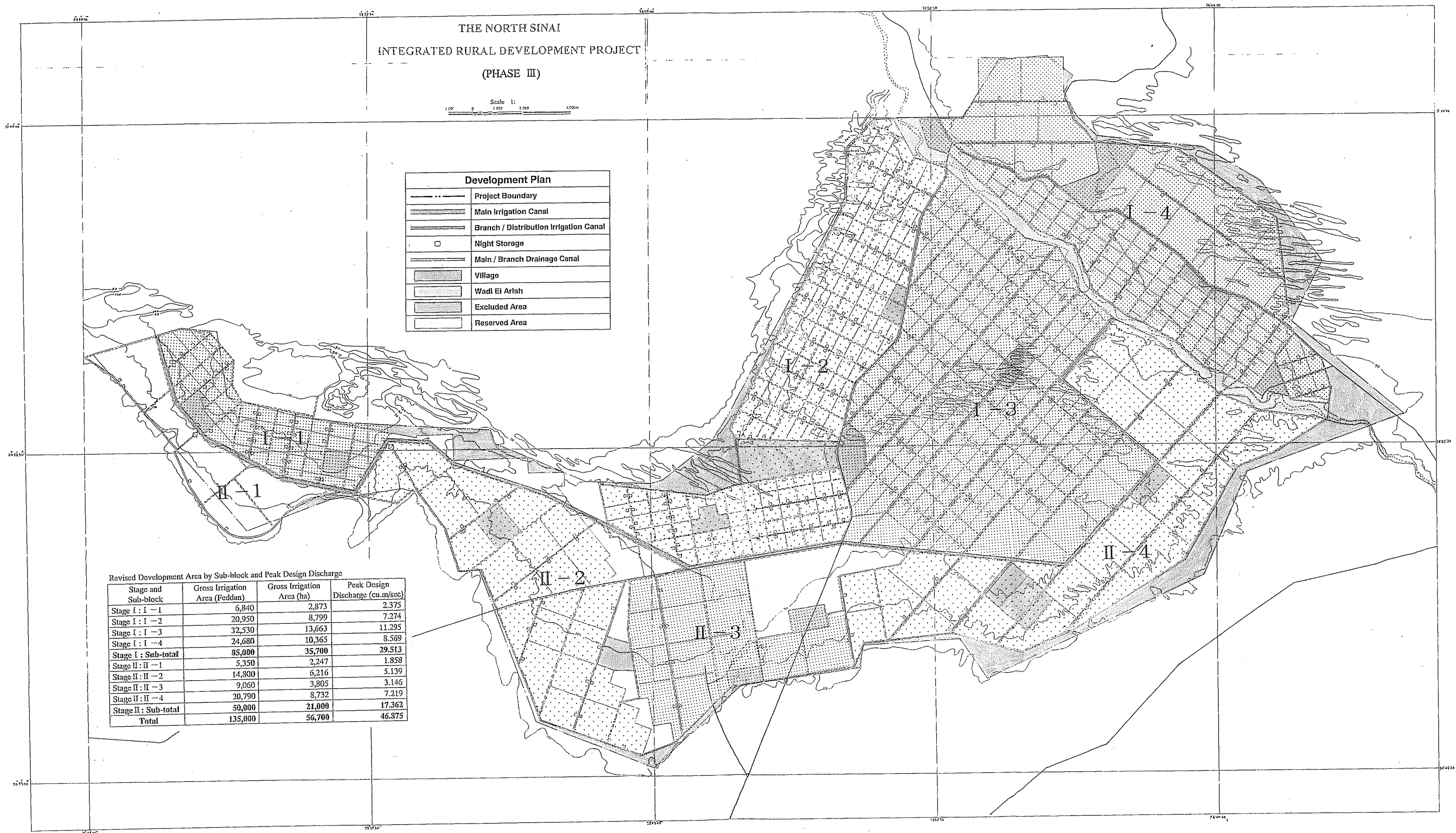


Figure 2.1-1 Project Development Plan

Table 2.2-1 Land Use Plan

(Unit : feddans)

Land Category	F/S original	Revised plan	Difference
(1)Gross project area	153,900	153,900	0
(2)Excluded area	18,900	6,700	12,200
(3)Reserved area	0	12,200	12,200
(4)Gross irrigation area	135,000	135,000	0
-Stage I		85,000	
-Stage II		50,000	
(5)Public land occupied	24,000	24,000	0
(6)Net irrigation area	111,000	111,000	0

Therefore, gross irrigation area, including public land occupied by canals, roads and public facilities within beneficial area, of stage I and stage II are 85,000 feddans and 50,000 feddans, respectively.

2.2.2 Settlement Plan

Sharing of land use for each categories of settlers are slightly changed from original plan at the feasibility study. Since gross irrigation area (GIA) of stage I and stage II were divided geographically into 63 % of the total GIA and 37 % of that area, 13 percent of total GIA (such as 26% of large investors) was included in the stage I area as large investors' farm land.

The final settlement plan for each settlers categories can be summarized as follows;

Table 2.2-2 Land Distribution to the Settlers

(Unit : feddans)

Settlement Category	F/S original	Revised plan	Difference
(1) Stage I			
-Graduate and Small farmers	33,750 (25%)	47,250 (35%)	(-)13,500
-Small investors	20,250 (15%)	20,250 (15%)	0
-Large investors	81,000 (60%)	17,500 (13%)	63,500
Sub-total	135,000 (100%)	85,000 (63%)	50,000
(2) Stage II			
-Large investors	0 (0%)	50,000 (37%)	(-) 50,000
Sub-total	0 (0%)	50,000 (37%)	(-) 50,000
(3) Total	135,000 (100%)	135,000 (100%)	0

The numbers of farmer for each category settlers are proposed dividing into unit area to be distributed to the farmers.

