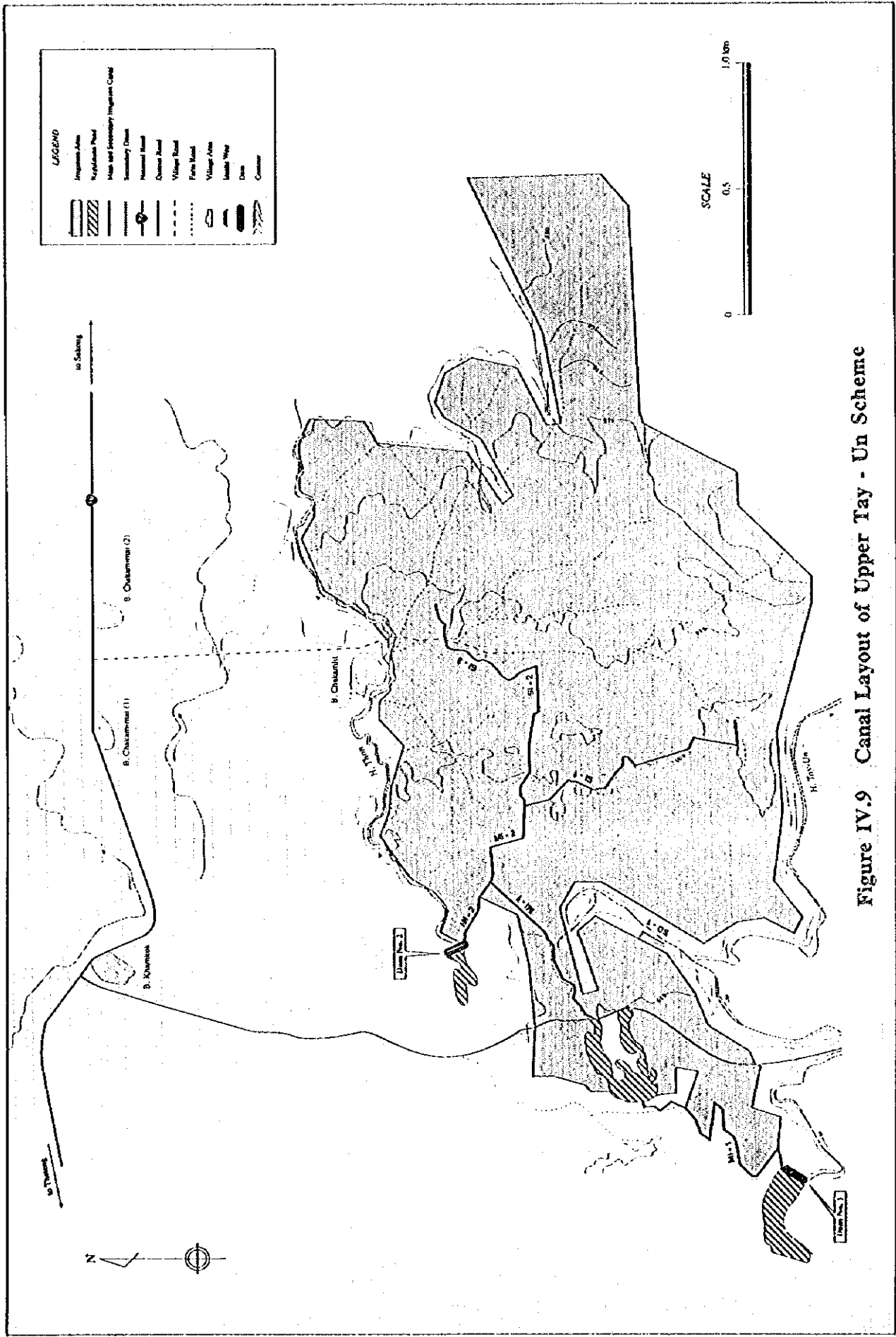


Figure IV.8 Canal Layout of Lower Xe Set Scheme (2/2)



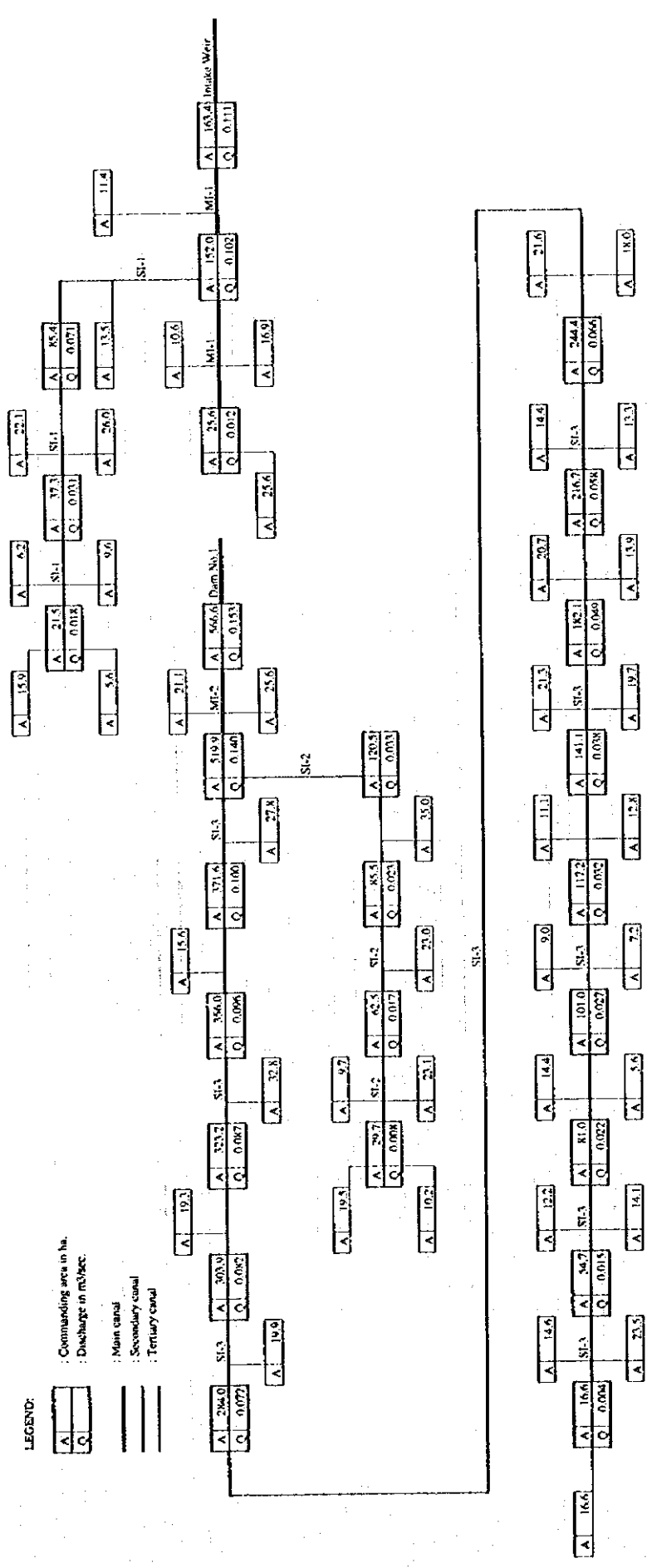
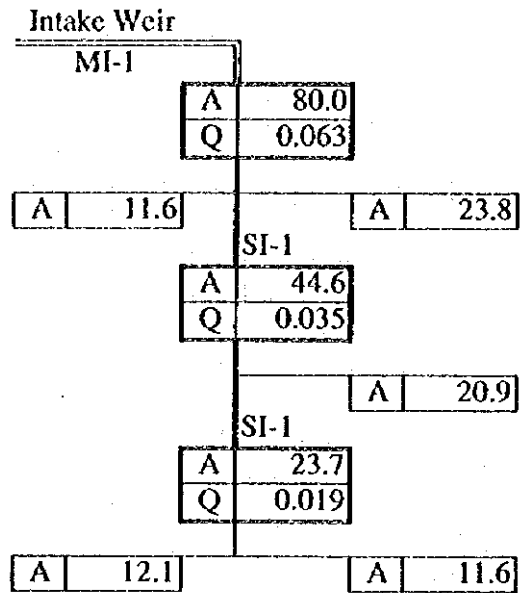


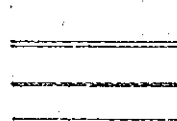
Figure IV.10 Upper Champi Scheme Irrigation Flow Chart



LEGEND:

A	
Q	

: Commanding area in ha.
 : Discharge in m³/sec.



: Main canal
 : Secondary canal
 : Tertiary canal

Figure IV.11 Upper Tapoung Scheme Irrigation Flow Chart

LEGEND:

A	: Commanding area in ha.
Q	: Discharge in m ³ /sec.

- : Main canal
- : Secondary canal
- : Tertiary canal

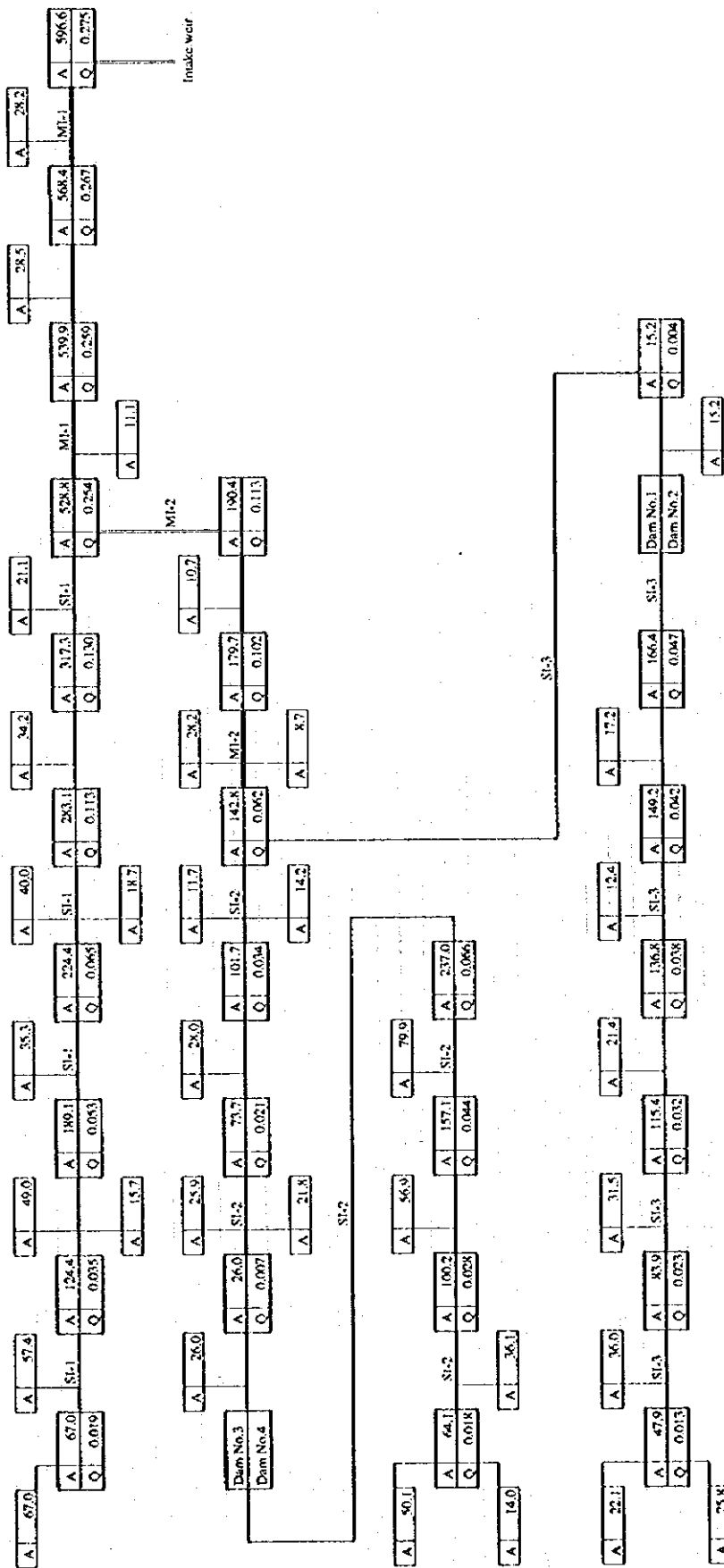
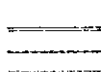


Figure IV.12 - Upper Kapheu Scheme Irrigation Flow Chart

LEGEND:

A	
Q	

: Commanding area in ha
 : Discharge in m³/sec.



: Main canal
 : Secondary canal
 : Tertiary canal

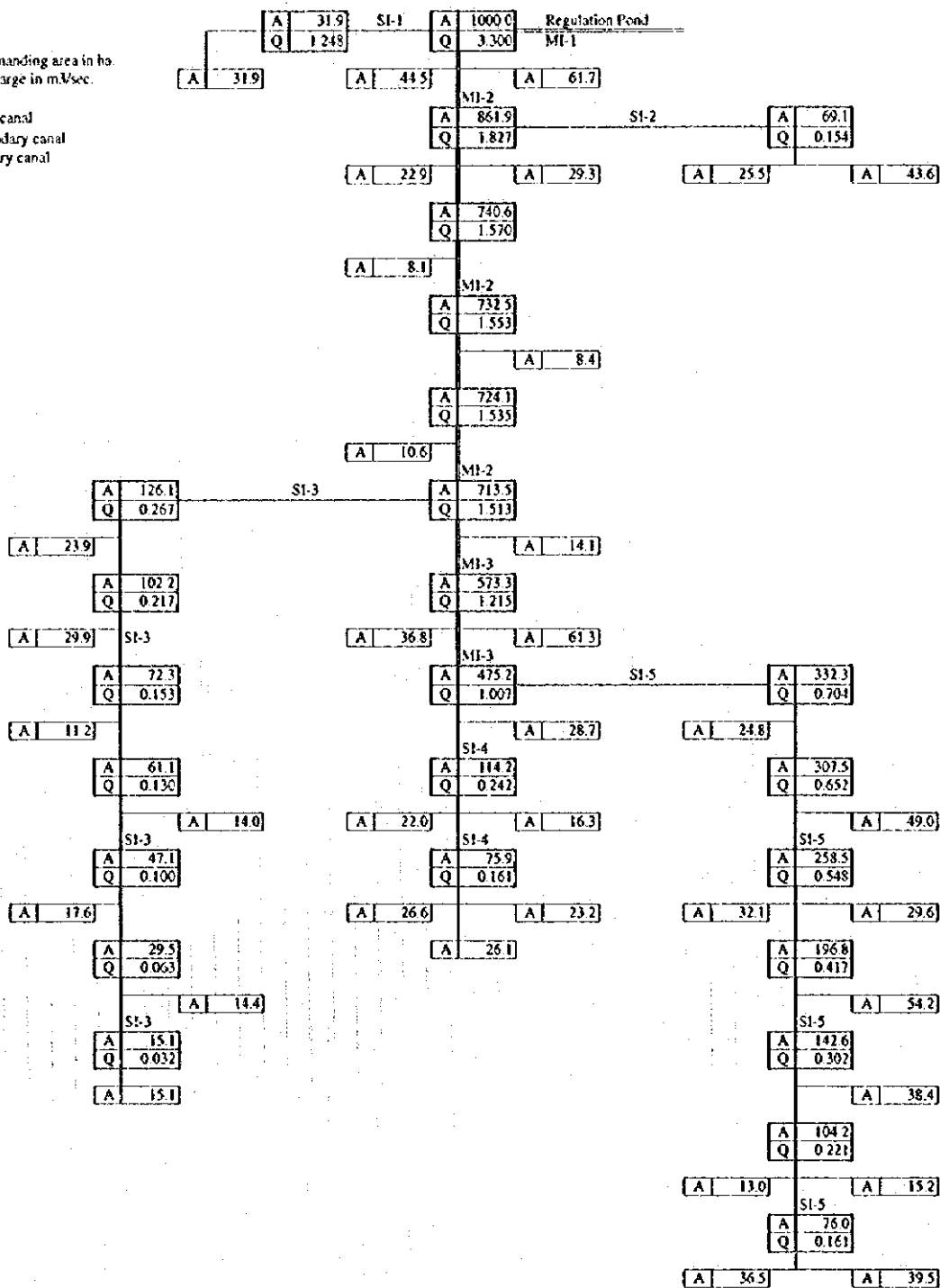


Figure IV.13 Lower Xe Set Scheme Irrigation Flow Chart

LEGEND:



: Commanding area in ha.
: Discharge in m³/sec.



: Main canal
: Secondary canal
: Tertiary canal

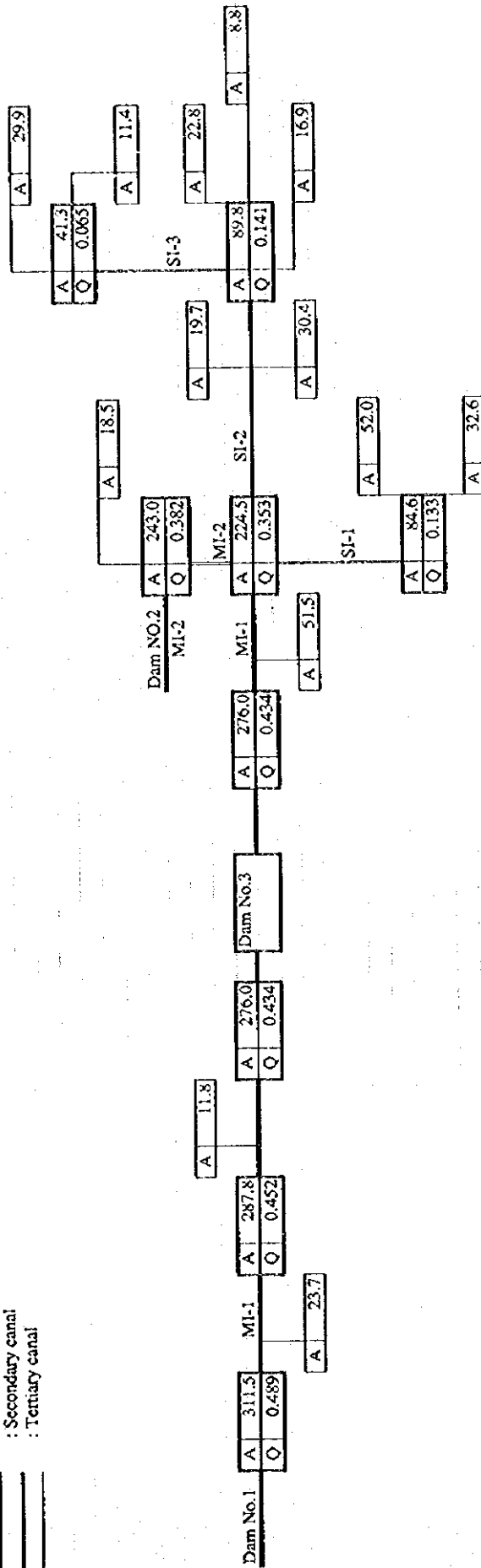


Figure IV.14 Upper Tay-Un Scheme Irrigation Flow Chart

LEGEND:

A	
Q	

: Commanding area in ha.
: Discharge in m³/sec.

Main canal	
Secondary canal	
Tertiary canal	

: Main canal
: Secondary canal
: Tertiary canal

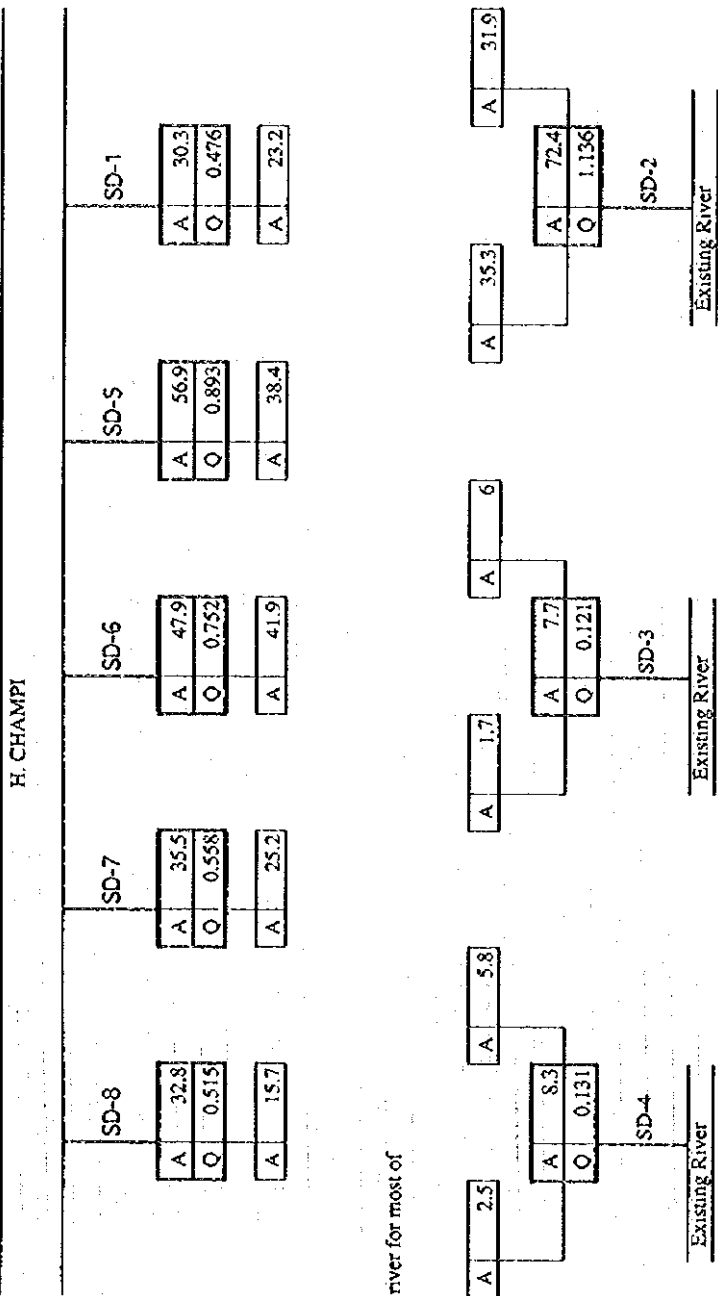


Figure IV.15 Upper Champi Scheme Drainage Flow Chart

LEGEND:

A	
Q	

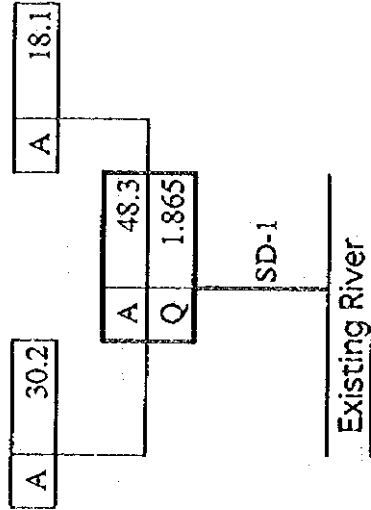
: Commanding area in ha.