Table 2.2-3 Numbers of Farmers

Categories	Gross Irrigation Area (fed.)	Net Irrigation Area (fed.)	Unit Land Scale (Fed. /family)	No. of Farmers
1. Stage I				
Graduate, small farmers	47,250	38,850	10 fed.	3,885
Small investors	20,250	16,650	100 fed.(10-500)	166
Large investors	17,500	14,430	740 fed.(over 500)	19
Sub-total	85,000	69,930		4,070
2. Stage II				
Large investors	50,000	41,070	740 fed.(over 500)	56
Total	135,000	111,000		4,126

2.3 Water Requirement and Water Distribution Plan

Water users of the project are agriculture (irrigation) and industrial sector. NSDO determined that irrigation water projection shall be followed the proposed land use plan for respective development stages but industrial water is divided into around 50% for each stages. Monthly base water demand projection, therefore, can be tabulated in the Table 2.3-1.

Table 2.3-1 Water Demand Projection

Month	Stage I Irrigation	Stage I Industry	Stage I Total	Stage II Irrigation	Stage II Industry	Stage II Total	Grand Total
Jan.	10.74	2.96	13.70	6.32	2.82	9.14	22.84
Feb.	12.69	2.96	15.65	7.46	2.82	10.28	25.93
Mar.	14.40	2.96	17.36	8.47	2.82	11.29	28.65
Apr.	12.42	2.96	15.38	7.30	2.82	10.12	25.50
May	11.95	2.96	14.91	7.03	2.82	9.85	24.76
Jun.	20.00	2.96	22.96	11.76	2.82	14.58	37.54
Jul.	29.52	2.96	32.48	17.36	2.82	20.18	52.66
Aug.	24.63	2.96	27.59	14.49	2.82	17.31	44.90
Sep.	12.42	2.96	15.38	7.30	2.82	10.12	25.50
Oct.	5.61	2.96	8.57	3.30	2.82	6.12	14.69
Nov.	5.13	2.96	8.09	3.02	2.82	5.84	13.93
Dec.	8.79	2.96	11.75	5.17	2.82	7.99	19.74
Average	14.02	2.96	16.98	8.25	2.82	11.07	28.05

Source: JICA F/S report 1997.

2.4 Proposed Farming Categories and Cropping Pattern

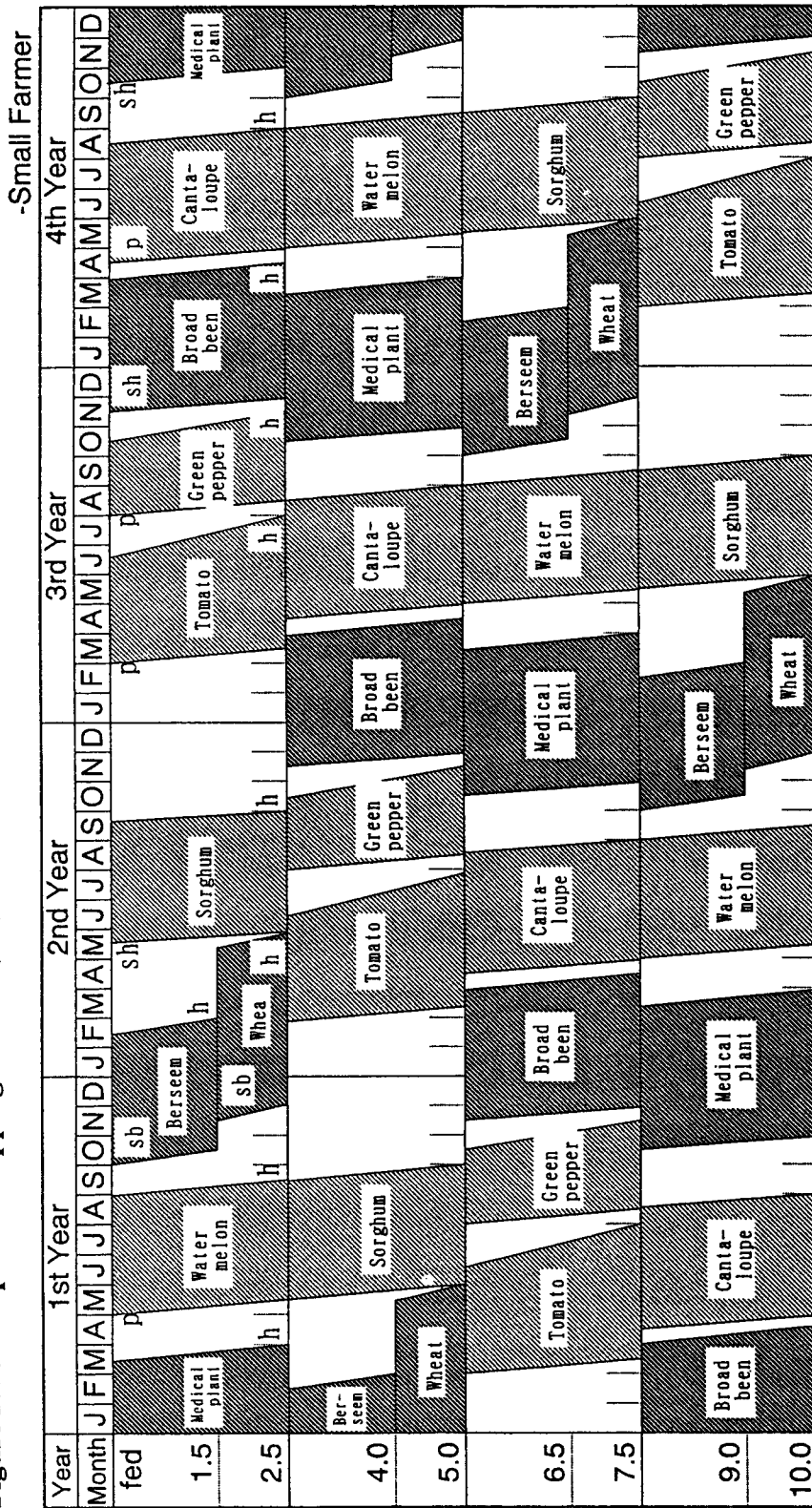
Proposed farming categories as well as each cropping patterns for respective settlement farmers are basically followed the original plan without modification from feasibility study. Those plans can be summarized as follows ;

Table 2.4-1 Farming Category and Cropping Pattern

Farming categories	Total farm land (fed.)	Crop intensity
1.Vegetables + Livestock for graduates	23,310	200 %
2.Vegetables + Fruit for graduates	7,770	200 %
3.Vegetables + Fodders(mixed) for small farmers	7,770	173 %
4.Vegetables + Beef Cattle for small.scale investors	8,325	200 %
5.Vegetables + Fruit for small scale investors	8,325	140 %
6.Land Use Farming for large scale investors	13,850	200 %
7.Dairy Farming for large scale investors	13,850	200 %
8.Livestock Raising for large scale farming	13,850	200 %
9.Fruit Growing for large scale investors	13,920	100 %
Total	111,000	180 %

These cropping pattern are illustrated in the Figure 2.4-1 to Figure 2.4-9.

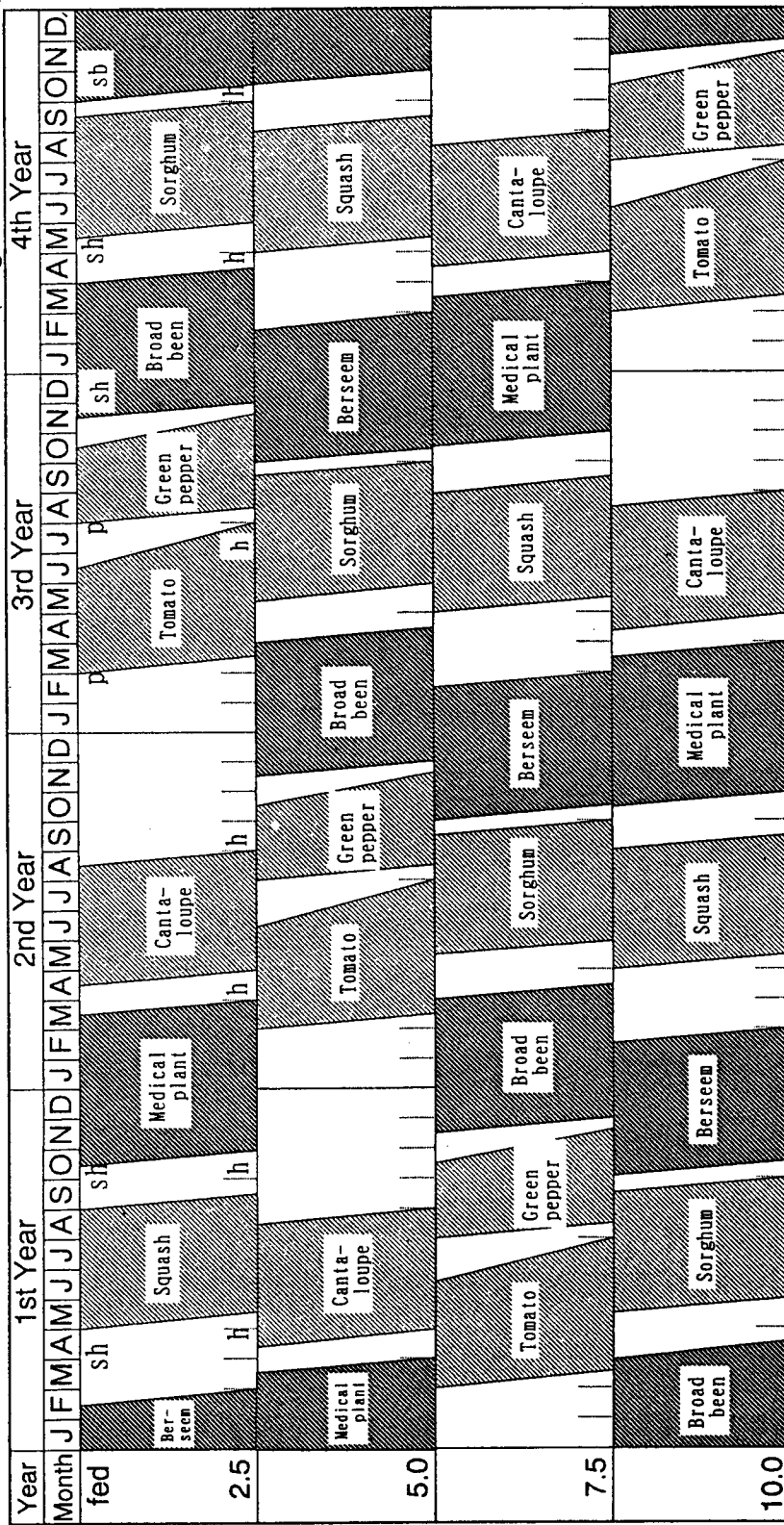
Figure 2.4-1 Proposed Cropping Pattern (1-1)



Note:

- 1) sb : broadcast seeding sh : hill seeding or stripe seeding p : planting h : harvesting
- 2) Medical plant (Cumin, Herbaceous, Carcadeh, Caraway)
- 3) Nursery of fruit vegetables by growing in vinyl house and tomato planting under plastic tunnels.