: Discharge in m³/sec.

: Main canal

: Secondary canal

: Tertiary canal



Note: Main and Secondary Drains are existing river for most of Tertiary drainage canal.

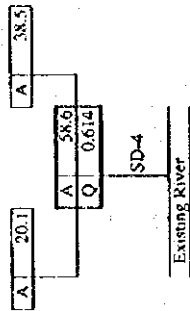
Figure IV.16 Upper Tapoung Scheme Drainage Flow Chart

LEGEND:

A	20.1
Q	0.614

: Commanding area in ha.
: Discharge in m³/sec.

— : Main canal
— : Secondary canal
— : Tertiary canal



Note: Main and Secondary Drains are existing river for most of Tertiary drainage canal.

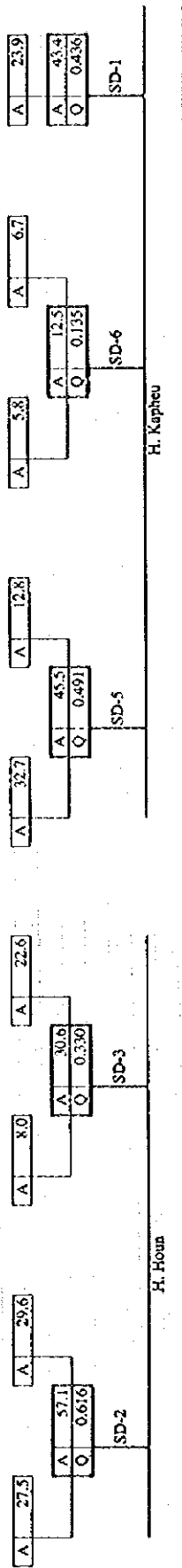


Figure IV.17 Upper Kaphreu Scheme Drainage Flow Chart

LEGEND:



- Main canal
- Secondary canal
- Tertiary canal

Note: Main and Secondary Drains are existing river for most of Tertiary drainage canal.

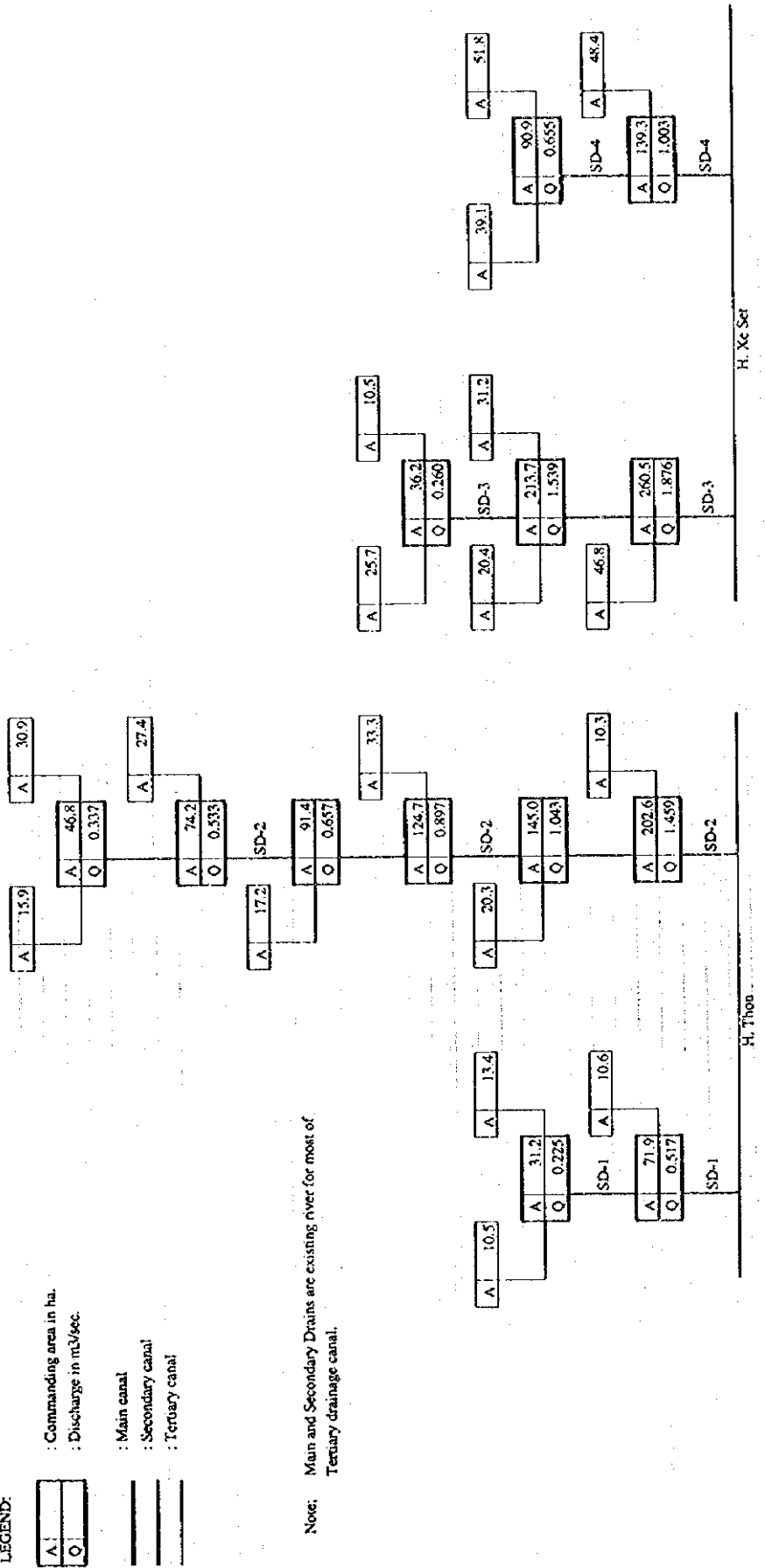


Figure IV.18 Lower Xe Set Scheme Drainage Flow Chart

LEGEND:

A	
Q	

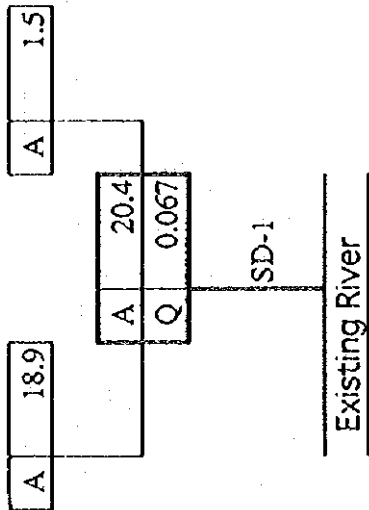
: Commanding area in ha.

: Discharge in m³/sec.

: Main canal

: Secondary canal

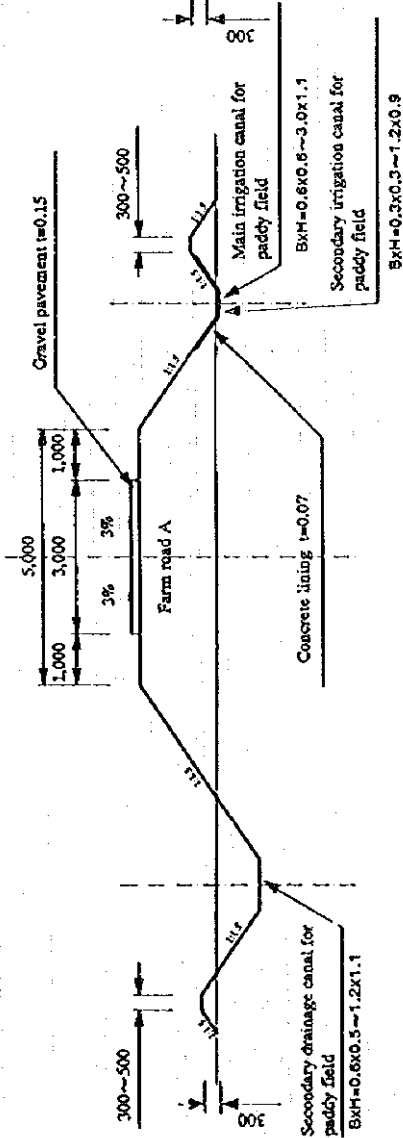
: Tertiary canal



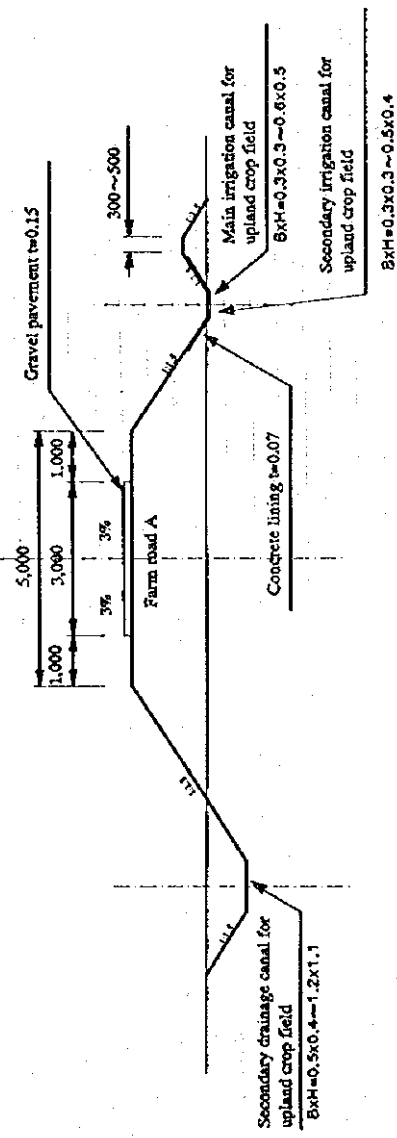
Note: Main and Secondary Drains are existing river for most of Tertiary drainage canal.

Figure IV.19 Upper Tay-Un Scheme Drainage Flow Chart

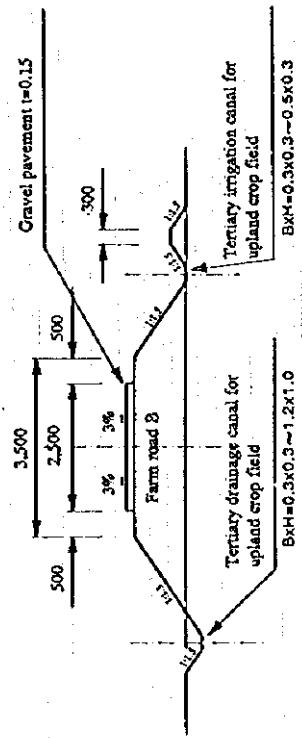
TYPICAL CROSS SECTION I



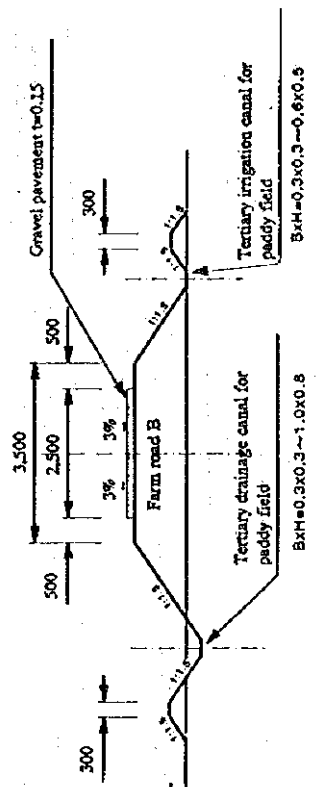
TYPICAL CROSS SECTION II



TYPICAL CROSS SECTION III

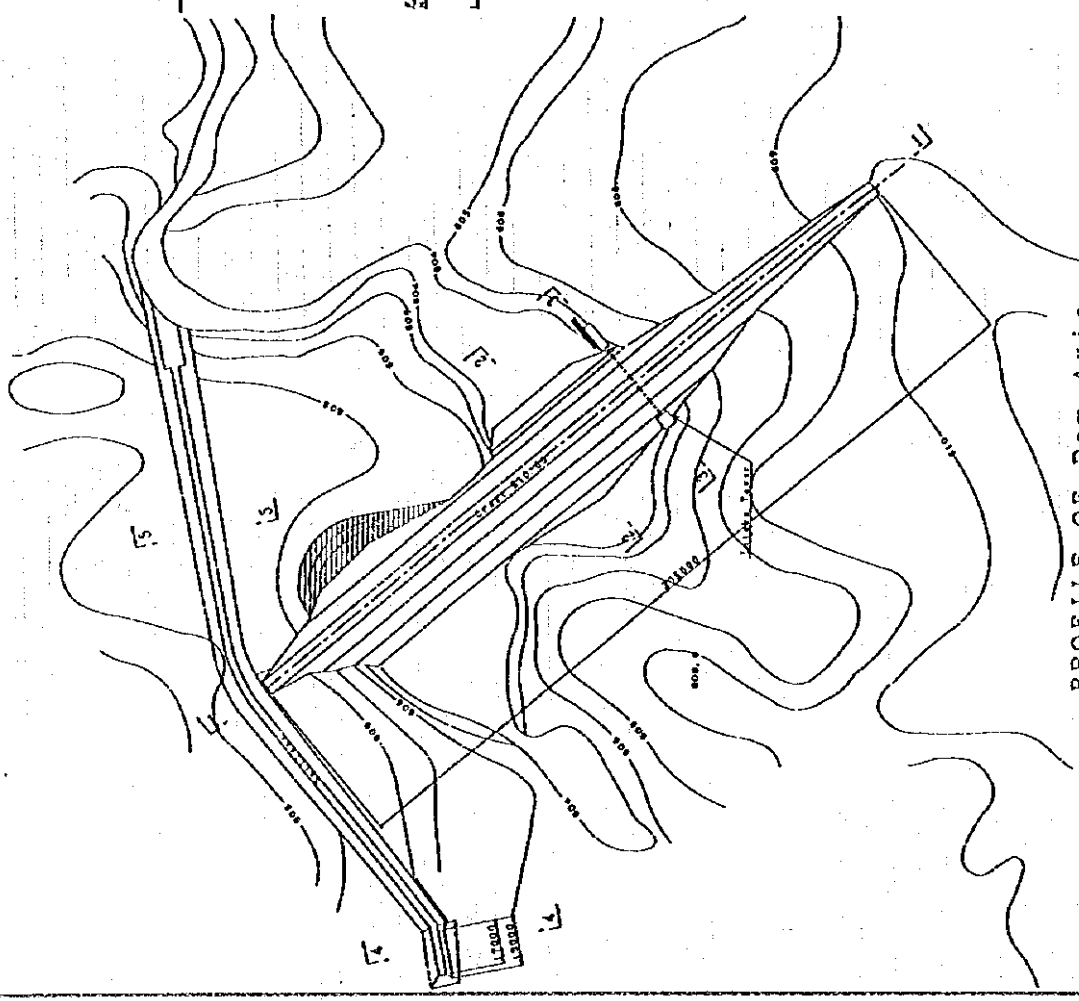


TYPICAL CROSS SECTION IV

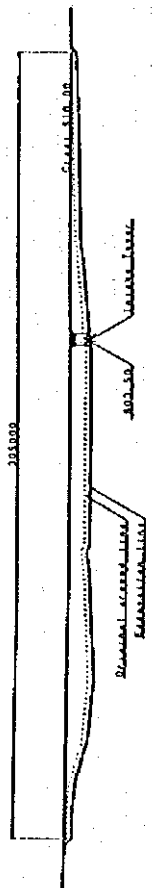


<p>THE LEO GROUP OF ENGINEERS AND ARCHITECTS MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT PROJECT IN BOLIVIA PLAZA</p>
<p>TITLE OF DRAWING</p>
<p>TYPICAL CROSS SECTION ON ROAD AND CANAL</p>
<p>NEFFON KOBAYASHI LTD MADRID ENGINEERING CO., LTD</p>
<p>Figure IV.20</p>

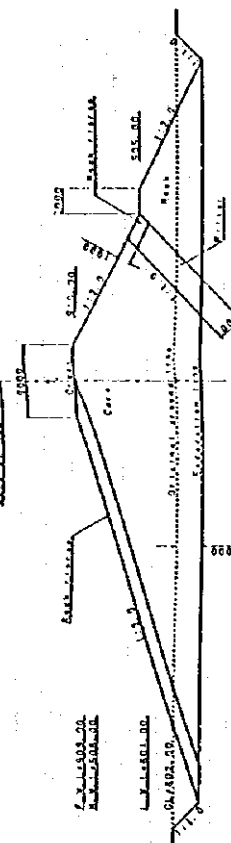
PLAN OF Tay-Un No. 2 Dam s=1/1000



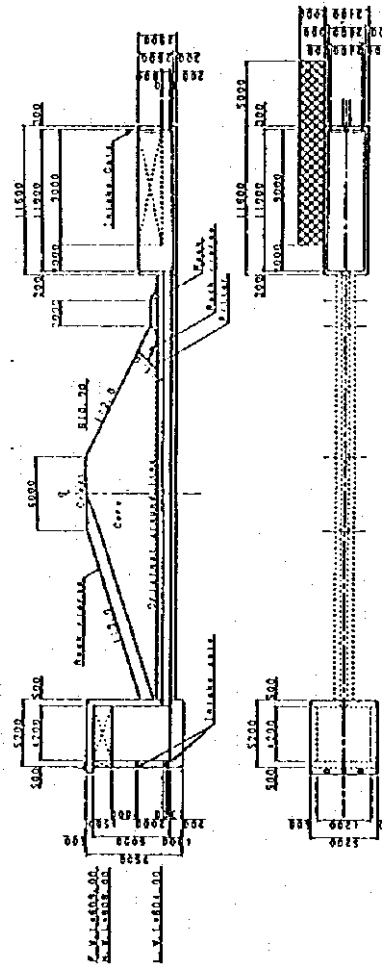
PROFILE OF Dam Axis
1-1 Section s=1/1000



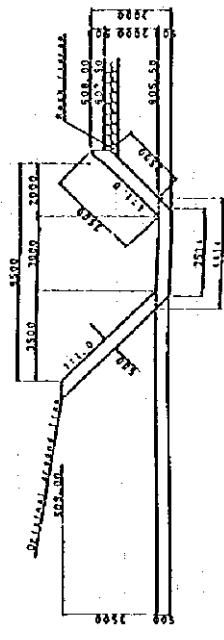
TYPICAL CROSS SECTION
2-2 Section s=1/200



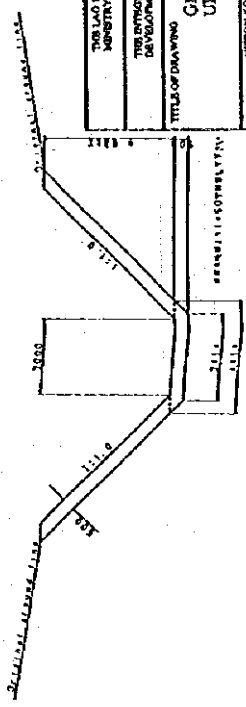
SECTION OF Intake Tower
3-3 Section s=1/200



4-4 Section s=1/100

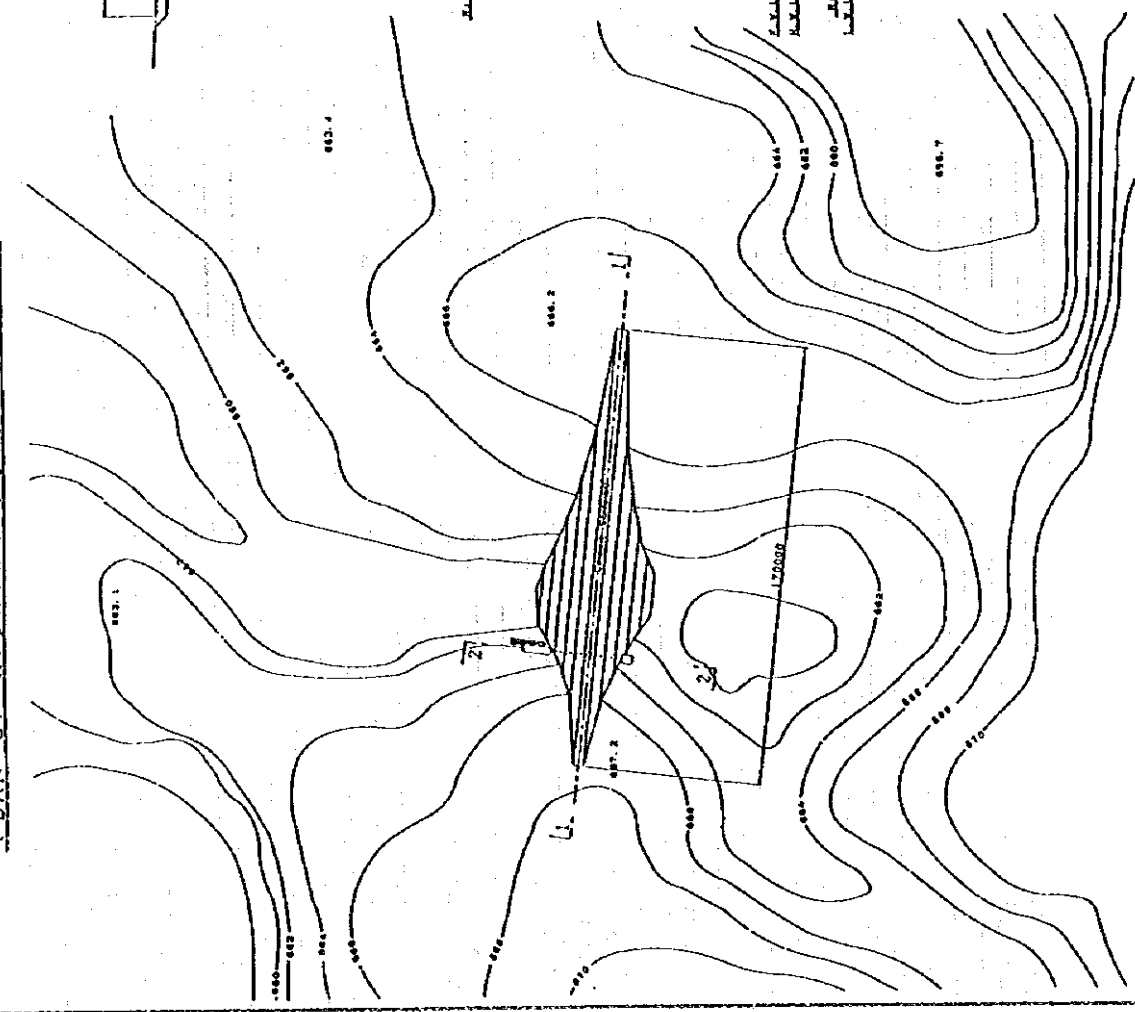


5-5 Section s=1/100



THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
MINISTRY OF AGRICULTURE AND FORESTRY
THE INTEGRATED AGRICULTURAL AND RURAL
DEVELOPMENT PROJECT IN BOLIVIAN PLAINS
TITLE OF DRAWING
GENERAL LAYOUT ON
UPPER TAY-UN DAM NO.2
REPORT 6085 CO. 3/70
MAJAL ENGINEERING CO., LTD
Figure IV.21

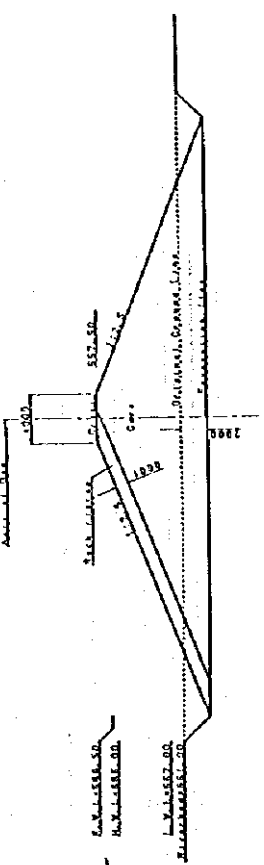
PLAN OF Kapheu No. 3 Dam S-1/1000



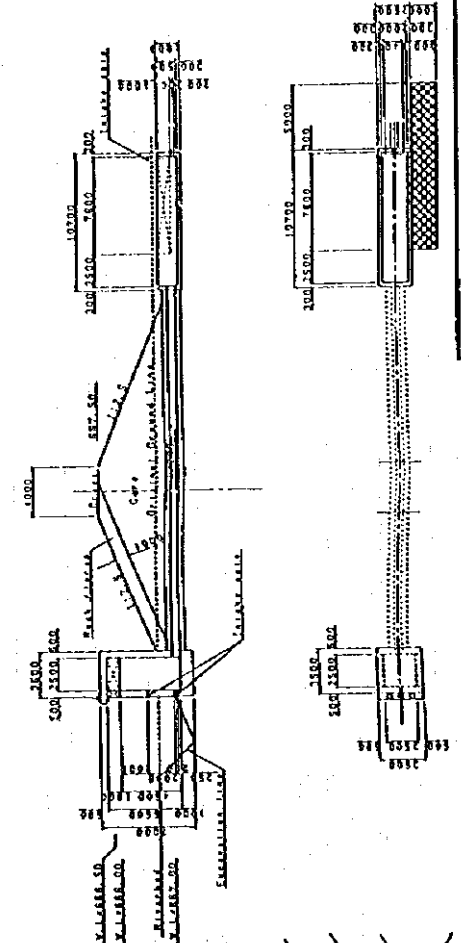
PROFILE OF Dam Axis
1-1 Section S-1/500



TYPICAL CROSS SECTION S-1/200

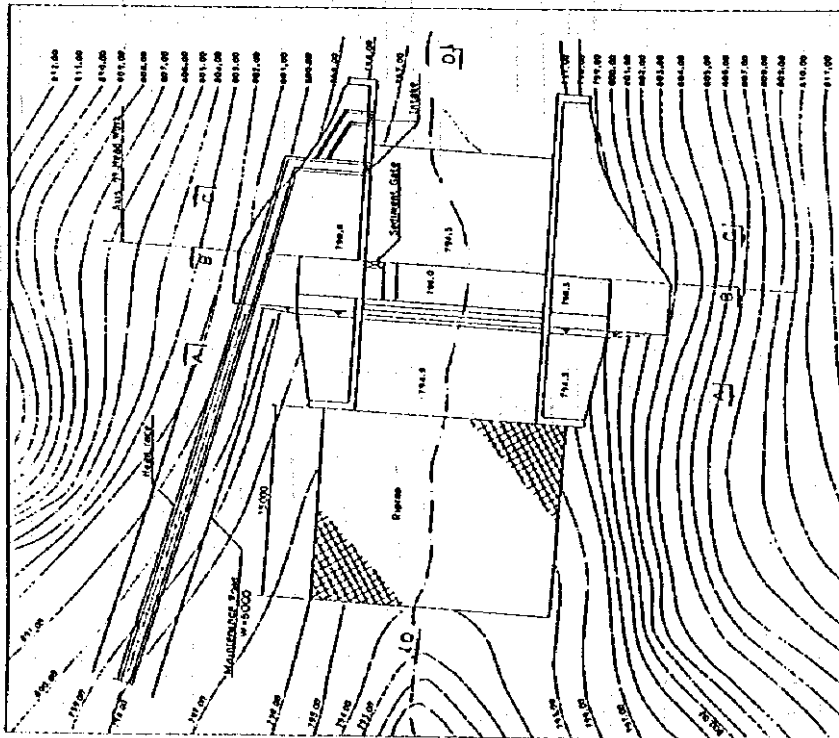


SECTION OF Intake Tower
2-2 Section S-1/200

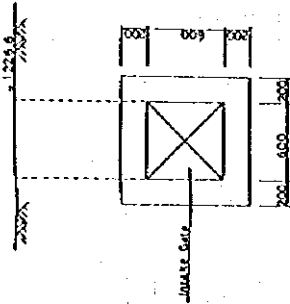


THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF AGRICULTURE AND FORESTRY
THE NATIONAL CENTER FOR AGRICULTURAL MECHANICAL DEVELOPMENT PROJECT IN BOLAVEN PROVINCE
TITLE OF DRAWING GENERAL LAYOUT ON UPPER KAPHEU DAM NO.3
SUPHACHON CO., LTD. NACSA ENGINEERING CO., LTD.
Figure IV.22

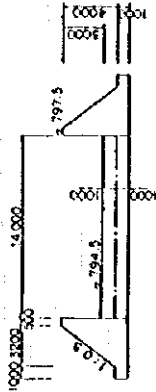
Plan of Upper Kapheu Scale 1:200



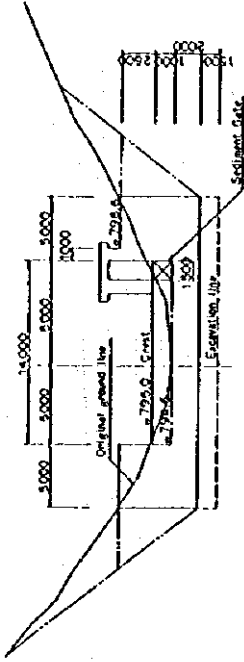
Detail of Intake Scale 1:20



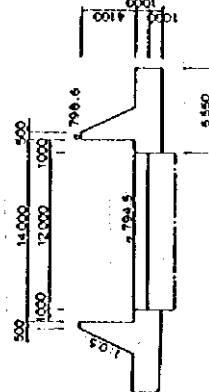
Section A-A Scale 1:200



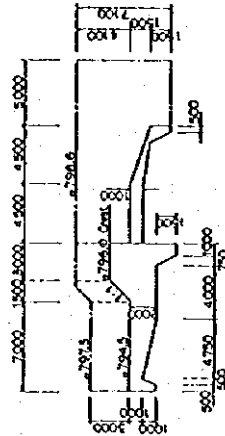
Section B-B Scale 1:200



Section C-C Scale 1:200

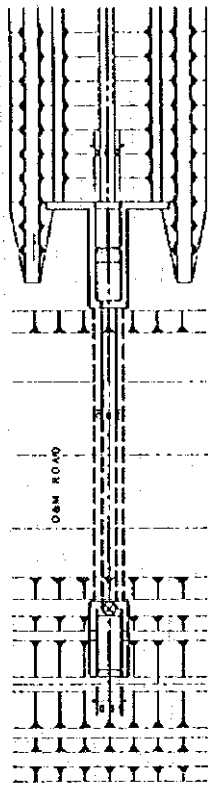


Section D-D Scale 1:200

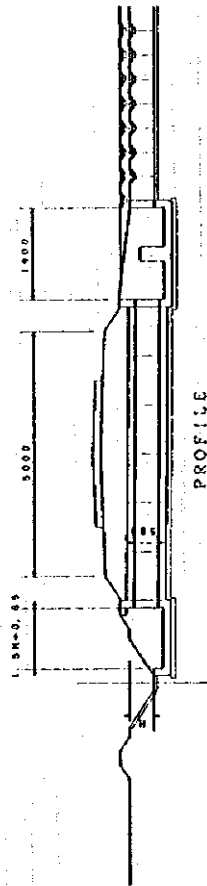


THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF AGRICULTURE AND FORESTRY	GENERAL LAYOUT ON INTAKE WEIR IN UPPER KAPHEU SCHEME	UPPER KAPHEU CO. LTD. GENERAL ENGINEERING CONSULTANTS
INTEGRATED AGRICULTURAL AND RURAL DEVELOPMENT PROJECT IN BOLIVIA FACTORY		
TITLE OF DRAWING		
FIGURE IV.23		

TURNOUT

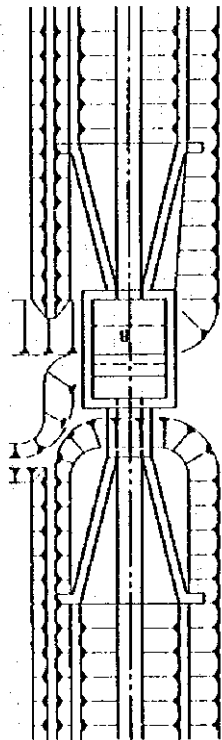


PLAN

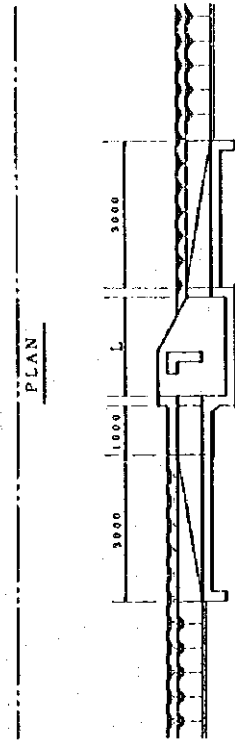


PROFILE

IMPACT BOX

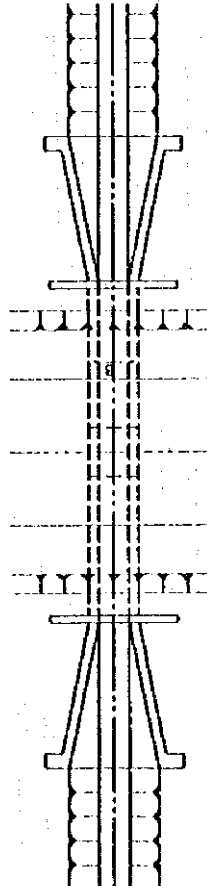


PLAN

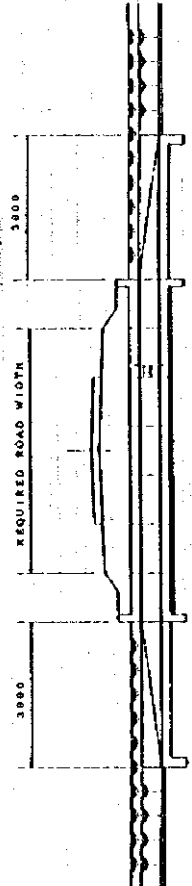


PROFILE

ROAD CROSSING



PLAN



PROFILE

TURNOUT

TYPE	K	WATER LENGTH
1	0.3	1.10
2	0.4	1.20
3	0.5	1.40
4	0.6	1.55
5	0.7	1.70

IMPACT BOX

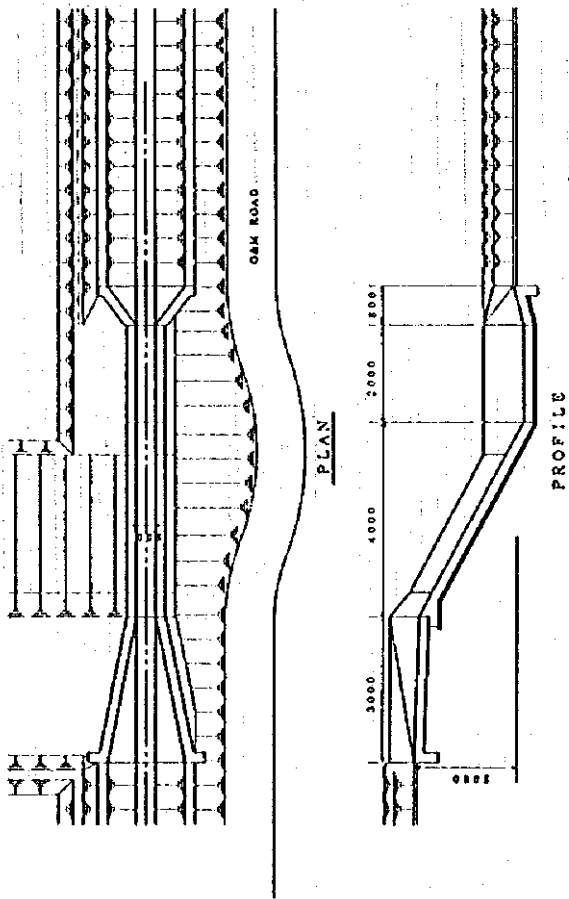
TYPE	DISCHARGE (M ³ /SEC)	B (CM)	L (CM)
1	1000	1.00	1.50
2	1500	1.50	2.00
3	2000	2.00	2.50

ROAD CROSSING

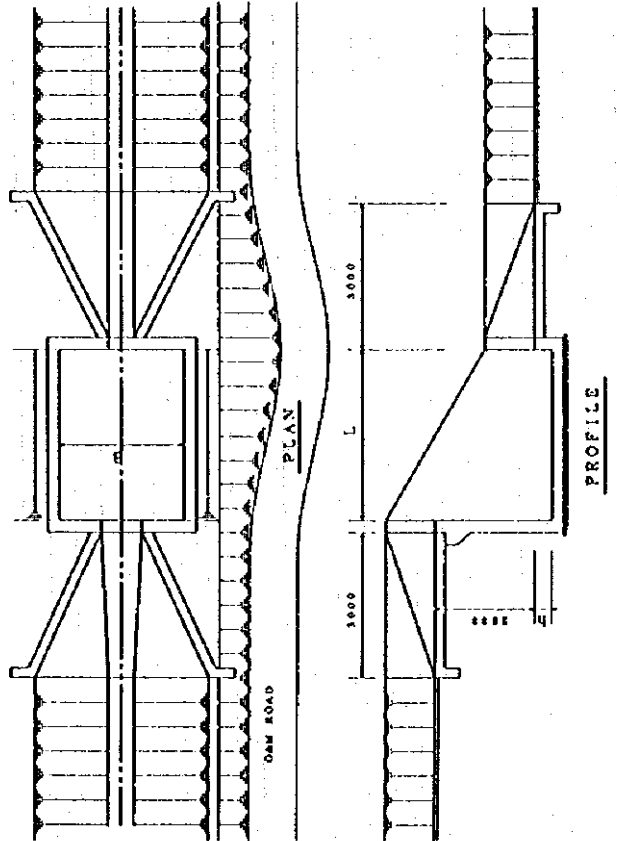
TYPE	BARREL (CM)		TYPE	BARREL (CM)	
	B	H		B	H
<u>SINGLE BARREL</u>					
1	0.40	0.40	10	0.90	0.50
2	0.60	0.40	11	1.10	0.40
3	0.60	0.40	12	1.30	0.40
4	0.80	0.50	13	1.50	0.40
5	1.00	0.50	14	2.00	1.00
<u>PIPE BARREL</u>					
6	1.10	0.60			
7	1.30	0.80	P-1 DIA. 900 mm		
8	1.80	0.80	P-2 DIA. 1,200 mm		
9	2.00	1.00			

THE LAO PEOPLES DEMOCRATIC REPUBLIC
 MINISTRY OF AGRICULTURE AND FORESTRY
 THE INTEGRATED AGRICULTURAL AND RURAL
 DEVELOPMENT PROJECT IN BOLDOVEN PLATEAU
 TITLE OF DRAWING
 RELATED STRUCTURES
 FOR CANAL SYSTEM No-1
 HIPPON KORI CO. LTD
 NAJCA ENGINEERING CO. LTD
 Figure IV-24

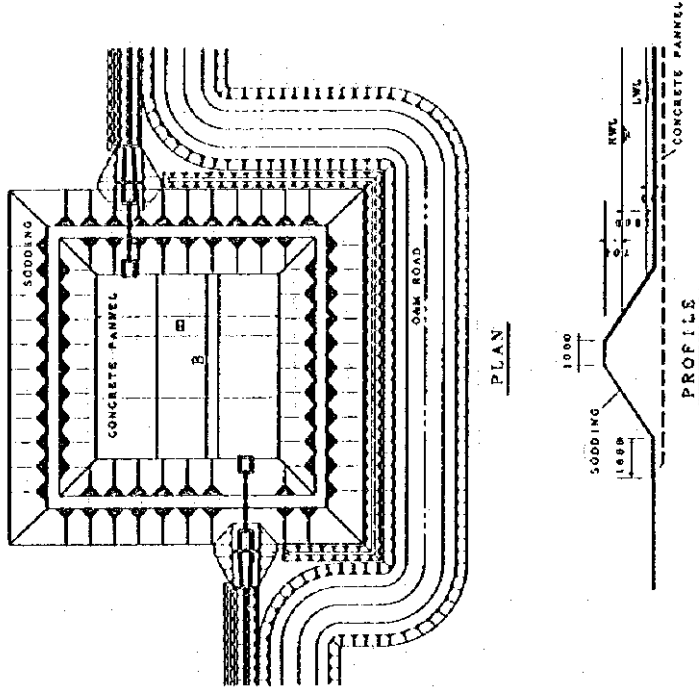
INCLINED DROP



DROP



FARM POND



INCLINED DROP

INLET	CHUTE	REGULATORS	OUTLET	WIDTH (m)
3.00	4.00	2.00	0.80	0.58

DROP

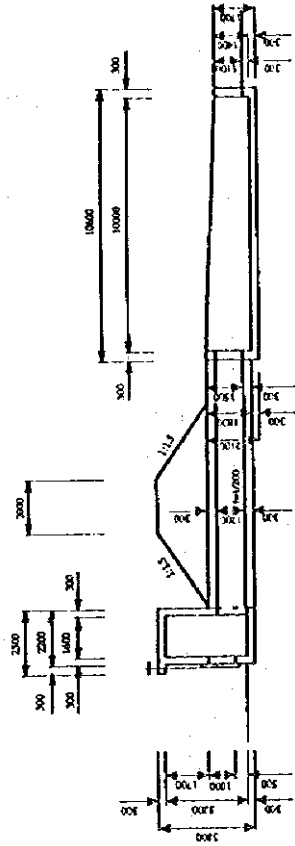
Q (MS/SEC)	L (m)	B (m)	H (m)
LESS THAN 1.0	3.50	2.50	0.35
MORE THAN 1.0	5.00	2.50	0.80