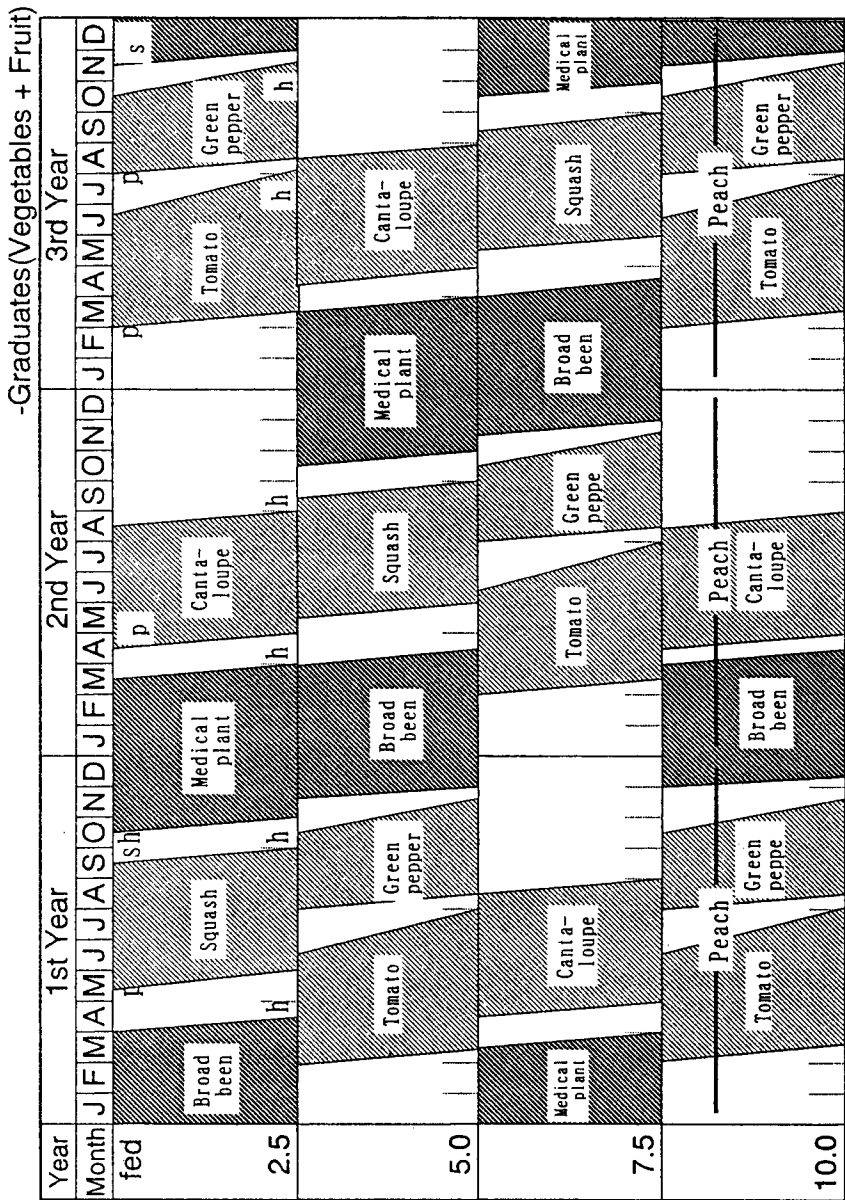
Figure 2.4-2 Proposed Cropping Pattern (1-2)
 -Graduates (Vegetables + Livestock)



Note:

- 1) sb : broadcast seeding sh : hill seeding/stripe seeding p : planting h : harvesting
- 2) Medical plant (Cumin, Herbaccus, Carcadeh, Caraway)
- 3) Nursery of fruit vegetables by growing in vinyl house and tomato planting under plastic tunnels