FARM POND

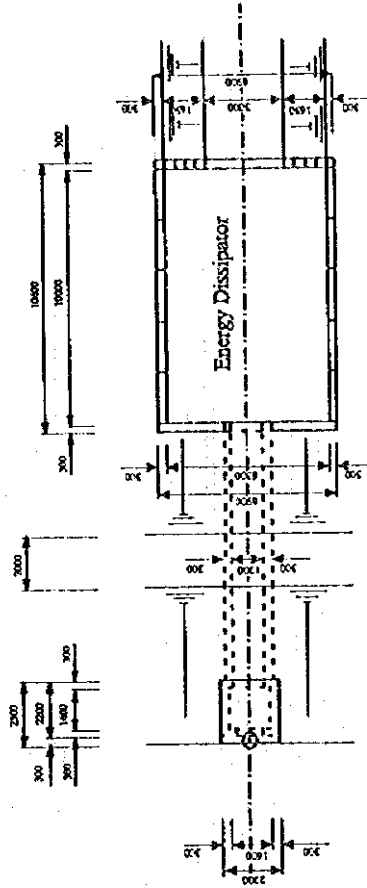
TYPE	BASIC DIMENSION		TYPE	BASIC DIMENSION	
	B (m)	V (m ³)		B (m)	V (m ³)
1	15	225	9	35	1,826
2	20	400	6	40	3,600
3	28	825	7	45	2,925
4	30	900	8	50	2,500

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
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 THE INTEGRATED AGRICULTURAL AND RURAL
 DEVELOPMENT PROJECT IN SODOMEN PLATEAU
 TITLE OF DRAWING
 RELATED STRUCTURES
 FOR CANAL SYSTEM NO-2
 NIPPON KOKI CO., LTD
 NATCAL ENGINEERING CO., LTD
 FIGURE IV-25

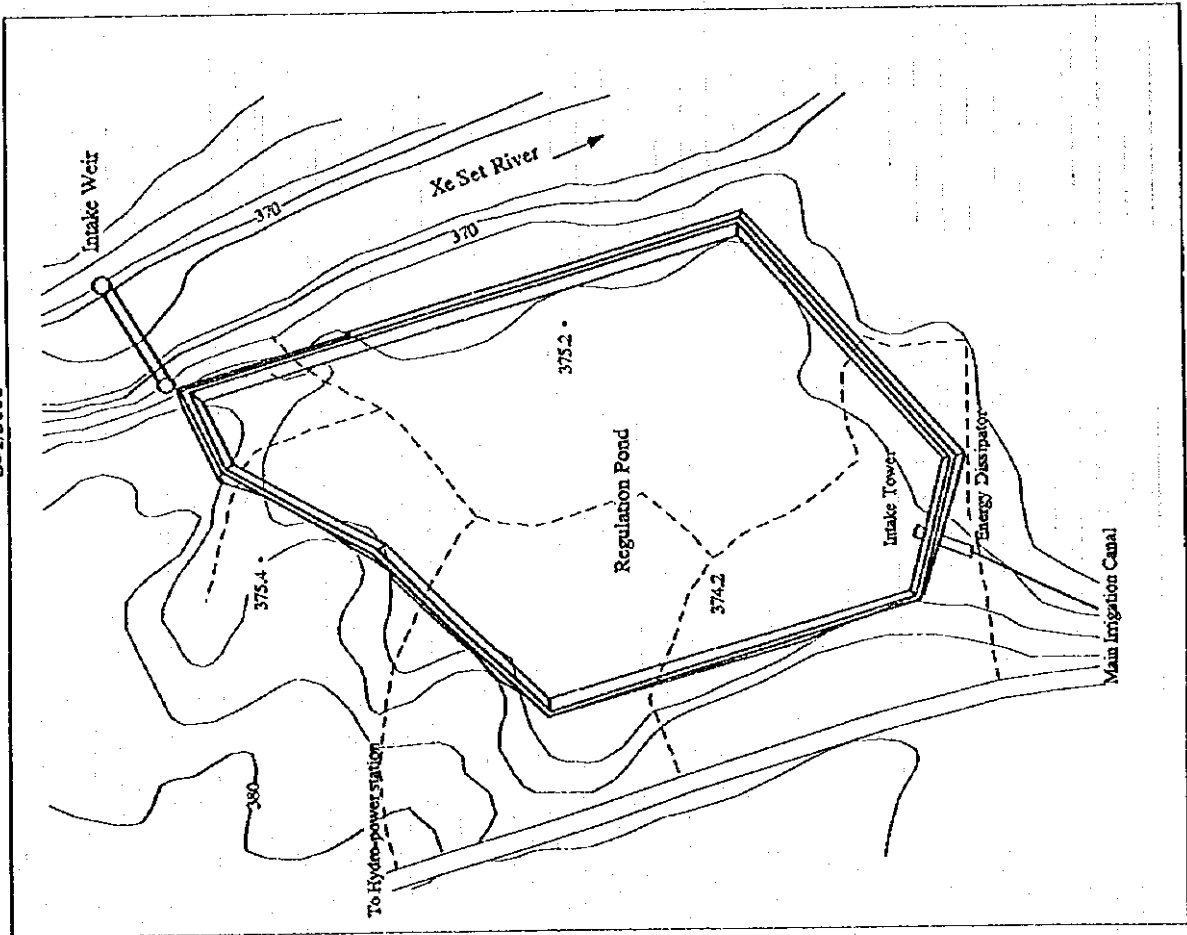
INTAKE FACILITIES CROSS SECTION
S=1/200



INTAKE FACILITIES PLAN
S=1/200



PLAN
S=1/3000



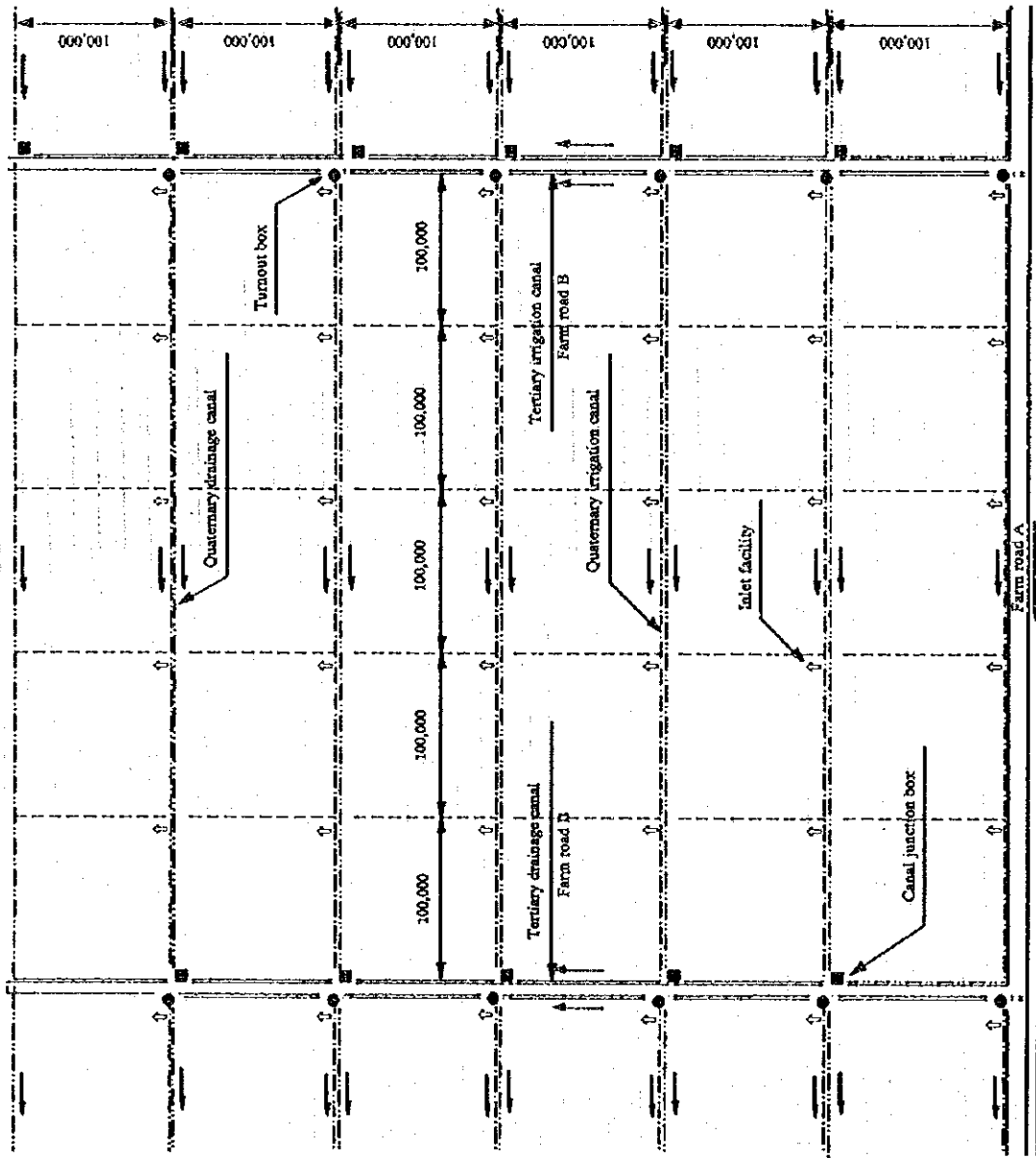
THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
MINISTRY OF AGRICULTURE AND FORESTRY
THE NATIONAL AGRICULTURAL AND RURAL
DEVELOPMENT PROJECT IN BOLIVIAN PLAINS
TITLE OF DRAWING

**REGULATION POND
IN LOWER XE SET**

HYDRO-KOBE CO., LTD.
NUSAENGRINGROO, LTD.

Figure IV.26

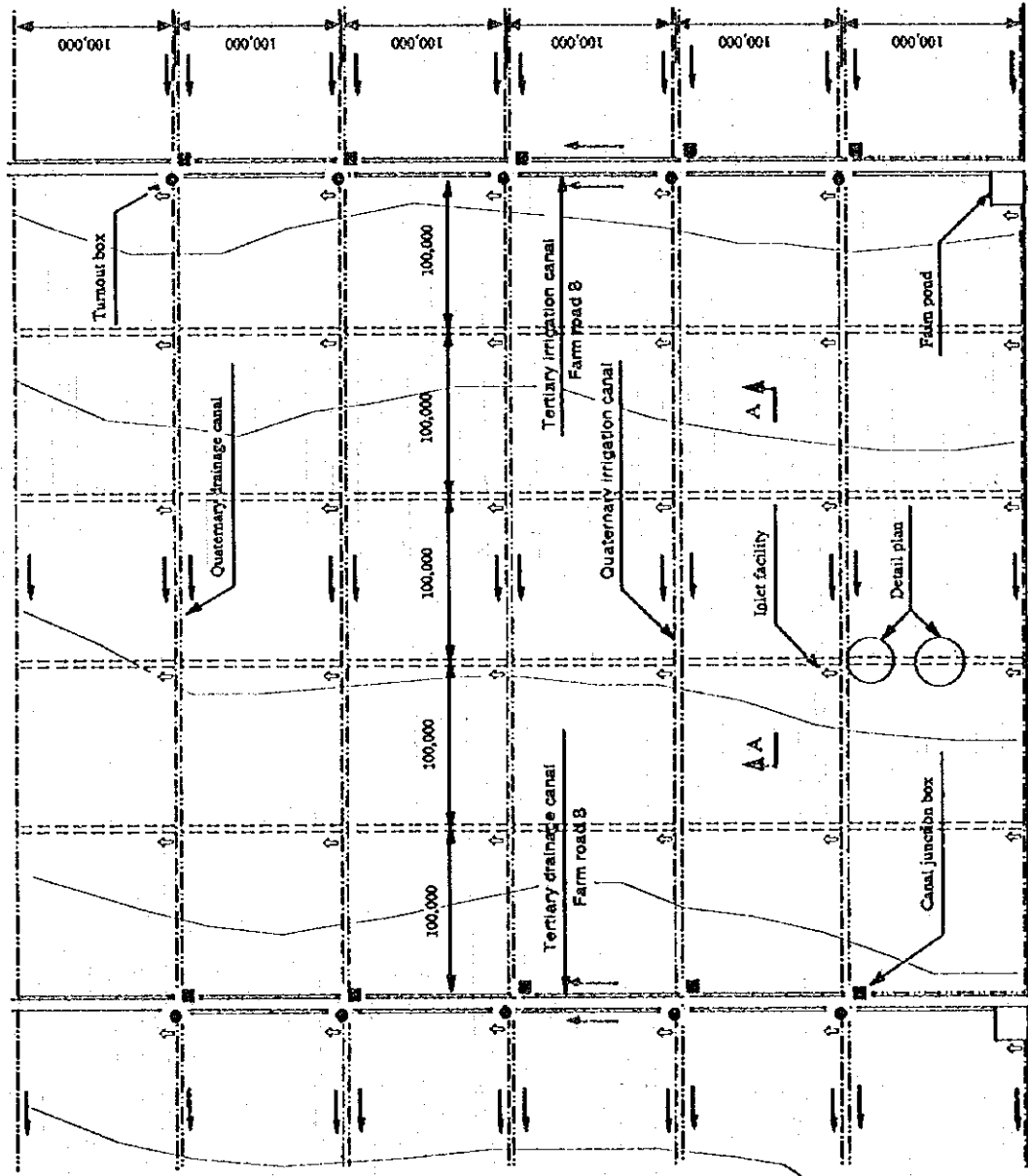
PLAN



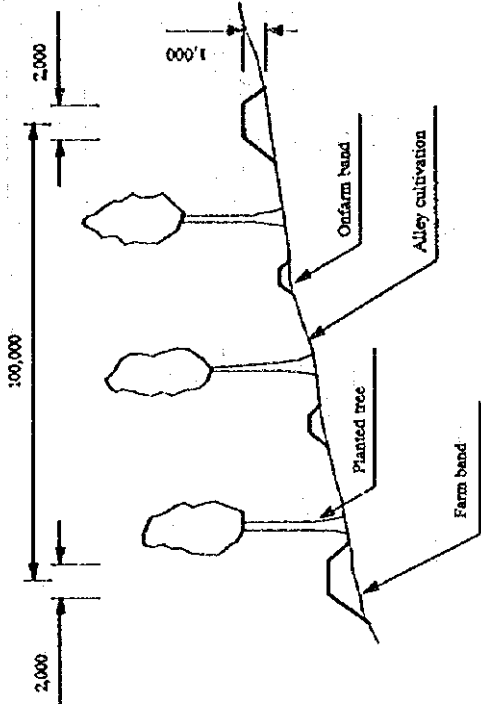
Legend	
	Farm road
	Boundary of a farm block
	Quaternary irrigation canal
	Quaternary drainage canal
	Inlet facility
	Turnout box
	Canal junction box

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
 MINISTRY OF AGRICULTURE AND FORESTRY
 THE INTEGRATED AGRICULTURAL AND RURAL
 DEVELOPMENT PROJECT IN JOUDET PROVINCE
 TITLE OF DRAWING
**UNIT IRRIGATION NETWORK
 FOR PADDY FIELD**
 NETON CANAL CO. LTD
 KAMAL ENGINEERING CO. LTD
 Figure IV.27

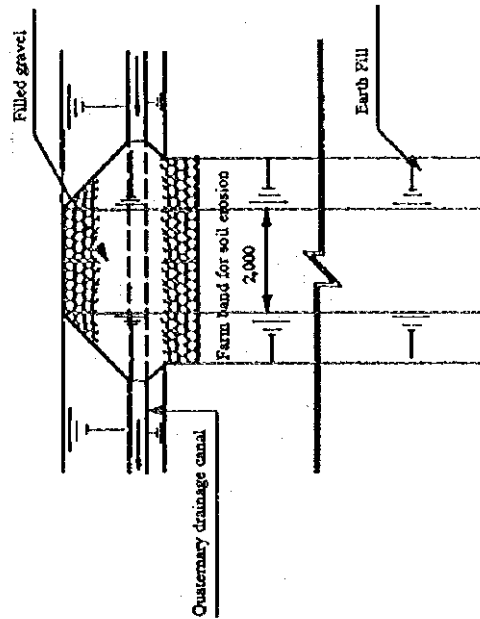
PLAN



A-A SECTION



DETAIL PLAN



THE S.A. PROJECT IN THE REPUBLIC
 MINISTRY OF AGRICULTURE AND FORESTRY
 THE INTEGRATED AGRICULTURAL AND RURAL
 DEVELOPMENT PROJECT IN BOLIVIA (PART I)

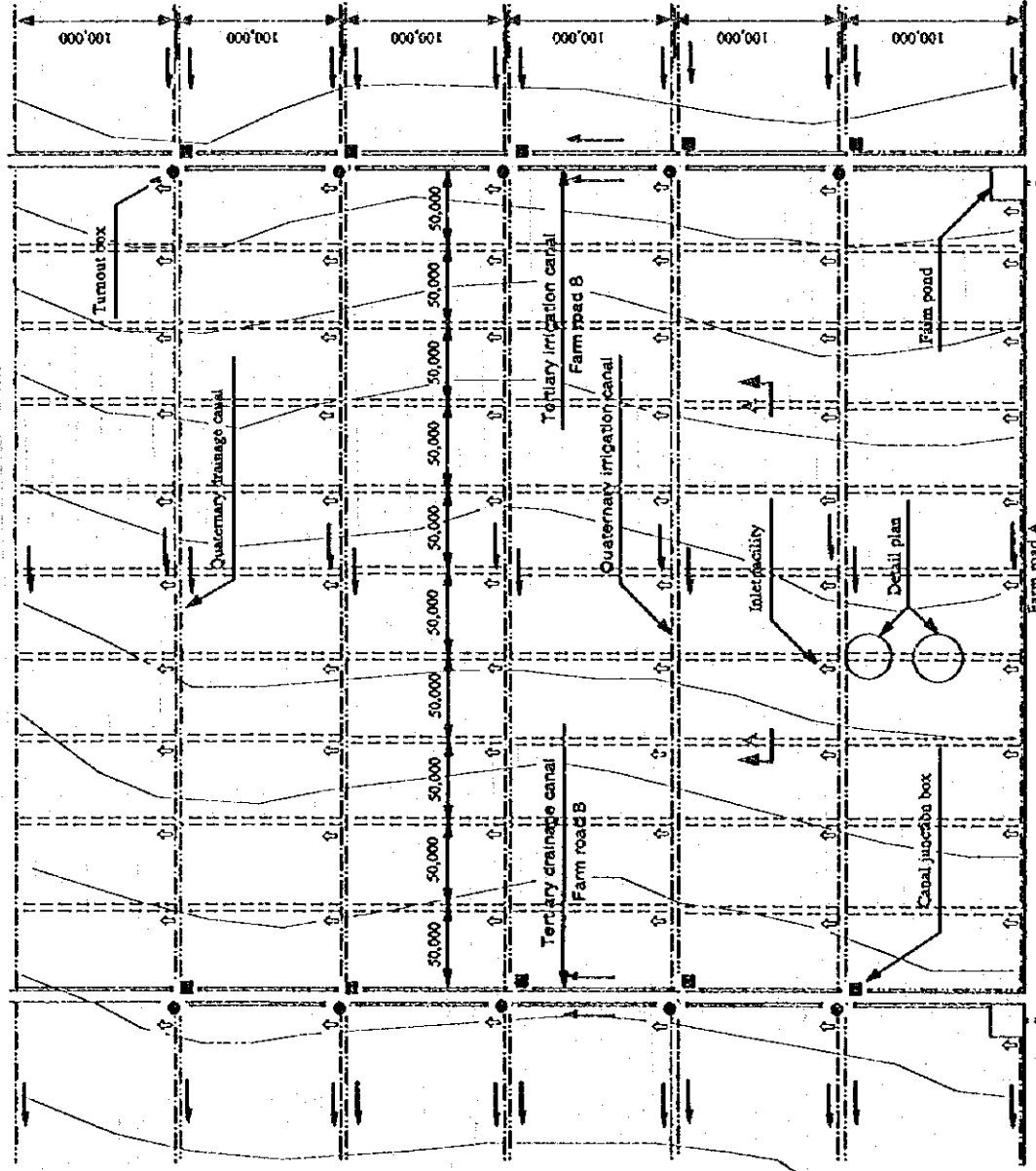
TITLE OF DRAWING: **UNIT IRRIGATION NETWORK
 FOR UPLAND CROPS No.1
 (SLOPE IS LESS THAN 5%)**