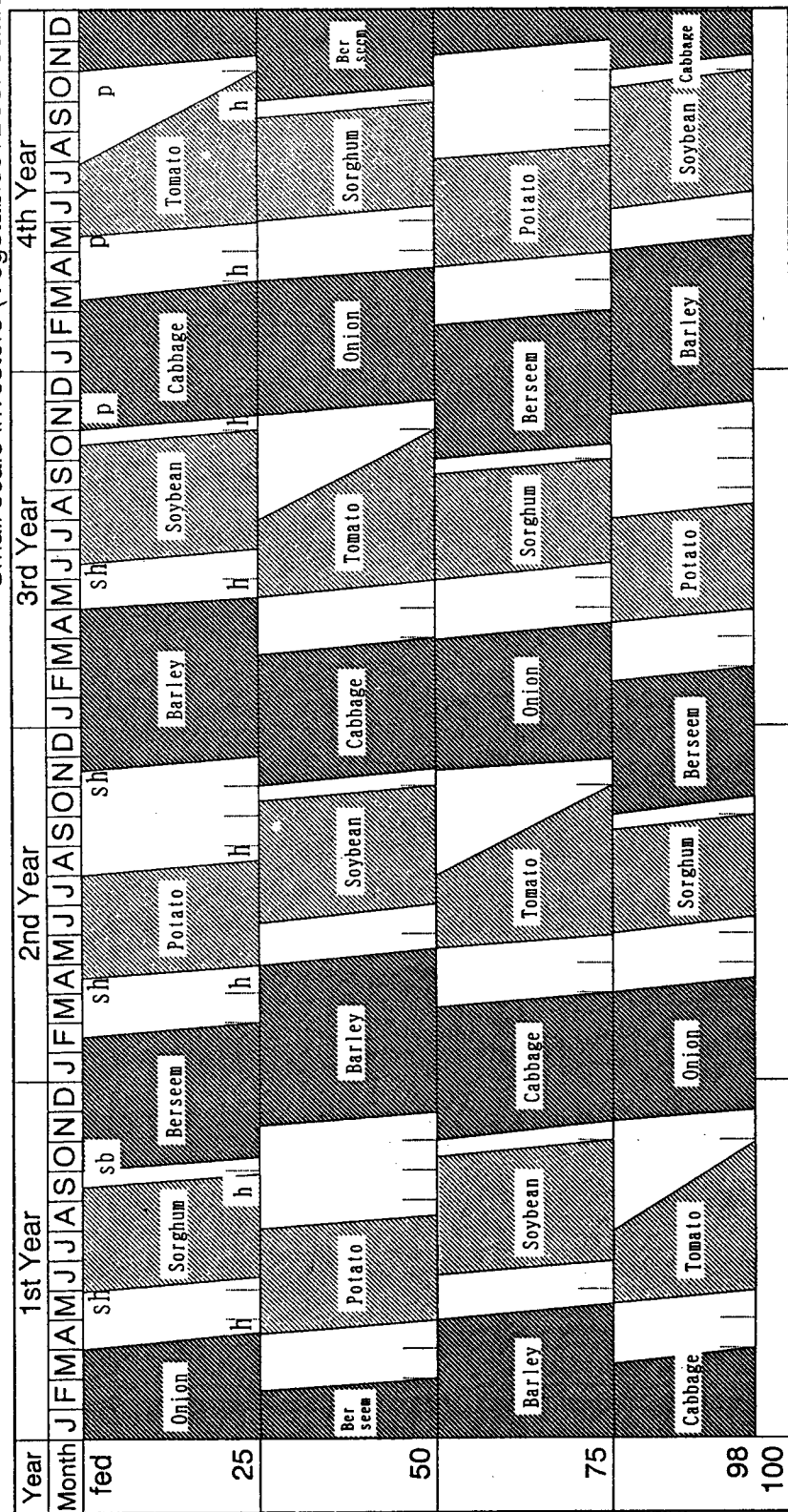
Figure 2.4-3 Proposed Cropping Pattern (1-3)



Note:

- 1) sb : broadcast seeding sh : hill seeding/stripe seeding p : planting h : harvesting.
- 2) Medical plant(Cumin,Herbaccus,Carcadeh,Caraway)
- 3) Nursery of fruit vegetables by growing in vinyl house and tomato planting under plastic tunnels
- 4) Planting inter-crops in young tree orchard.
- 5) Early peach varieties are picked from end of March to end of May.

Figure 2.4-4 Proposed Cropping Pattern (2-1)
 - Small scale investors (Vegetables+Beef Cattle)



Note: 1) sb : broadcast seeding sh : hill seeding or stripe seeding p : planting h : harvesting

Figure 2.4-5 Proposed Cropping Pattern (2-2)

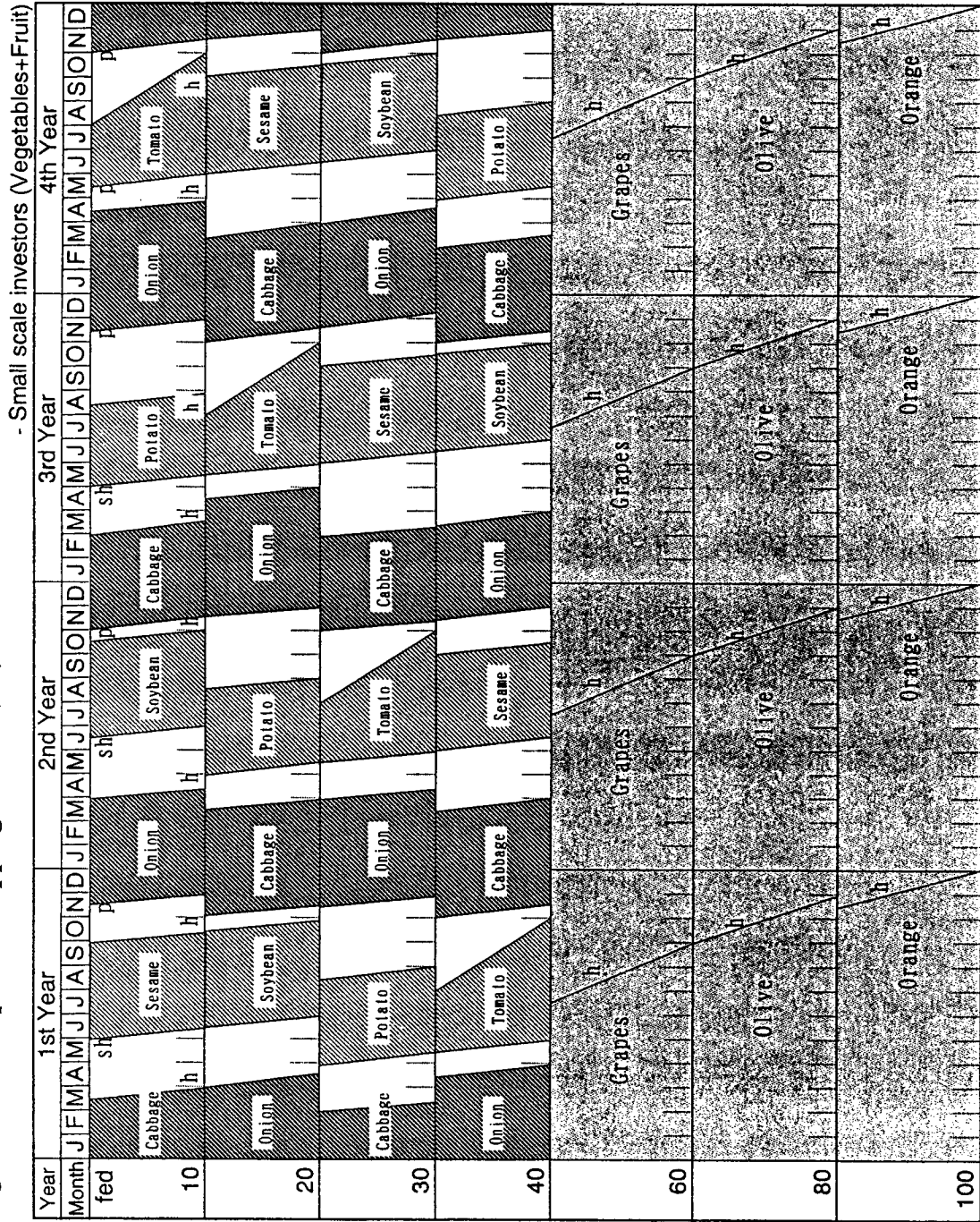
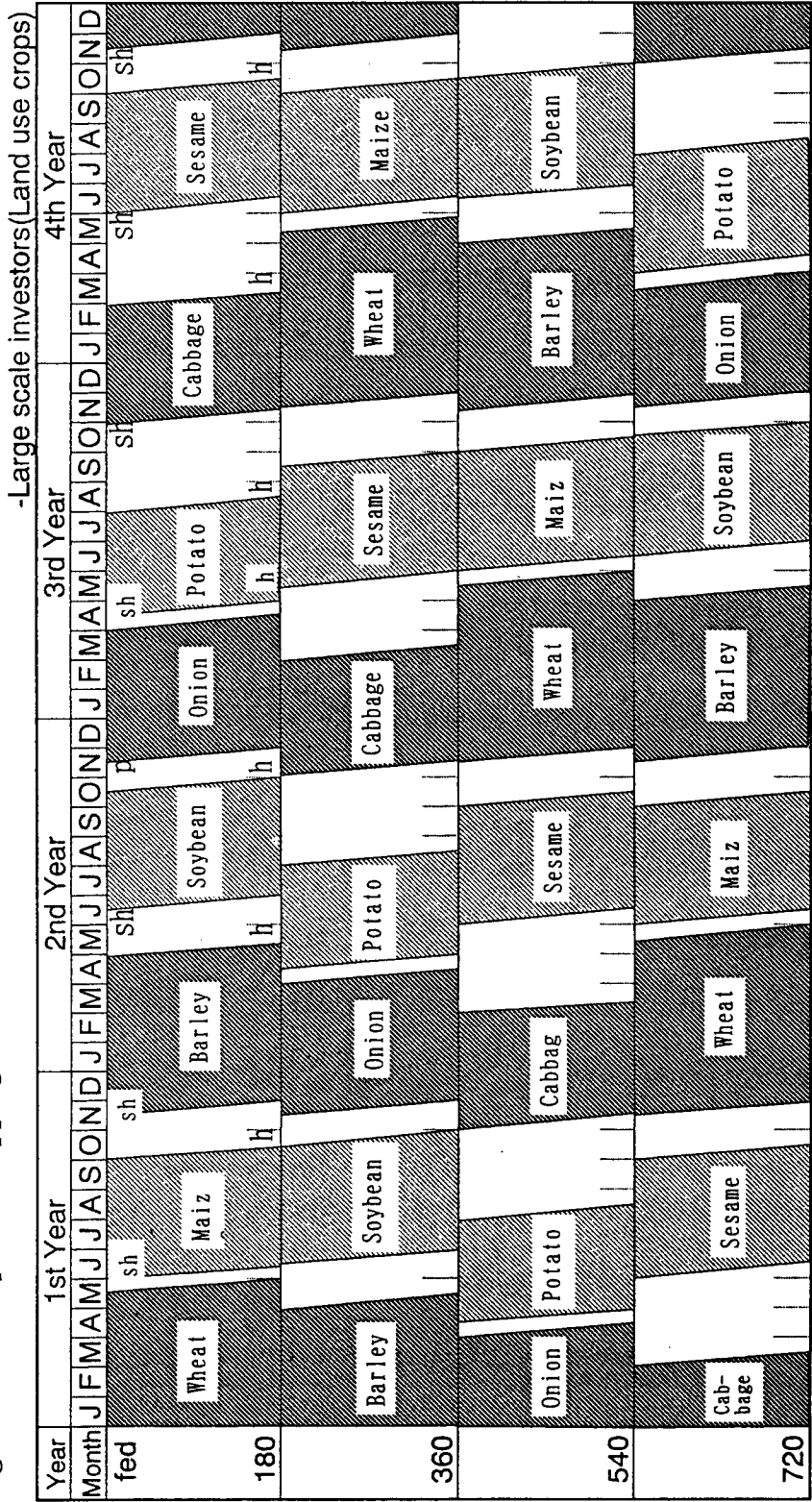