MAPON-LORON CO., LTD.
 MANILA (PHILIPPINES)

Figure IV.23

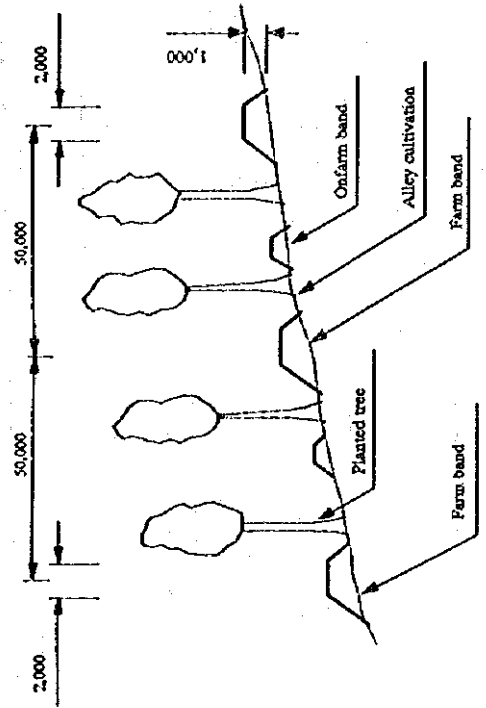
Main and Secondary Irrigation Canal

PLAN

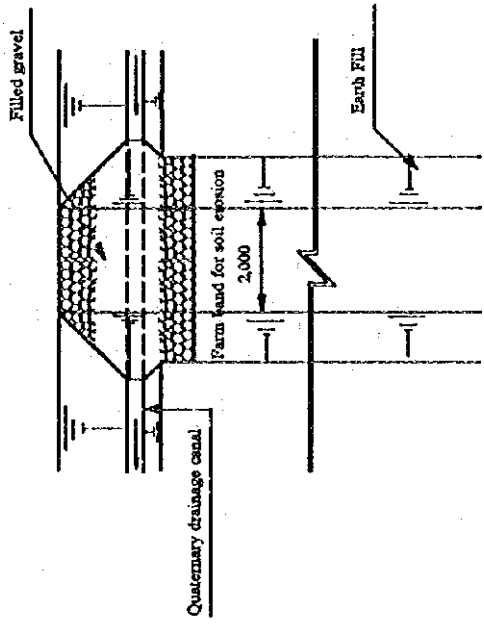


Main and Secondary irrigation canal

A - A SECTION

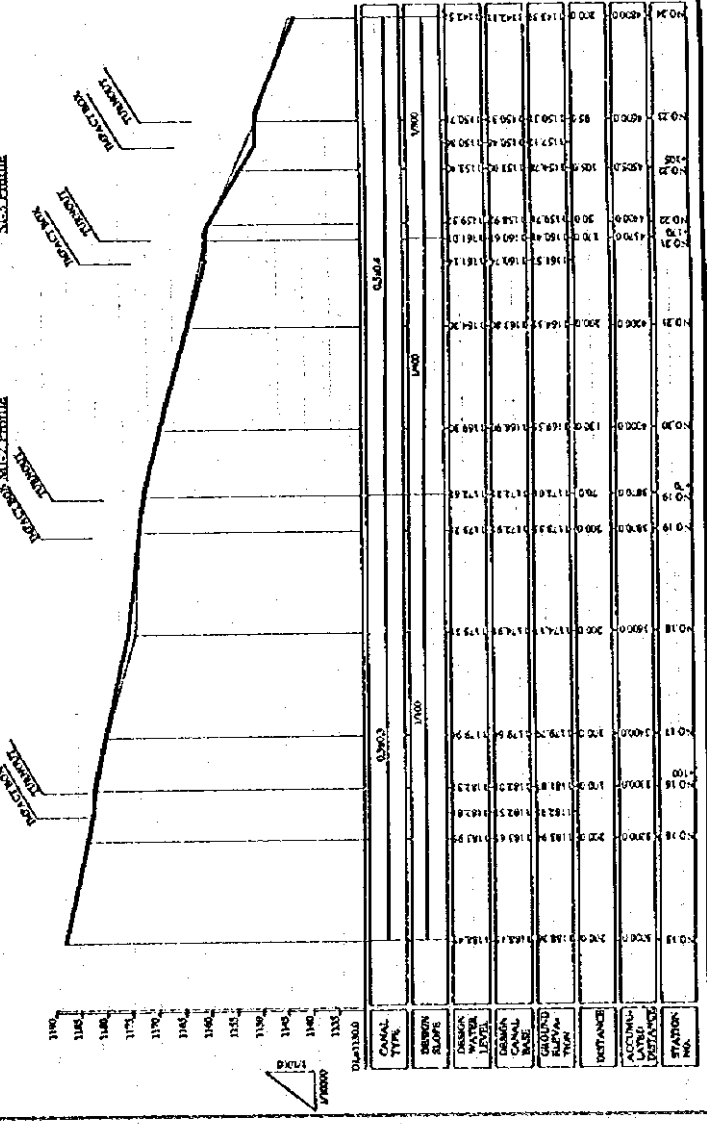
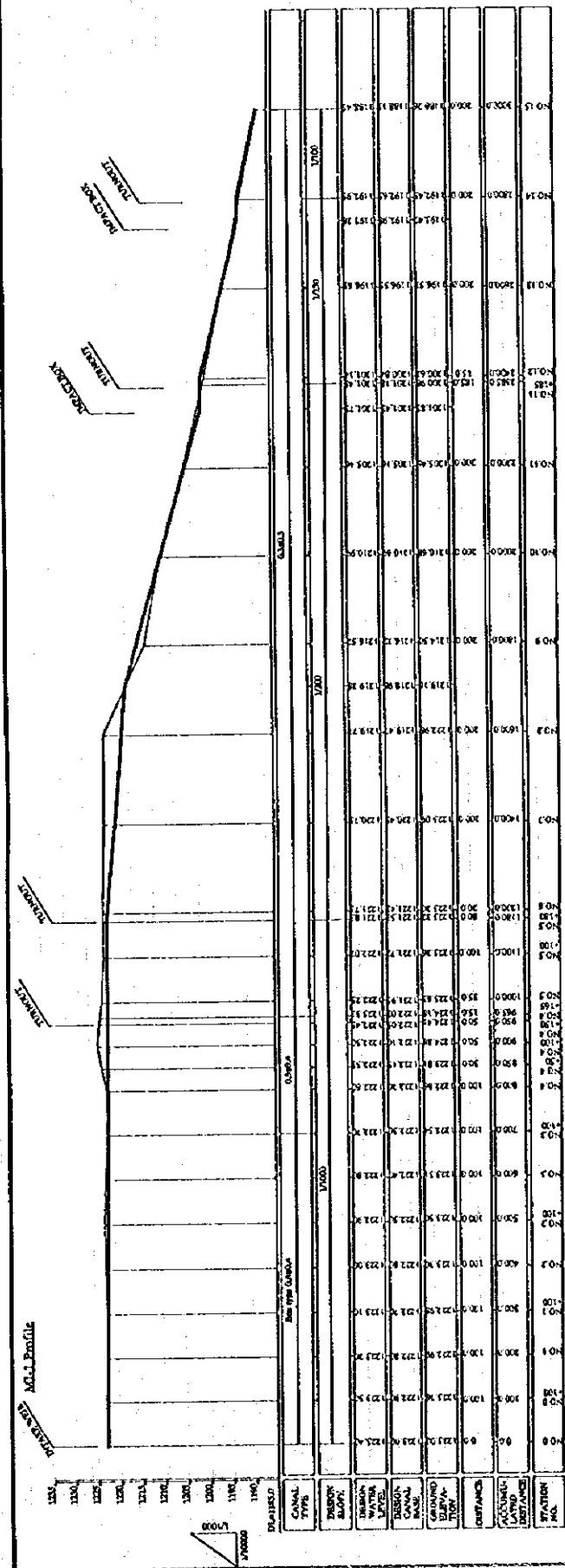


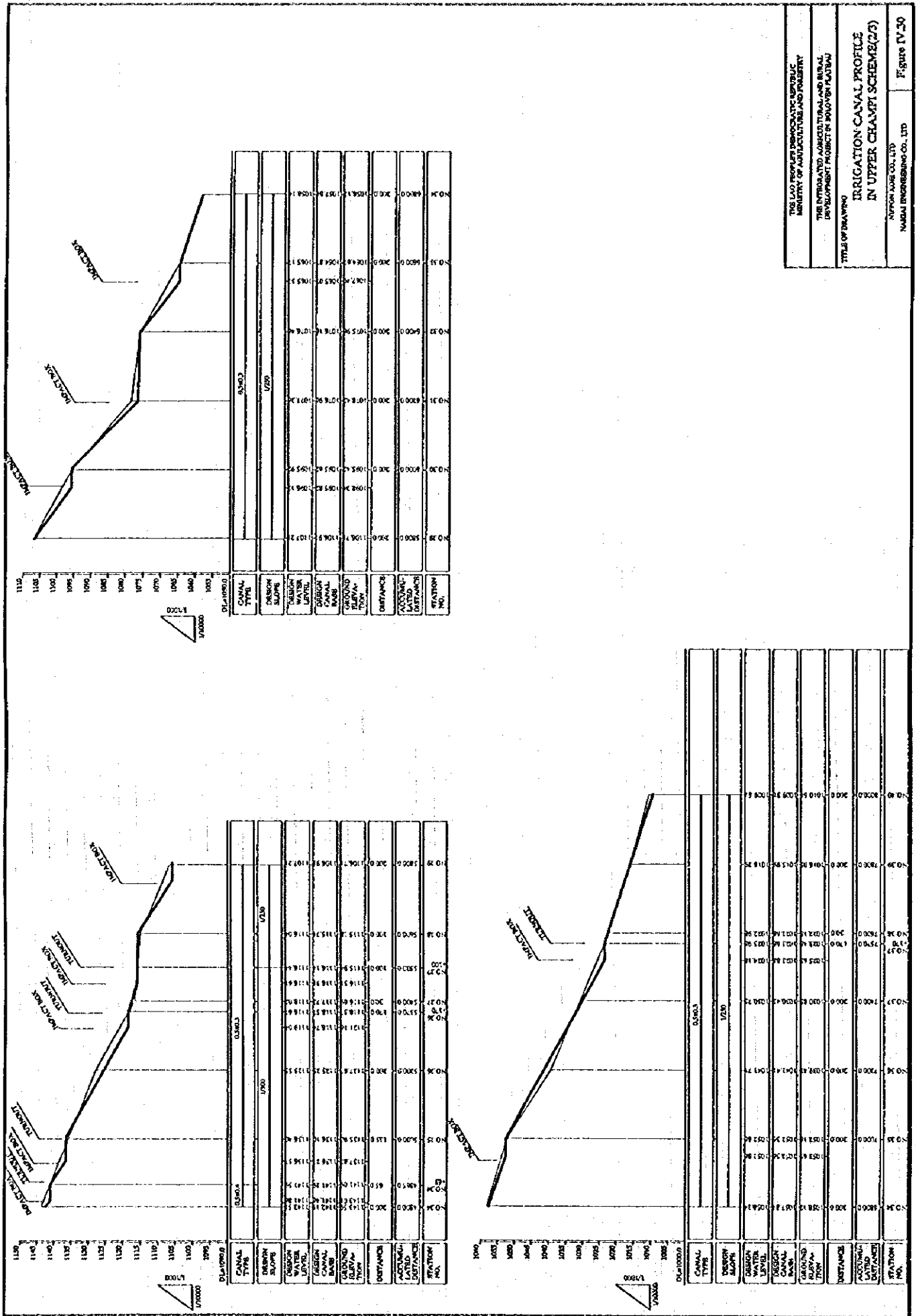
DETAIL PLAN



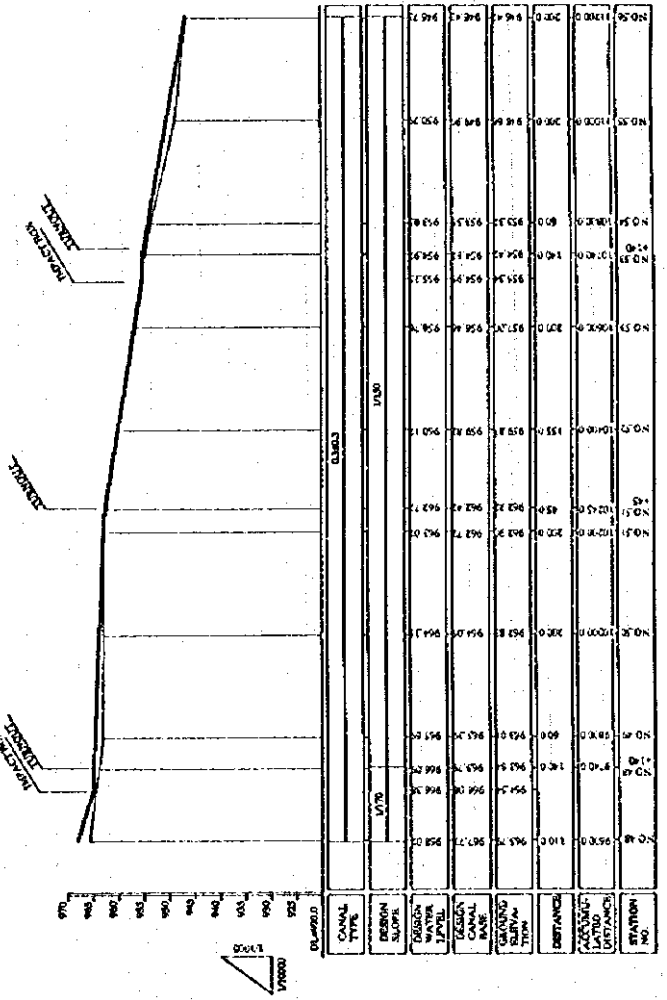
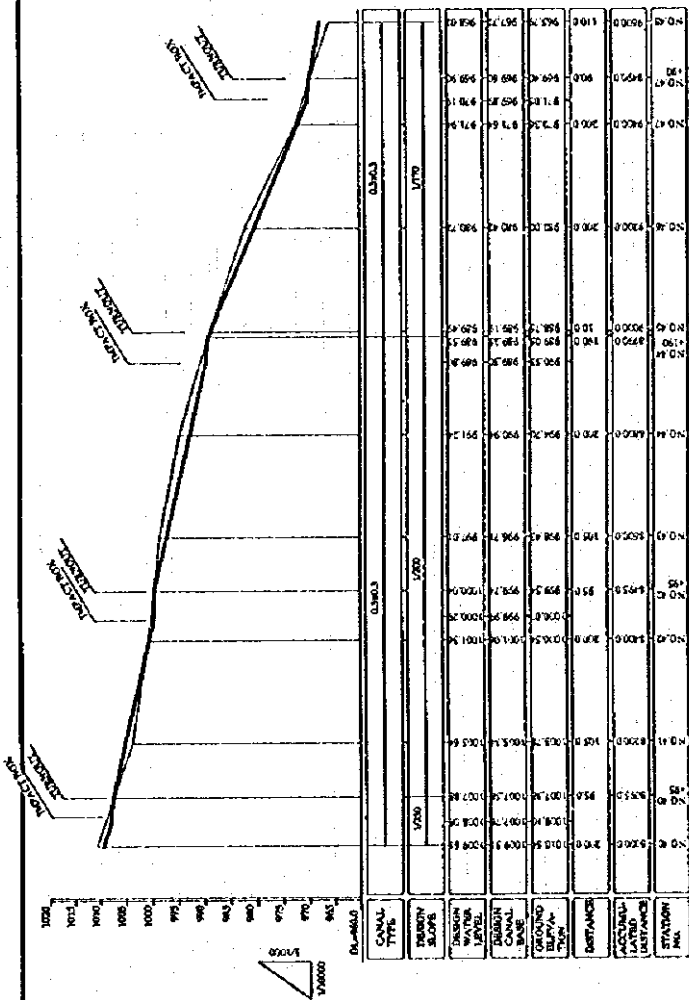
THE LAD POKHRI DEVELOPMENT BOARD PUNJAB AGRICULTURAL UNIVERSITY
THE INTEGRATED AGRICULTURAL AND RURAL DEVELOPMENT PROJECT IN PUNJAB PLATAU
TITLE OF DRAWING: UNIT IRRIGATION NETWORK FOR UPLAND CROPS No.2 (SLOPE IS MORE THAN 5%)
POPON KISH CO. LTD MUMBAI ENGINEERING CO., LTD
Figure IV.29

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
 MINISTRY OF AGRICULTURE AND FORESTRY
 NATIONAL CENTER FOR AGRICULTURAL
 DEVELOPMENT TRAINING IN POLY-TECHNICAL
 TITLE OF DRAWING
 IRRIGATION CANAL PROFILE
 IN UPPER CHAMPI SCHEME(1/3)
 NATION CON. CO., LTD.
 NAKAI ENGINEERING CO., LTD. Figure IV.30





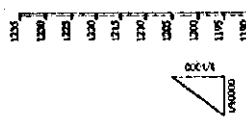
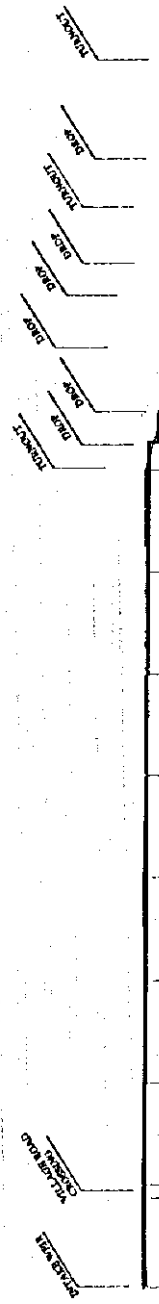
THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
 MINISTRY OF AGRICULTURE AND FORESTRY
 THE INTEGRATED AGRICULTURAL AND RURAL
 DEVELOPMENT PROJECT IN BOUOENG RATTANA
 TITLE OF DRAWING
**IRRIGATION CANAL PROFILE
 IN UPPER CHAMPI SCHEME(23)**
 SUPPLIER: NIPON KURE CO., LTD.
 DRAWN: NAGAI ENGINEERING CO., LTD.
 Figure IV-20



THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
 MINISTRY OF AGRICULTURE AND FORESTRY
 THE NATIONAL AGRICULTURAL AND RURAL
 DEVELOPMENT PROJECT IN BOLIVIAN PLAIN
 TITLE OF DRAWING
**IRRIGATION CANAL PROFILE
 IN UPPER CHAMPT SCHEME(3/3)**
 NAPPON 2003.01.01
 NAGRAI ENGINEERING CO., LTD. Figure IV.30

M.L. Profile

S.L. Profile

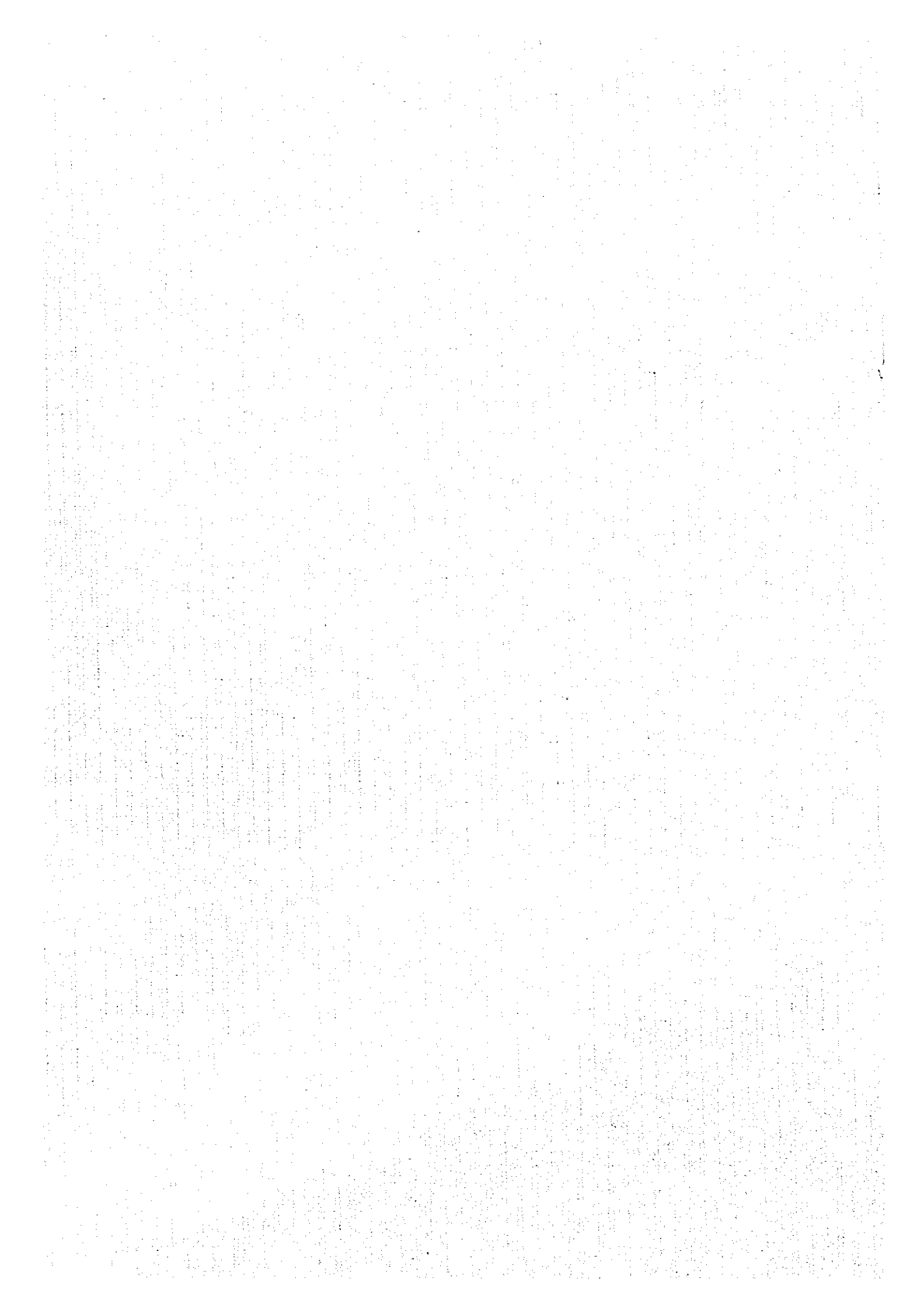


STATION NO.	STATION DISTANCE	GROUND ELEVATION	DESIGN CANAL ELEVATION	DESIGN CANAL WIDTH	DESIGN CANAL DEPTH	DESIGN CANAL AREA	DESIGN CANAL PERIMETER	DESIGN CANAL VOLUME	DESIGN CANAL CAPACITY	DESIGN CANAL VELOCITY	DESIGN CANAL FRICTION	DESIGN CANAL LOSS	DESIGN CANAL EFFICIENCY
0+0	0.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+1	100.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+2	200.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+3	300.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+4	400.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+5	500.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+6	600.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+7	700.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+8	800.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+9	900.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+10	1000.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+11	1100.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+12	1200.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0+13	1300.00	125.00	125.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
 MINISTRY OF AGRICULTURE AND FORESTRY
 THE INTEGRATED AGRICULTURAL AND RURAL
 DEVELOPMENT PROJECT IN BOUAVEN PLATOU
 TITLE OF DRAWING
 IRRIGATION CANAL PROFILE
 IN UPPER TAPOUNG SCHEME
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 Figure IV.31

ANNEX V

**AGRICULTURAL SUPPORT
SERVICES**



ANNEX-V AGRICULTURAL SUPPORT SERVICES

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ANNEX-V AGRICULTURAL SUPPORT SERVICES

I INTRODUCTION

The Annex-5 presents agricultural support services based on the results of agricultural support survey in the Study Area as well as Champasak, Salavan and Sekong provinces, and in the priority scheme selected from the Master Plan Study, such as Upper Champi, Upper Tapoung, Upper Kaphou, Lower Xe Set and Upper Tay-Un schemes.

The survey on agricultural support services, the survey was carried out through, (i) direct observation, interview with officials concerned of the relevant authorities at the central, provincial and district level, (ii) collection of data and information from these authorities, and (iii) data review including the data collected from such authorities and other reports on agriculture of Laos.

This ANNEX consists of :

- (1) identification of the agricultural support situations in the study area and the priority scheme area;
- (2) study of current constraints for agricultural support services; and
- (3) proposal of the improvement and development plan of agricultural support services in the study area and the priority scheme area.

2. THE MASTER PLAN STUDY

2.1 Present Condition

2.1.1 Government Organization

The provision of agricultural support services is the responsibility of the MAF and the provincial agricultural and forestry authorities. Agricultural and forestry services are organized into three levels: central, provincial and district. The central level consists of the Ministry itself with its departments, various institutions, research stations, and of rice seeds production. Agricultural and forestry services at the provincial level follow national policy and guidelines. The provincial authorities provide technical support for the district service units administrated by district offices. Organization charts of MAF and the provincial and district agriculture and forestry authorities are shown in Figure V-1-1 to -1-3.

2.1.2 Agricultural Research

The National Agricultural Research Centre (NARC), MAF is the responsibility of research at the central level, and operates the works in cooperation with the MAF's Department of Agriculture and Extension (DAE) and the provincial agricultural and forestry services. Because rice is the predominant crop occupying more than 80 percent of the cultivated area in the Lao PDR, the present agricultural research is primarily concerned with rice. In 1992, the national rice research network consisted of the National Agricultural Research Center (NARC), DAE, MAF, in Vientiane and the key research station supported by three research stations located in the provinces Luangprabang (upland research), Champasak (in Pakse), and Xayabury. The national research network operates in cooperation with the MAF's DAE and the provincial AFSs.

The research stations relating to the study area are Phone Ngam Research Station which carries out lowland rice research, experimentation and extension under the National Rice Research Programme (NRRP) supported by the Lao-IRRI Project, Ban Itou Research Station of the LUADP, financed by the World Bank with technical assistance by the French government, which conducts research on coffee (at the end of February, 1996, technical assistance for upland crops by the Australian government was concluded). Further, the Fruit-tree Research Station of Champasak province, located at Km 20, carries out research and production of fruit tree seedlings such as durian, and teak for reforestation. As new station, Palay Upland Crop Research Station of Champasak province is now under construction at the site of Palay Irrigation Project, will conduct upland crop research and trials. The Fishery Research and Extension Station, located at Km 8, carries out research and extension of freshwater fishery, and fingerling production and distribution.

Except for Phone Ngam and Ban Itou research stations whose activities are supported by international organizations, the activities of these stations have been stagnated due to deteriorated facilities, under skilled manpower, insufficient research staff and budget shortages. However, presently, the Fruit-tree Research Station is rehabilitating its facilities and having electricity installed. Besides, the Fishery Research and Extension is now under planning the rehabilitation program of existing facilities by the Mekong Commission. Pakxong Livestock Station, located at Km 49, is now under reconstruction and will reopen as the Livestock and Veterinary Research Station fro the Southern Region. This station aims to promote small-holder farmers, guide livestock raising techniques for livestock farmers, anlyse problems with current animal husbandry techniques and to supply improved grass seeds and breeds.

Agricultural research institutions related to the study area are tabulated as follows:

Research Station	Location	Authorities	Research and Activities
a. Phone Ngam Research Station	Pakse	NARC	Rice research and extension under the National Rice Research Programme International Cooperation: IRRI, SDC
b. Fruit-tree Research Station	Km 20	AFS Champasak	Research and Seedling production and distribution
c. Fishery Research and Extension Station	Km 8	AFS(LVS) Champasak	Research and extension, fingerling production and distribution
d. Ban Itou Research Station	Km 35	LUADP	Research and extension of coffee production for the target villages International Cooperation: World Bank, French government
e. Livestock and Veterinary Research Station	Km 49	DLVS, MAF	Research and demonstration of livestock breeding and animal health, under construction
f. Upland crop Research Station	Palay	AFS Champasak	Research and trials of upland crops Under construction

2.1.3 Agricultural Extension and Support Services

The agricultural extension activities at the central level is the responsibility of the Agricultural Extension Agency (AEA) established in 1992 and are operated in cooperation with the NARC and DAE. All the provincial and district authorities were centralized into the national system. AEA takes responsibility for technology transfers for farmers, information and publicity on agricultural policies, farming methods and plant protection. It also is responsible for the extension staff and farmer through activities such as training and demonstrations using a model farm.

The activities of this agency are being carried out as follows:

(1) Establishment of Model Farmer:

Establishment of 1,200 model farmers to be selected from progressive rice farmers throughout the country and the training of these farmers in order to strengthen extension activities in village level,

(2) Training for the Provincial and District Extension Staff:

The training of the provincial and district extension staff aims to improve of the technical capability of the extension staff concerning farming technology on lowland rice, secondary crops, plant protection and extension methods, in line with the National Integrated Extension and Research Programme (NIERP),

(3) Extension of IPM (Integrated Pest Management):

Extension of IPM through on-farm training and farmer school, and

(4) Agricultural Extension Support to Provincial AFSs:

Support to the provincial AFSs by back up technical knowledge of crop production.

However, this agency has many problems such as a shortage of qualified extension staff, an insufficient budget and lack of equipment for extension work. Currently, training in extension methodology given to staff and extension officers of the provincial services is provided by the AEA. On the other hand, in 1995, the AEA was held four training courses on irrigated farming technology for extension officers and farmers in the target areas of the Farmer Irrigated Agriculture Training Project (FIAT) supported by UNDP, in collaboration with the Department of Irrigation, MAF.

Agricultural extension services in the study area are under the responsibility of the provincial and district AFSs concerned with the area. The agricultural and forest sections of each district AFS consist of agriculture, forestry, livestock and veterinary, irrigation and meteorology. (see Table V-1-1 and Figure V-1-4 and -1-5)

The extension services in the study area have not functioned well for the same reasons as the AEA and the training has not been carried out regularly. The provincial AFSs have been held a training course once a year, for village leaders at their offices. In the guidelines for agricultural extension activities, the MAF has set up as a target one extension officer for five villages, but the actual number of villages assigned to extension staff is more than ten villages in the study area. For this reason and because transportation, such as motorcycles, is unavailable, visits to each village for technical assistance and training for transfer technology has been done only one or two times in a year. In a farm survey conducted in the study area, 60 percent out of a sample of 200 farmers could not obtain technical assistance and training from extension staff of the district AFSs.

Recently, in these circumstances, agricultural extension by village volunteers selected among progressive farmers in the village was adopted. The on-farm training for village farmers is carried out on the demonstration farms by the extension staff of the provincial and district AFSs. However, in the study area, this system has not yet been introduced.

On the other hand, LUADP has established extension station, located at Ban Itou, for the purpose of extension work in the target villages (63 villages) of the project. Agricultural extension is not limited to coffee production in the Pakxong, Laongam and Thateng districts, but also upland crops such as lowland rice, legumes and fruit in the Bachiang, Laongam and Thateng districts. Currently, the extension activities of the project concentrate to the target villages of coffee production, with 11 extension staff of the station, and the extension works for upland crops and fruit are not undertaken, as the Australian government's cooperation concluded.

The extension services for livestock and veterinary are mainly concerned with vaccination and disease control in the village. In the results of the farm survey, 98 percent of sample farmers requested vaccination services and 5 percent listed the necessity of improved grass seeds.

The extension services for forestry in the area are carried out in the special forest areas (SFAs) and the forest conservation areas by the provincial and district extension staff under the Lao-Swedish Forest Cooperation Programme (SIDA Project). This project aims to promote the introduction of cash crop production, lowland rice cultivation and freshwater fish culture to convert sustainable agriculture from shifting cultivation.

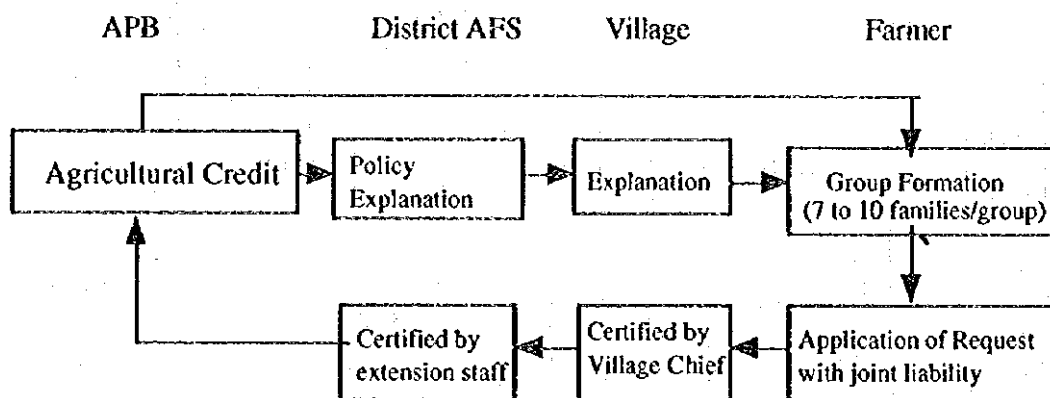
2.1.4 Agricultural Credit Services

Until August, 1994, agricultural credit was delivered by the Pak Thai Bank in Pakse, a state-owned bank, in the study area. Agricultural Promotion Bank (APB) established in August, 1994, by the government decree, for the purpose of agricultural promotion. APB's

Pakse and Salavan branches provide agricultural credit to farmers as the public financing institution for the agricultural sectors. In November, 1995, APB established Sekong branch and Pakxong office. (see Figure V-1-6) The credit recipients consist of farmer groups, individual farmers and traders of agricultural products. Therefore, APB strives to form farmer groups for credit lending in the village in cooperation with extension officers and the staff of the provincial and district AFSs. The group is formed by farmers (7 to 10 members) within the same village who are jointly liable for the loan. According to APB, the total amount of loans released in 1995 in the three branches related to the study area are as follows:

- Pakse branch : 4,003,384,923 kip
- Salavan branch: 1,117,116,300 kip
- Sekong branch: 120,000,000 kip

Loan conditions and loan amount in the study area are shown in Table V-1-2 to -1-3. The procedure of the APB's agricultural credit is illustrated as below.



From the rural socio-economic survey, it appears that the loan amount from APB is 75,000 kip to 1,500,000 kip per households. In case of small loans, there is credit through farmer's group. Only about 27 farm households (13.5%) of 200 sample households are benefit from the APB's credit. Most of the formal credit is short term (up to one year).

In the study area, a farmers' association as Grameen-style operations (mutual financing by money collected from villagers) was established recently for the purpose of providing mutual assistance to village farmers. The village farmers can borrow money from the fund for medical expenses, purchase of a paddy, and other emergency cases at an interest of 5% per month.

2.1.5 Farmers' Organization

There are some farmers' organization established by LUADP, APB and the forestry services in the study area. Besides, there are village organizations such as the village committee (for administration), the village units (nuay), elders groups, including the national front, youth association and the women's union under the government's patronage. In the village surveyed (10 villages), there are 4 extension groups, 3 education groups, and 5 health groups. In the study area, 63 extension groups were organized in the target villages of the LUADP. In 128 villages, 385 farmer groups were organized in order to obtain the formal credit form the APB. In villages located in the SFA or FCA, the village resource management and development committees supported by the provincial and district AFSs (under the SIDA project), have established 13 committees in the Baching district, 14 committees in the Pakxong district, and

14 committees in the Laongam district, respectively.

On the other hand, an autonomous farmers' association has been established in the village of Lao Loum ethnic groups, for the purpose of mutual assistance to villagers. The provincial women's union strives for the establishment of a rice and cattle bank pilot project in each district to improve the living conditions in rural areas in collaboration with the NGOs.

2.1.6 Women's Role in Agriculture

Generally, women in rural area are involved in all stages of agricultural production. In addition, domestic activities, i.e., housekeeping and child care, are an essential part of women's work. According to a UNICEF report, 16 percent of girls and 7 percent of boys in the 11-15 year age group were occupied in the agriculture sector.

As mentioned in the preceding section, the study area is an ethnically diverse society distributed widely of the Lao Loum and Lao Thueng out of three main ethnic groups. Gender based division of labor varies among ethnic groups of Lao Loum and Lao Thueng by farming patterns such as coffee growing and slash and burn cultivation, and is linked to the social status of the women. Upland farming (slash and burn cultivation) requires much more labor for a given yield than lowland agriculture, particularly in weeding, which is usually done by women. From the data surveyed in the area, the daily working hour of women in the farm field ranges from four to six hours, while the working hour of women in ethnic minorities villages is five to six hours. Rural women have to shoulder many tasks that have remained since olden times. These include feeding the pigs and poultry, taking care of the vegetable gardens, checking the fruit trees and collecting firewood from the forest or swidden fields. For farmers, this work becomes much more time-consuming depending on the frequency of trips from house to field and on the location of the water.

Domestic activities are essential to household maintenance. These activities include rice hulling, food preparation, fetching water, firewood collection, washing cloths and looking after their children. Condidring these activities as unproductive has been a major obstacle to the imrovement of working conditions and the status of women.

2.1.7 Water Users' Association

There is no water users' association established in the study area under the government arrangement. Few independent water user's groups exist in the small scale irrigation schemes of the area but are not well-operated owing to lack of fund for operation and maintenance and irrigation techniques.

In Champasak province, the provincial agricultural authorities initiated the organization of water user groups in the lowland rice production areas since 1994, and conducted training cources of irrigation management for beneficiaries. However, water user groups have not yet been well-organized in these areas so far due to lack of understanding on irrigation management among beneficiaries.

2.2 Development Constraints

Despite the fact that existing agricultural production areas such as coffee plantations, rice and vegetable fields as well as livestock raising have the potential to increase productivity, no package farming techniques have been developed. However, the constraints to agricultural support services cause low crop and livestock productivities in the study area, as listed below:

- (1) A shortage of qualified manpower exists because research and extension officers and staff are not trained. Consequently, a limited transfer of information and technology for introduction of improved farming practices is possible.
- (2) A shortage and/or deterioration of facilities and equipment for research and extension works, bring about poor research and extension services that do not aid in increasing crop and livestock productions which is the reason for the transfer of information and technology.
- (3) A shortage of operational funds for research and extension works generates the above mentioned situations.
- (4) A lack of appropriate agricultural credit opportunities at reasonable amount/interest rates.

2.3 Development Plan

2.3.1 General

As mentioned in 2.2 Development Constraints, the agricultural support services for farmers in the study area are very weak. In order to achieve the long term objectives of the rural and agricultural development proposal, it is essential to provide adequate and sufficient agricultural support services for farmers. This plan will provide various programs;

- (1) Strengthening the services for agricultural and livestock and veterinary based on the NIERP supported by ADB,
- (2) Improvement and strengthening of existing research stations,
- (3) Establishment of Highland Vegetable Trial and Demonstration Station, and
- (4) Formation of farmers' organization.

On the other hand, it is expected that sufficient services for livestock and veterinary in the future will be conducted by the strengthening of facilities and staff of the Livestock and Veterinary Research and Extension Station which are under construction in Pakxong district by DLVS, MAF.

Accordingly, implementation of these programs will be done in the short period of the development plan. These programs are summarized as follows:

2.3.2 Agricultural Research and Extension

- (1) Agricultural research

The activation of existing Fruit-tree Research Station at Km 20, and Fishery Research and Extension Station at Km 8, located at the east of Pakse, in which the activities are stagnated due to deteriorated and weak facilities and manpower, will be planned through the improvement and strengthening of these issues. In addition, the Highland Vegetable Trial and Demonstration Station will be established at an altitude of more than 1,000 m in the plateau aiming to promote vegetable production in the area. This program should materialize in the course of a short period of the development plan.

- (a) Rearrangement and strengthening of Fruit-tree Research Station

Based on the agricultural development plan, introduction and promotion of upland crops production will be planned. The development of packaged farming techniques for upland crops to be introduced is essential for the increase and stabilization of agricultural productivity in the study area. Therefore, the development of such farming techniques will be made thru various field trials of crop varieties, appropriate planting time, fertilizer practices

and weeding assuists to the differences in the physical conditions of the area at a well-designed research station.

Accordingly, the Fruit-tree and Upland Crop Research Station will be established through the rearrangement and strengthening of the existing Fruit-tree Research Station, located at Km 20 along the National Road 23, by installing research facilities for upland crops and augmenting the staff required for the activities to be executed by the station for the model area during short period of the development plan. The station will prepare concrete programs for development in cooperation with the provincial and district agricultural authorities. This will contribute to improving their technical and managerial capabilities for agricultural development in the study area. For this station, the following proposed works will be carried out under this plan.

- a. Reconstruction of an administrative office with storage, a garage and workshop.
- b. Construction of a building for research work including laboratory and training of extension staff and farmers.
- c. Construction of a farm plot to be used for experiments, training and demonstrating the improved farming system on upland crops, and consolidation of fruit-tree nursery and farm plots for experiments.
- d. Facilities and machinery required for research and extension work, such as farm machinery, audio visual equipment and laboratory apparatuses.
- e. Machinery and equipment for operation and maintenance of the irrigation facilities in the model areas as well as in the station. Required number of staff and dimensins of facilities, etc., are designated in the future study.

The station will carry out the following main work in collaboration with the NARC, international organizations and NGOs.