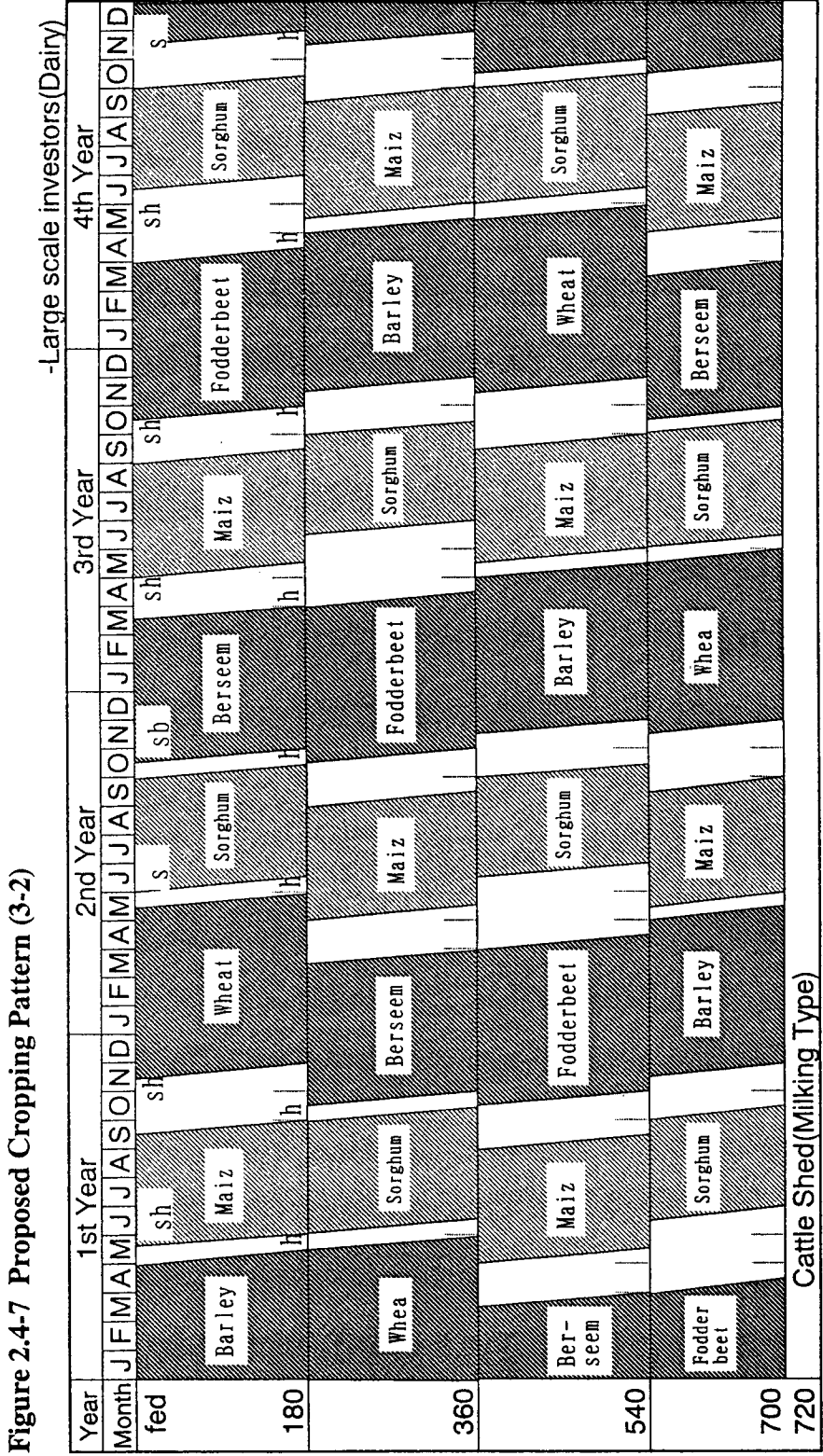