- (i) Research and trials
 - i) Research and field trials will be carried out to develop improved farming techniques for upland crop cultivation and fruit growing to include:
 - i. selection of superior varieties of upland crops and fruit-trees, and collection and introduction of crop varieties within the study area as well as other areas of the country and outside the country,
 - ii. soil fertility improvement to increase unit yield of crops by applying fertilizers, green manure and compost,
 - iii. improvement of crop protection technology such as pests and disease control and weed control, etc.,
 - iv. improvement of cultivation method in combination with variety trials, such as planting time, nursery preparation method and planting density, for upland crops,
 - v. harvesting, post-harvesting and quality technology improvement,
 - vi. establishment and standardization of cultivation technology and preparation of materials for extension work to farmers,
 - vii. demonstration of improved farming methods in the model areas through the district AFSS,
 - viii. improvement of farming practices by introducing and improving farm tools and equipment such as ploughs and harrows, and
 - ix. training farmers in improved farming technology.
 - ii) Research and field trials for developing year-round upland crop farming systems will

include:

- i. introduction and selection of superior varieties of upland crops, such as maize, soybean and groundnuts,
 - ii. introduction of irrigation farming in the study area where irrigation water is available,
 - iii. improvement of crop cultivation system for proper management of each kind of crop by applying pure standing method in a separated field plot for each crop,
 - iv. establishment of a crop rotation system including alley cropping to maintain and improve soil fertility, weed control and crop productivity for sustainable agriculture,
 - v. introduction of soil fertility management technology by applying green manure and mulching, etc.,
 - vi. diversification of the existing monoculture of rice by growing secondary crops such as maize, soybeans, groundnuts, potatoes, and
 - vii. cooperation in demonstration, extension and the training of extension officers, staff and farmers on the above farming technology.
- iii) Research and trial works will also be carried out for extension of improved fruit-tree growing techniques, including the introduction of improved fruit-trees varieties.
 - (ii) Trainig and guidance for extension officers, staff and farmers
 - i) Training of extension officers and staff in both fruit-tree and upland crop farming techniques.
 - ii) Training of farmers in both fruit-tree and upland crop farming.
 - iii) Direct guidance from the district AFSs in demonstrating fruit-tree and upland crop farming in the model areas.
 - (iii) Seed and seedling multiplication
 - i) Introduction and selection of superior varieties of fruit-tree and upland crops.
 - ii) Multiplication and distribution of improved seeds and seedlings to farmers through the district AFSs.
 - (iv) Operation and maintenance
 - i) Operation and maintenance of irrigation facilities constructed in the model areas.
 - ii) Repair and maintenance of machinery and equipment for operation and maintenance.
 - (v) Study, planning, monitoring and evaluation
 - i) Study and preparation of concrete plans and programs to be executed at the medium and long period of development plan for further improvement and strengthening of marketing systems means of measuring environmental problems, and further rehabilitation of irrigation facilities and new irrigation deveopment. During the preparation, the staff of the provincial and district AFSs will be trained to improve their technical and managerial capabilities for continued independent rural agricultural development.
 - ii) Monitoring and evaluation of the agricultural development scheme in the model areas.

Duration of the plan will be set up as follows:

- Short period : 5 years (1996 to 2000)
- Medium period : 5 years (2001 to 2005)
- Long period : 5 years (2006 to 2010)

The provincial AFSs as executing agency will be responsible for this program in cooperation with the MAF's DAE.

During the short period, a plan for the improvement and strengthening of this station will be carried out through the supporting of the MAF's DAE. Through implementation of the development plan, the extension services by the station will be concentrated on the model area scheme. The station will provide and maintain machinery and equipment for operation and maintenance of irrigation facilities.

(b) Improvement of Fishery Research and Extension Station

Although freshwater fishery promotion is conducted for the purpose of improvement of farmer's nutrition and increasing their income, the support services for farmers are insufficient because of deteriorated facilities and lack of staff. In the program, improvement of deteriorated facilities and strengthening of staff will be done as follows:

- a. Reconstruction of an administrative office with storage, a garage and workshop,
- b. Construction of a building for research work including laboratory and training of extension staff,
- c. Reconstruction of a hatching houses and hatching ponds and rearing ponds, and
- d. Facilities and equipment required for the research, extension and production of fingerling such as generators, pumps, purifiers, audio visual equipment and laboratory apparatuses.

The station will emphasize the following work in collaboration with the MAF's DLVS, international organizations and NGOs.

(i) Research

- i) Research will be carried out to develop improved farming techniques for freshwater fish culture, which will include:
 - i. selection of suitable species of freshwater fishes, and collection and introduction of fish species in the southern region as well as other areas of the country and outside the country,
 - ii. feed improvement to increase unit yield of fish,
 - iii. fish protection technology improvement such as disease control,
 - iv. improvement of farming methods in combination with the species trials, such as hatching preparation method and fish farming density,
 - v. catching, post-catching and quality technology improvement,
 - vi. establishment and standardization of farming technology and preparation of materials for extension work to farmers,
 - vii. demonstration of the improved farming method in the model areas through the district AFSs, and
 - viii. training of farmers in improved farming technology.
- ii) Research for developing fish farming systems will include:
 - i. introduction and selection of suitable species of fish, such as male, tilapia,

- rofu, malikarn, grass carp, indian carp and local carp.
 - ii. introduction of paddy field fish farming in the study area, particularly in lowland rice fields where irrigation water is available,
 - iii. improvement of fish farming systems for proper management of each fish by applying pure standing methods in a separated pond for each fish, and
 - iv. cooperation in the demonstration, extension and training of extension officers, staff and farmers in the above farming technology.
- (b) Training and guidance for extension officers, staff and farmers
- i) Training of extension officers and staff on fish farming techniques.
 - ii) Training of farmers on fish farming techniques.
 - iii) Direct guidance from the district AFSs in demonstrating fish farming in the model areas.
- (c) Fingerling production
- i) Introduction and selection of suitable species of fish.
 - ii) Production and distribution of fingerlings to farmers in the station.
- (d) Study, planning, monitoring and evaluation
- i) Study and preparation of concrete plans and programs to be executed at the medium and long periods of development plan for further improvement and strengthening of marketing system and means of measuring environmental problems. During the preparation, the staff of the provincial and district AFSs will be trained to improve their technical and managerial capabilities for continued independent rural agricultural development.
 - ii) Monitoring and evaluation of the freshwater fishery scheme in the model areas and the target areas for extension.

Duration of the plan will be set up as follows:

- Short period : 5 years (1996 to 2000)
- Medium period : 5 years (2001 to 2005)
- Long period : 5 years (2006 to 2010)

The provincial AFS's as executing agency will be responsible for this program in cooperation with the MAF's DLVS.

During the short period, a plan for the improvement and strengthening of this station will be carried out. In the medium and long periods, the extension services will be concentrated in the model area scheme by trained extension staff.

(e) Establishment of Vegetable Trial and Demonstration Farm

In the study area, the plateau exceeding an elevation of 1,000 m has proved to be favorable for vegetable production from observing physical features. For the purpose of the promotion and extension of vegetable production which could greatly improve the farm household economy and the development of the regional economy, the Vegetable Trial and Demonstration Farm will be established. This plan is to construct the necessary buildings and supply farm plots with facilities and equipment. It also is to establish the organization including the staff required for executing farm activities in the model areas and the villages located in favorable conditions for vegetable production during short period of development plan. The station will be opened near the urban of Pakxong district. The farm will prepare a definite plan

for development and extension of vegetable farming techniques in cooperation with the MAF's DAE and international organizations. This will contribute to the technical and managerial capabilities of the extension staff and farmers for agricultural development in the study area. Accordingly, the following works will be carried out in this program.

- a. Construction of buildings for administrative office and trial work, training of extension officers, staff and farmers and workshop for repairing machines.
- b. Construction of farm plot to be used for trials, training and demonstrating the improved farming system on vegetable.
- c. Facilities and machinery required for the trials and extension work such as farm machinery, audio visual equipment and laboratory apparatuses.
- d. Required number of staff and dimensions of facilities, are designated in the further study.

The farm will carry out the following main work in collaboration with the MAF's DAE, international organizations and NGOs:

(i) Trials

i) Field trials will be carried out to develop the improved farming techniques for vegetable cultivation, which will include:

- i. selection of superior varieties of vegetables, and collection and introduction of crop varieties within the study area as well as other areas of the county and outside the country,
- ii. soil fertility improvement for increase in unit yield of vegetables by applying fertilizers, green manure and compost,
- iii. crop protection technology improvement such as pest and disease control and weed control, etc.,
- iv. improvement of cultivation methods in combination with variety trials, such as planting time, nursery preparation methods and planting density, for vegetables,
- v. harvesting, post-harvesting and quality technology improvement,
- vi. establishment and standardization of cultivation technology and preparation of materials for extension work to farmers,
- vii. demonstration of the improved farming method in the model areas through the district AFSs in cooperation with this station,
- viii. improvement of farming practices with introducing and improving farm tools and equipment such as ploughs and harrows, and
- ix. training of farmers in improved farming technology.

ii) Field trials for developing year-round vegetable farming systems will include:

- i. introduction and selection of superior varieties of vegetables, such as cabbage, carrot, onions and potatoes,
- ii. introduction of irrigation farming in the study area where irrigation water is available,
- iii. improvement of crop cultivation systems for proper management of each kind of vegetable by applying pure standing method in a separated field plot for each vegetable,
- iv. establishment of crop rotation systems including alley cropping to maintain

and improve soil fertility, weed control and crop productivity for sustainable agriculture,

- v. introduction of soil fertility management technology by applying green manure and mulching, and
 - vi. cooperation in the demonstration, extension and training of extension officers, staff and farmers on the above farming technology.
- (ii) Training and guidance for extension officers, staff and farmers
 - i) Training of extension officers and staff in vegetable farming techniques.
 - ii) Training of farmers in vegetable farming techniques.
 - iii) Direct guidance from the district AFSs in demonstrating vegetable farming in the model areas.
 - (iii) Seed and Seedling Multiplication
 - i) Introduction and selection of superior varieties of vegetables.
 - ii) Provision of seedling facilities at the model areas.
 - iii) Distribution of improved seedlings to farmers through the district AFSs.
 - iv) Multiplication and distribution of improved seeds and seedlings to farmers through the district AFSs.
 - (iv) Study, planning, monitoring and evaluation
 - i) Study and preparation of concrete plans and programs to be executed at the medium and long period of development plan for further improvement and strengthening of marketing systems means of measuring environmental problems, and further rehabilitation of irrigation facilities and new irrigation development. During the preparation, the staff of the provincial and district AFSs will be trained to improve their technical and managerial capabilities for continued independent rural agricultural development.
 - ii) Monitoring and evaluation of the agricultural development scheme in the model areas.
- Duration of the plan will be set up as follows:
- Short period : 5 years (1996 to 2000)
 - Medium period : 5 years (2001 to 2005)
 - Long period : 5 years (2006 to 2010)

The provincial AFSs as executing agency will be responsible for this program in cooperation with the MAF's DAE.

During the short, medium and long periods of development plan, the extension services will be concentrated in the model area scheme. In the long period, reorganization of this station will take place in order to expand the vegetable research and extension station. The installation of a vegetable seed multiplication plant will be considered in order to secure stabilized distribution at low cost and to increase self-sufficiency by using improved seeds. In the future, extension services will be expanded by sufficiently trained staff assigned to the study area.

(d) Strengthening of Livestock and Veterinary Research and Extension Station

At present, the station is under construction in Km 49, Pakxong district, by DLVS, MAF. The objectives of this station are; (1) to train small holders (farmers), (2) to promote

technical aspects of breeding for the farmer, (3) to analyze problems concerning the breeding system, (4) to supply improved grass seeds and cattle breeds, and (5) to research animal health. Further, extension work for small holders (farmers) on effective use of animal excretion such as compost and barnyard manure for vegetable production, maintenance of soil fertility, bio-gas for energy and so on, through the improvement of raising method, would be added. Therefore, the extension activities of this station should be carried out in close collaboration with the agricultural extension officers and staff of the provincial and district agricultural services.

During the short period of development plan, the construction of the station will be completed. In the medium and long periods, the extension services will be concentrated in the model area scheme and the areas of livestock promotion. In the long period, extension services will be expanded with sufficient trained staff to the study area.

(2) Strengthening of Agricultural Extension Services

In order to provide appropriate and effective extension services in the area, improvement and strengthening of AFS in the district level will be made based on the NIBRP supported by ADB. The following works will be provided for support in the extension activities.

- (a) Provision of equipment and vehicles needed to extension works,
- (b) Adequate predisposition and increase of extension staff,
- (c) Establishment of training program for the development of technical and management capacities of extension staff,
- (d) Technical and management training in Phone Ngam station in Pakse, fruit-tree and upland crops research station at Km 20 and highland vegetable trial and demonstration station for extension staff, and
- (e) Introduction and employment of women's extension staff for guidance of rural life improvement.

The services by the extension officers and staff will be carried out as follows:

- (i) Short period (for model area scheme)
 - i) Distribution of extension seeds and seedlings produced in the fruit-tree and upland crop research station,
 - ii) Introduction and demonstration of improved irrigated lowland rice farming and training of farmers,
 - iii) Introduction and demonstration of vegetable farming and training of farmers, and
 - iv) Introduction of women's extension staff for rural life improvement.
- (ii) Medium and long periods (for model area scheme)
 - i) Distribution of extension seeds and seedlings produced in the fruit-tree and upland crop research station,
 - ii) Introduction and demonstration of improved irrigated lowland rice farming and training of farmers,
 - iii) Introduction and demonstration of vegetable farming developed in the highland vegetable trial and demonstration station and training of farmers,
 - iv) Introduction and demonstration of improved upland crop farming developed in the fruit-tree and upland crop research station and training of farmers, and
 - v) Introduction of women's extension staff for rural life improvement.

The provincial AFSs as executing agencies will be responsible for this program in

cooperation with the research stations concerned.

During the short period, the extension services will be concentrated in the model area scheme. In the medium and long period, agricultural extension services will also be focused in the model area scheme and expand with sufficient trained staff to the study area.

2.3.3 Farmers' Organization

In order to develop effective and profitable agricultural production in the study area, establishment of a farmers' organization which has a function of agricultural credit, technical assistance, supply of farm inputs and marketing of farm products, is indispensable. For this purpose, a new farmers' organization based on the existing organization will be formed. In particular, formation of new farmers' organization will be made by pushing forward community development on the village level, and taking into account the characteristics of ethnic minorities such as culture, custom and behavior. On this account, permanent and effective farmers' organization will be formed through the following steps.

- (i) To arrange the field of talk common problems out between existing farmer's groups;
- (ii) To lead recognition of the problems by farmer themselves and to work out a solution to the problems at the field of talk by extension staff;
- (iii) To guide group formation by farmer themselves in order to solve the problem and expectation of progressive farmer's leadership to group formation, and to conduct the farmer's training for the purpose of autonomous group operation;
- (iv) To definite approach establishment of agricultural association in village level from village leaders and extension staff to farmers for direct attention toward farmer's awareness to set up the association, and give the incentives from the relevant authorities to farmers, such as subsidies for purchasing farm materials and operating funds of the association, in order to promote the establishment; and
- (v) To establish agricultural association at the village level after the above steps.

On the other hand, through the development of farmer's consciousness to operation and maintenance for the irrigation facilities constructed by the Project. Water user's association and/or groups will be formed under the guidance of the provincial and district agricultural services, in order to operate and maintain smoothly the facilities. Formation of the organization will be made in accordance with the regulations on the management and use of irrigation systems in the Lao PDR, No. 0598/MAF.DOI, but this organization will be managed by the beneficiaries' autonomy. Accordingly, in order to give aggressive awareness to form the groups and/or association for beneficiaries, the incentives from the authorities concerned such as establishment of subsidies and supporting services, and preferential treatment of agricultural credit systems, will be considered.

(1) Farmers' Association

A farmers' association (organization) autonomously managed by farmers themselves will be proposed. For a short period in the initial stage of the plan, namely, the association will be set up in the village of model area to be developed as one unit, comprising four sections; as agricultural credit, technical assistance, marketing of farm products and supplies of input and instrument. A chief elected by the members of village farmers' association will take the responsibility for operation of the association under the guidance of the district AFSs. Members of the association will take charge of each section mentioned. The marketing facilities for collecting and shipping of farm products, such as storage or deposit, will be

constructed by the association. The members of the association will contribute money to capital and pay membership fees annually.

In the long run period, through extension of the formation of the farmers' association in the districts related to the study area, the central farmers' association will be established in the center of district for the purpose of strengthening the activities at the village level. Its branch office will be set up in the main village of each zone. This central association will support the activities of village association.

(2) Water Users' Association

Along with the project implementation, the irrigation facilities will be constructed in the development area. In order to proceed smooth and effective operation and maintenance and water control of the irrigation facilities constructed, formation of water users group in the village level and water users' association in the irrigation district level respectively is essential. For this purpose, the formation of these organizations will be proposed as follows:

(a) Formation of water user group in the village level

Water user group by the beneficiaries will be organized in each village of the irrigation district. The village water users group will set up a chief of group, a water-man and a water charge collector. A chief will be elected by members of the group and will take the responsibility of managing the group activities. The water-man will operate water distribution to farm fields and water charge collector will collect the water charge for operation and maintenance of the irrigation facilities.

(b) Formation of water users' association in the irrigation district level

In order to manage the entire irrigation district, water users' association will be organized. The association will carry out water distribution and control, operation and maintenance of the irrigation facilities, calculation of O & M costs as water charge, collection of water charge and expenditure of operation costs. Management of the association will be done by the managing committee composed of the chief of the village groups, and the association will be set up a chief of the association, secretary, accountant and water-man. The chief of the association will take the responsibility of managing of the entire irrigation district. The secretary and accountant will be assigned by the committee members. The association will employ a water-man who has a knowledge of irrigation.

Management and operation of these organizations will be conducted under the guidance and support of the irrigation engineers of the provincial and district AFSSs. The provincial AFSSs will hold regular training on irrigation and water control techniques and operation and maintenance of the facilities for the beneficiaries.

3 THE FEASIBILITY STUDY

3.1 Present Condition

3.1.1 Agricultural Research

The agricultural research for the crop production of five priority scheme areas is the responsibility of the existing research stations, as follows:

(1) **Phone Ngam Research Station:**

The station, located at Pakse, carries out lowland rice research, experimentation and extension under the National Rice Research Program (NRRP) supported by the Lao-IRRI Project.

(2) **Ban Itou Research Station:**

The station, located at Km 35, carries out coffee research, trials and extension under the Lao Upland Agricultural Development Project (LUADP) financed by the World Bank with technical assistance by the French government, which conducts research on coffee. At the end of February, 1996, technical assistance for upland crops of the LUADP by the Australian government was terminated.

(3) **Palay Upland Crop Research Station:**

The station is now under construction at the site of the Palay Irrigation Project, located at the Bachiang district, Champasak province. The station will conduct research and trials for upland field crops. The new station will contribute to research and extension works for upland field crops in the scheme area.

(4) **Fishery Research and Extension Station:**

The station, located at Km 8, carries out research and extension for freshwater fishery and production and distribution of fish fingerlings. The station is now under rehabilitation of existing facilities supported by the Mekon Commission. The freshwater fishery production in the scheme area will be accelerated by this station.

3.1.2 Agricultural Extension

The extension activities in the priority scheme area have not functioned well due to shortage of extension staff and insufficient resources for this work. In addition, low capability of staff of the district AFSs has also contributed. The provincial AFSs holds a seminar on farming technology for village leaders once a year. According to the survey, the extension work as field visit and observation by extension staff of the district AFSs have been conducted one or two days a year, for some villages. However, most villages in the scheme area did not received any extension work from the district AFSs last year. Currently, MAF places emphasis on the strengthening of agricultural extension in the nation-wide, based on the National Integrated Extension and Research Program Project (NIERP) supported by the Asian Development Bank, and training in extension methodology given to staff and extension officers of the provincial AFSs is provided by the Agricultural Extension Agency in Vientiane.

On the other hand, the extension station of the LUADP, located at Ban Itou, for the purpose of extension work in the target villages (coffee production) of the project, are carried out in the scheme area. The extension work at the target village has been conducted two or three days a year. Particularly, the object of extension work is for improvement of coffee tree and pruning.

In Lower Xe Set scheme area, the provincial AFSs is carried out the intensive

extension work of upland crop production, particularly groundnut production, for Khonleng village.

3.1.3 Agricultural Credit Services

According to the provincial branch of Agricultural Promotion Bank (APB), the total amounts of loans released in 1995 in the priority scheme are; 190,831,500 kip in Upper Champi scheme, 89,359,000 kip in Upper Tapoung scheme, 18,988,000 kip in Upper Kapheu scheme and 14,601,000 kip in Lower Xe Set scheme. No loans from the APB have been provided in Upper Tay-Un scheme. According to the survey, villager's need for agricultural credit (APB) of Upper Tay-Un scheme is not forthcoming because of complicated procedures. The number of groups and families for loans in the scheme is; 31 groups with 310 families in Upper Champi scheme, 11 groups with 84 families in Upper Tapoung scheme, 11 groups with 65 families in Upper Kapheu scheme, and 9 groups with 87 families in Lower Xe Set scheme. (see Table V-2-1 to -2-3)

In order to promote coffee production in the Boloven Plateau, the APB established Pakxong Office in 1995. The loans are only coffee production in the plateau area. In villages of Lower Xe Set scheme, some groups have the loans on upland field crops and livestock from Salavan branch of the APB.