Figure 2.4-6 Proposed Cropping Pattern (3-1)

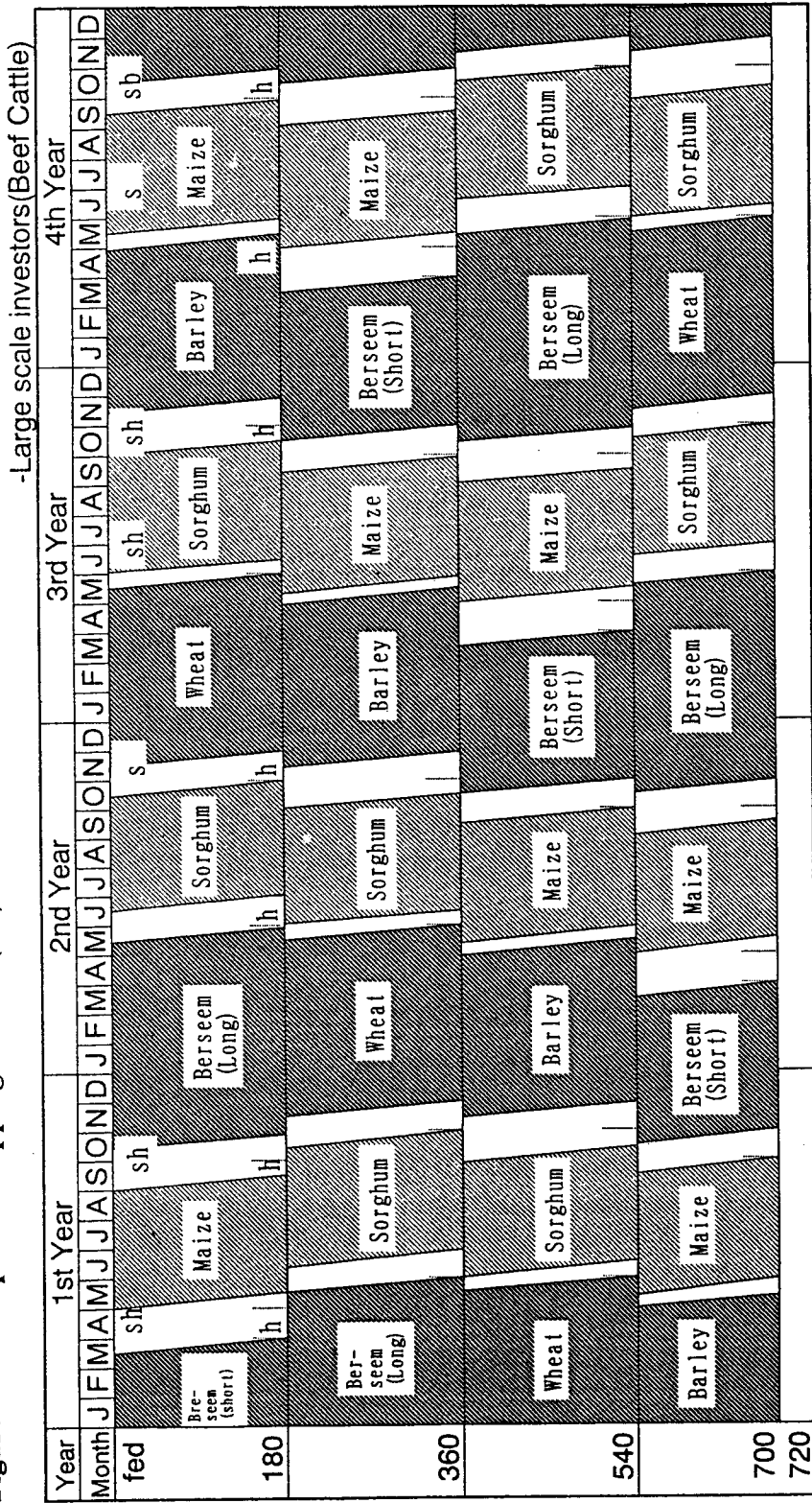


Note: 1) sb : broadcast seeding sh : hill seeding or stripe seeding p : planting h : harvesting



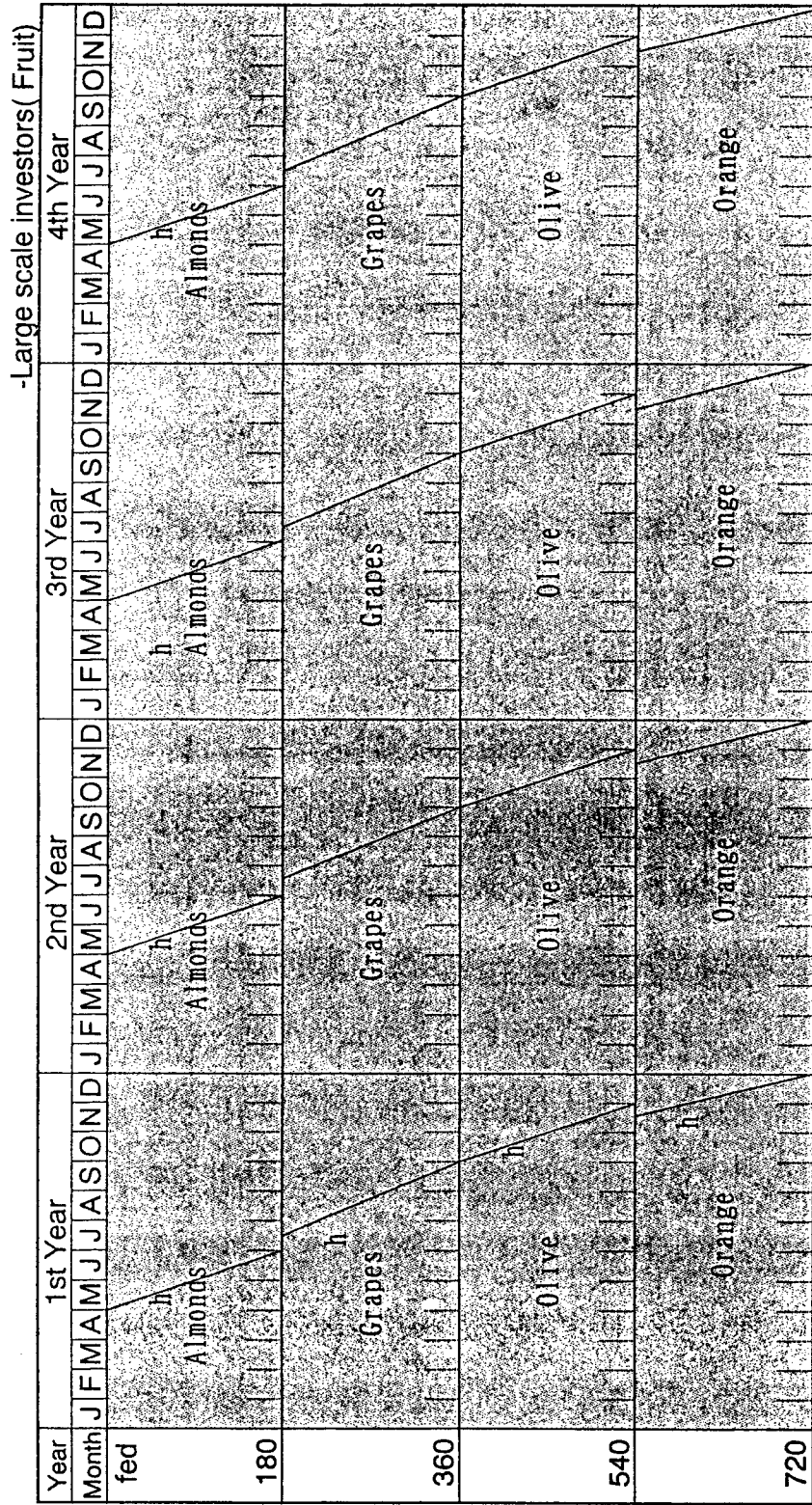
Note: 1) sb : broadcast seeding sh : hill seeding or stripe seeding p : planting h : harvesting

Figure 2.4-8 Proposed Cropping Pattern (3-3)



Note: 1) sb : broadcast seeding sh : hill seeding or stripe seeding p : planting h : harvesting.

Figure 2.4-9 Proposed Cropping Pattern (3-4)



Note: 1) h : harvesting