3.1.4 Farmers' Organizations

There are some farmers' organizations established, such as rice bank, mutual fund, extension group of the LUADP, and production group of the APB, in the priority scheme area. The rice bank and mutual fund were established by villagers in 1995. From the data surveyed, rice banks are one each in a village of Upper Kapheu, Lower Xe Set and Upper Tay-Un schemes, and two mutual funds are in Upper Champi scheme. Existing rice banks were set up under the guidance of the LUADP, and supported by the LWU, particularly in villages of ethnic group. The interest rate of this bank varies depending on village from 20 percent to 50 percent, and borrowed rice returns with interest after harvesting. (see Table V-2-4)

With regard to water user's group in village, there is no such group in five schemes even villages in Upper Tay-Un scheme where irrigation practices extend small paddy field with irrigation facilities such as intake and canal. The beneficiaries are maintaining these facilities by themselves under their mutual consent without any support from the authorities. This activities proves the ethnic minorities' traditional behaviors.

Most village women's groups in the scheme area are inactive because of insufficient voluntary participation and sources for operation. Women's Union of Salavan province strives for promotion of women's development project in villages of ethnic groups. In Khonleng village of Lower Xe Set scheme, women's group is working to improve their livings through the project supported by the provincial women's union and UNICEF. However, no target villages of this project are in the other schemes.

3.1.5 Women's Role in Agriculture

As mentioned in Annex VI, 4.1.5, most priority scheme areas exhibit ethnically diverse societies comprising numerous tribal groups of Lao Thueng and some groups of Lao Loum. Among ethnic groups, gender-based division of labor varies with farming patterns. Most women in the areas are deeply involved in their societies, having own traditional behavior and social systems. Consequently, their social status continues to be of a low standing. Coffee growing and upland agriculture (upland rice production by slash and burn cultivation) require much labor, particularly in harvesting and post-harvest of coffee and weeding of upland crop fields, and this is usually done by women. The daily tasks of feeding pigs and poultry, taking care of the vegetable gardens, are also the responsibility of women.

From the village interview survey, it appears that women's average working hours on the farm are; 5.4 hours in the Upper Champi area, 5.3 hours in the Upper Tapoung area, 5.4 hours in the Upper Kapheu area, 5.5 hours in the Lower Xe Set area and 6.7 hours in the Upper Tay-Un area. Society of the Upper Tay-Un area is composed of Nge, Alak and Katu tribes and their societies are different from the other ethnic groups on the social systems and religious orientations. Workload of women in the area reflects to the farming systems and traditional way of life. The data surveyed shows that the working hours on daily tasks are about 2.3 hours on average in the areas. (see Table VI-2-5 and -2-6)

According to the survey, most women in the ethnic minorities' villages consider rice husking the most exhausting task among domestic activities. Traditional husking and winnowing of rice takes more than one hour per day. All cooking occupies two or three hours, and water fetching usually requires one to one and half hours per day and almost households in the areas have no access to an improved source of water. In total, women in the areas spend approximately 13 hours per day working, seven days a week.

3.2 Development Constraints

Major constraints to the agricultural support services development common to five priority scheme areas are indicated as below:

- No program of extension activities by the district AFSs;
- Shortage of extension officers and staff of the district AFSs;
- Low capability of extension officers and staff of the district AFSs caused by insufficient training for farming technology;
- Inflexible and preconceived idea of the district AFSs' staff;
- Inappropriate distribution of extension officers and staff of the district AFSs;
- Lack of extension materials and equipment for farming technology;
- Lack of research activities on agricultural crops except coffee;
- Shortage of sources and facilities for agricultural research and extension works;
- Weak linkages between existing research stations and district AFSs;
- Weakness of agricultural financial services in the scheme areas;
- Lack of appropriate credit opportunities at reasonable loan and interest rates;
- Lack of appropriate farmers' organization.

The following constraints to each scheme are specified.

Upper Champi scheme

- No program of extension activities for crop production by the Pakxong district agricultural services which is responsible to this scheme area, only the activities for coffee in cooperation with the LUADP's extension staff;
- Shortage of extension staff (only two agricultural extension staff cover the entire area of the Pakxong district with 105 villages); and
- Lack of appropriate farmers' organization.

Upper Tapoung scheme

- No program of extension activities for crop production and shortage of extension staff as well as the Upper Champi scheme area;
- Lack of extension activities for vegetable production;
- Lack of formal agricultural credit for vegetable production; and
- Lack of appropriate farmers' organization.

Upper Kapheu scheme

- No program of extension activities for crop production by the Laongam district agricultural services which is responsible to this scheme area, only the activities for coffee in cooperation with the LUADP's extension staff;
- Shortage of extension staff (only four agricultural extension staff cover the entire area of the Laongam district with 110 villages); and
- Lack of appropriate farmers' organization.

Lower Xe Set scheme

- No program of extension activities for crop production in this area by the Salavan agricultural services;
- No extension activities for some villages located in inaccessible and remote places in this area;
- Shortage of extension staff (only four agricultural extension staff cover the entire area of the Salavan district with 161 villages);
- No financial services for crop production in some villages; and
- Lack of appropriate farmers' organization.

Thateng scheme

- No program of extension activities for rice production by the Thateng district agricultural services which is responsible to this scheme area, only the activities for coffee in cooperation with the LUADP's extension staff;
- Shortage of extension staff (only two agricultural extension staff cover the entire area of the Pakxong district with 50 villages); and
- Lack of appropriate farmers' organization.

3.3 Development Concept

The objectives of the agricultural support services in the National Integrated Extension and Research Program Project (NIERP) established by the MAF are to improve the rural life and to develop regional agriculture through increase in crop and livestock productions by integrated and concentrated supporting to farmers. In order to achieve these objectives, MAF strives to strengthen and improve the institutional organizations. However, the support services in the Study area are given full scope of these functions due to lack of skilled staff, inappropriate distribution of staff, lack of resources for operations of existing staff, deterioration of existing research stations, and shortage of adequate financial services in the area. In order to achieve the objectives of the agricultural and rural development project in Boloven Plateau, it is essential to provide adequate and sufficient agricultural support services for farmers.

Hence, this proposed plan of the support services comprises (i) agricultural research, (ii) agricultural extension, (iii) agricultural input supply, (iv) farmers' organization and (v) establishment of the highland vegetable trial and demonstration station. The area to be covered by the agricultural support services is not limited to the priority scheme areas but also to the entire Study area.

As mentioned above, there exist various constraints relating to the present agricultural supporting system in the area. In order to cope with the prevailing constraints, a comprehensive supporting system is needed which consists of training of farmers as well as extension staff, supply of farm inputs and quality seeds of improved varieties together with appropriate farming techniques suitable for the agricultural conditions in the priority scheme area, through effective

staffing and facilities provided.

3.4 Development Plan

3.4.1 Agricultural Research and Extension

(1) Agricultural research

The agricultural research will be improved and strengthened the existing research stations; the Fruit-tree Research Station, located at Km 20, and the Fishery Research and Extension Station, located at Km 8. Currently, both the stations are under rehabilitation and reconstruction by the provincial agricultural authorities, and which are financed and supported by the international organizations such as the IDA for the LUADP (Fruit-tree Research Station), and the Mekong Commission for the Fishery Research and Extension Station. On the other hand, new Upland Crop Research Station, which is under construction, will be strengthened.

By installing sufficient research facilities, training extension workers, and adequate staffing for the activities to be conducted by these stations in the short term development stage, these stations will contribute to improving their technical and managerial capabilities for agricultural development in the Study area. For these station, the following works will be proposed under this plan.

(i) Fruit-tree Research Station:

Facilities and machinery for research and extension work, such as, farm machinery, audio visual equipment and laboratory apparatuses.

(ii) Fishery Research and Extension Station:

Facilities and equipment required for the research, extension and production of fingerling such as generators, pumps, purifiers, audio visual equipment and laboratory apparatuses.

(iii) Upland Crop Research Station:

Facilities and machinery for research and extension work, such as, farm machinery, audio visual equipment and laboratory apparatuses.

For the researchers and extension staff of these stations, MAF's DAB, Hatdockeyo Research Station and DLV will carry out the training to improve their technical capabilities.

(2) Agricultural extension

In this plan, the agricultural extension services will be provided mainly for lowland and upland rice, and upland crops, through provision of skilled extension staff, vehicles and equipment and office buildings to be constructed. The extension services for coffee production are excluded from this plan because the extension program is carried out by the LUADP. Strengthening of the extension services at the district AFSs of the Study area including the priority scheme areas, and farmers in the area, will be proposed as follows:

(i) Strengthening of agricultural extension services:

- (a) Establishment of agricultural extension section at the district AFS**
The section will be established through provision of trained extension workers, materials for extension activities and vehicles.
- (b) Augment of extension worker at the district AFS**
The section will be augmented trained extension workers in order to carry out sufficient extension activities for farmers.

- (c) **Introduction of women's extension staff**
Women's extension workers will be introduced at the office, in order to improve rural life through development of women.
 - (d) **Establishment of agricultural extension volunteer at the village level**
In order to carry out adequate and sufficient extension services at the village level, the village extension volunteer will be adopted, and the volunteer is selected among progressive farmers who help to extension worker's activities. The on-farm training for village farmers is carried out on the volunteer's farm plot for demonstration, by the extension staff and volunteer.
- (ii) **Extension activities:**
- (a) **Introduction of improved varieties:**
Introduction of improved and recommendable varieties selected through the experiments by agricultural research stations. Execution of simple trials and demonstration cultivation of the introduced varieties in the Study area to confirm suitability to conditions of the area,
 - (b) **Supply of planting materials:**
Multiplication and supply of extension seed of the introduced varieties required by the farmers. The multiplication will be carried out by the contracted progressive farmer's field,
 - (c) **Demonstration and guidance on cultivation techniques:**
Demonstration and guidance for cultivation of crops such as improved nursery management, kind, rate, timing and method of application of fertilizer and pesticides, pest surveillance, water management including irrigation and drainage,
 - (iv) **Information of marketing and distribution:**
Communication of market information to farmers, through collection and analysis of information of production and marketing,
 - (v) **Improvement of rural life:**
Education of women/women's groups on garden farming, housekeeping, and domestic animal raising, and enlightening of nutrition of family, child care and health and hygiene in cooperation with the district health nurses, and
 - (vi) **Monitoring and evaluation:**
Monitoring and evaluation of the results obtained through the extension activities should be executed for further feed back to improvement of the agricultural support services.

For the extension activities of coffee production, extension workers of the agricultural extension section will be collaborated to extension workers of the LUADP.

In terms of livestock and veterinary extension services, the provincial and district AFS's LVS strives to promote small holders of livestock in the Study area, aiming to improve farmer's income. Strengthening of these services will be provided as follows:

- (i) **Extension of livestock production:**
Guidance on the methods of raising animals for better production, improved nutrition (feed technology), disease control, and
- (ii) **Strengthening of vaccination services:**
Vaccination for the animals will be strengthened by provide equipment and training for village level vaccinators, and enlightened farmer's awareness to animal health.

(3) Proposed staffing for agricultural extension

The proposed agricultural extension section will be set up in the district AFSs and the staffing of this section will be the base for the agricultural extension work in the priority scheme areas to be developed, and the details of the covering area of each office are summarized as follows:

Agricultural Extension Office	Priority Scheme Area	Net Area (ha)	No. of Village	No. of Households	Proposed No. of Field Worker
Pakxong	Upper Champi	730	8	828	2
	Upper Tapoung	80	3	262	1
Laongam	Upper Kapheu	1,000	5	456	1
Salavan	Lower Xe Set	1,000	6	386	1
Thateng	Upper Tay-Un	330	3	108	1

The required number of field extension worker for the priority scheme areas is estimated based on the following assumptions:

- (i) The village farmers' association to be covered by one field extension worker are proposed to be about 3 to 6 at the maximum.
- (ii) The working day for field worker are:
 - a. Visit and observation one association twice a month,
 - b. Visit and observation one or two associations a day, and
 - c. Training and study for worker himself for 2 days a week.

The specialities of field extension worker to be assigned for the priority scheme areas are; coffee and fruit for the Upper Champi area, vegetables for the Upper Tapoung area, coffee for the Upper Kapheu, rice and upland crops for the Lower Xe Set area, and rice for the Upper Tay-Un area.

(5) Facilities and equipment

The facilities and equipment for agricultural extension work are required for both activities of field and office works. The agricultural extension section in the district AFSs will be established in each district AFS. The section which takes charge of the priority scheme area to be developed will be set up in the short term development stage. The community hall established in each village will be the field office of the field extension worker, and will be used for training of farmers. The office facilities required are summarized as follows:

- Copy machine 1 unit
- Printing machine 1 unit
- Personal computer 1 unit
- Audio-visual equipment
- TV set 1 set
- Videocorder 1 set
- Slide projector 1 set
- Portable generator 1 set
- Camera 1 unit
- Transportation
- Motorcycle 2

3.4.2 Agricultural Input Supply

The proposed supply system of agricultural inputs required such as fertilizers and

agro-chemicals is a strengthening of the existing supply system of the state channel by the State Company of Agricultural Materials and private channel. Since 1995, APB has been given the credit for agricultural inputs to the lowland rice production groups of under the agreement with the State Company, for the purpose of increase in rice production. Along with the development of the Study area, it is expected that the credit of agricultural inputs will be expanded for crop production such as vegetables and other introduced crops. The proposed supply systems are;

- to supply inputs required to the areas to be developed by the State Company and private traders through strengthening of the source of APB's credit, and
- to strengthen and construct the storage of the village farmers' organization to meet the requirement.

The amounts of fertilizers and agrochemicals required for the priority scheme areas are as follows:

Currently, the state plays a dominant role in the development and marketing of improved seeds and planting materials. In the case of rice, which dominates the seeds subsector, the Phone Ngam research station in Pakse, sells the seeds to farmers through the provincial agricultural services. In the development stage in the priority scheme areas, the research stations relating to the areas will be applied the similar procedures for upland crops and vegetables.

3.4.3 Agricultural Credit and Insurance Services

(1) Agricultural credit

With the agricultural production developed, availability of credit will become increasingly important as farmers move toward income diversification, adopting new technologies and larger productive investments which yield longer term benefits (tree crops, livestock, and small scale business activities). In the initial developmet stage, concentration on providing credit for the priority scheme areas by APB will be proposed. The APB needs to concentrate on building up its infrastructure, particularly staff training, expanding its branch network, strengthening its financial structure to maintain adequate equity and liquidity, and introducing an appropriate accounting and reporting system.

Savings and resource mobilization should be part of any self-sustainable financial operation including rural finance. Accordingly, initiatives to promote and develop community mutual fund or saving and loan associations as well as Grameen-style operations will be encouraged. NGOs are probably the most well-suited organizations to establish and provide training for such institutions.

(2) Agricultural insurance

The Lao PDR has not established agricultural insurance system in order to relieve the reduction of farm income caused by natural disasters, pests and insects for plant crops which impede the agricultural production, and to assist the farmers to secure income. Therefore, it is recommended to implement an agricultural insurance system by the government as a public policy measure to promote general welfare among the people in rural areas, as a kind of social insurance.

3.4.4 Farmers' Organization

The establishment of farmers' organization is essential to achieve effective and profitable agricultural production. A new farmers' organization will be formed based on the existing farmer's groups such as extension groups of coffee, production groups of the APB,

rice banks and mutual financing in villages, under the guidance of the provincial and district agricultural authorities. The farmers' organization will be formed by enlighten the farmers' awareness to agricultural development, pushing forward community development at the village level and by taking account of the ethnic minorities' own culture, customs and behaviors. In particular, women's participation to such farmers' organization will be proposed taking into consideration the women's role in agriculture.

On the other hand, in the priority scheme area to be developed, in order to carry out smooth and effective operation and maintenance of irrigation facilities constructed, village water user's group and water users' association of irrigation area will be organized legally under the guidance of the provincial AFSs on the basis of the Regulation No. 0598/MAG.DOI, dated 25 June, 1993, on "Management and Use of Irrigation Systems in the Lao PDR". The village water supply group also will be formed in the areas to be developed.

For these purpose, the establishment of a farmers' organization will be proposed as follows:

(1) Farmers' Association

A new farmers' association autonomously managed by the farmer will be established in villages of the priority scheme to be developed as one unit for a short period in the initial development stage. Considering farmers' intention obtained from the village interview survey and farm household survey, organization of farmers will be proposed taking the following methods.

- (i) By proposal from extension officers and staff of the provincial and district AFSs, the field of talk common problems out between existing farmer's groups will be arranged.
- (ii) The problems will recognize by farmer themselves and will work out a solution to the problems at the field of talk by extension staff's lead.
- (iii) In order to solve the problems, reorganization of existing groups and newly group formation will be made. The group formation will be made autonomously by farmer themselves under the guidance of extension staff. The leadership of the progressive farmers in village to group formation will be expected. In addition, the training on autonomous group operation for farmers will be conducted by the extension staff at the village level.
- (iv) For direct attention toward farmer's awareness to establish a village agricultural association, a definite approach to the establishment of the association will be made from village leaders to farmers. With a view to promoting this organization, the support from the relevant authorities will be conducted through giving the subsidies for purchasing farming materials and for operating funds of the association, and preferential treatment of APB's loans.
- (v) These groups will be consolidated into the village agricultural association. The association will be developed of open and voluntary membership, and democratic administration, equitable contribution, and fair share of the risk and benefits for members of the association and/or groups.

On the basis of the mentioned above method, establishment of a village agricultural association which has the leading role for agricultural production will be proposed in each village of the scheme. This association will include not only the support to agricultural production, but also rice bank and credit as mutual financing which contribute to the living of farmers. Extension staff of the district AFSs will support indirectly for managing the association. Furthermore, the guidance and supporting to agricultural association activities by

experienced experts of international organizations and NGOs will be proposed.

The association will set up a head, and he will be elected by members of the association. A head will take the responsibility for managing the association's activities. An executive organ of the association will consist of a head, a deputy head, secretary and accountant, and also will organize the managing committee comprising the representatives of groups. The groups are production group (recipient of APB's loan), extension group (working group for improvement of farming), marketing group (marketing of farm products and inputs), and rice bank and saving bank (mutual financing and village credit). The association will promote effectively agricultural production, working a close teamwork with the village water user's group for irrigation. A member of the association will finance the contribution and pay annual fee to the association. In the initial stage of establishment of the association, the contribution will set low amount because of farmer's low farm income, and then will raise the contribution and annual fee along increase in farm income through introduction of irrigated agriculture.

(a) Village agricultural association

This association will be the center of agricultural production group in the village level, including the existing groups such as production groups of the APB, and extension groups of the LUADP, rice banks and mutual financing. For the formation of this, the provincial and district agricultural authorities will give an incentive to organization autonomously for village farmers, and will advise on its operation and administration. The purpose of this association is a stable and profitable agricultural production and agricultural promotion in the village, and it will perform a function in coordination and consultation of the guidance of farming techniques from the agricultural authorities concerned, rural credit, and marketing support. (see Figure V-2-1)

A chief elected by the members of the village agricultural association will take responsibility for operating the association under the guidance of the district agricultural services. Representatives of the groups such as extension, production, marketing, farm youth, rice bank and mutual fund, will take charge of a committee member of managing the association. In addition, a representative of the village women's group will participate to the managing committee as a member, in order to support the village agricultural promotion from the stand of women. The members of the association will contribute money to capital and pay membership fees annually. The farmer's groups comprising the association will have a function as follows:

- Extension group: work and study at farming techniques and support to extension work by extension staff;
- Production group: loan recipient of APB;
- Farm youth group: work and study at farming (as 4-H club);
- Marketing group: operation of marketing for farm products and inputs, and be connected with the wholesale marketing board;
- Rice bank: mutual security of staple food as rice; and
- Saving bank: mutual financing for emergency.

In the village, the storages for agricultural inputs and for rice bank, and marketing facilities as small collecting and shipping deposit, will be constructed by the association. The association will be obtained the market information and support, and quality control techniques of farm products through the participation to the Wholesale Marketing Board established.

In the long run period, through extension of the formation of the agricultural association in the districts related to the Study area, the central agricultural association will be established in the center of district for the purpose of strengthening the activities at the village

level. Its branch office will be set up in the main village of each zone. This central association will support the activities of the village association.

(2) Considerations for formation of the agricultural association

Formation of the agricultural association in the scheme area will be proposed taking into account the characteristics of each scheme area, as follows:

(i) Upper Champi scheme:

From the view point of socio-economic conditions in this area, family income and educational levels are relatively better than another areas. The ethnical structure is predominant of Lao Loum (LL). Due to a behavioral characteristic of the LL has generally strong individual play more than social group action, a leader as a popular active man and an enlightening of farmers' awareness through implementing the community development program are essential.

(ii) Upper Tapoung scheme:

The farm family incomes are in moderate levels. The ethnical structure is simple composed of the Laven tribe, which is represented ethnic group of the plateau, of Lao Theung (LT). Owing to their strong solidarity, formation of farmers' organization is facilitated by promote a better understanding for community activities among peoples. However, it is essential to develop farmers' awareness for community activities through community development program (improving the literacy rate).

(iii) Upper Kapheu scheme:

The income levels of farmers are moderate means. The ethnical structure is composed of the Phouthai tribe (LL) and Laven tribe (LT), and they are set up ethnically homogenous villages. However, there is no struggle or trouble on the social problem among the ethnic groups. The educational level varies among the villages, but the low level in general. From the ethnical view, it is essential to enlighten farmers' awareness as well as Upper Tapoung area.

(iv) Lower Xe Set scheme:

This area has the poorest physical and socio-economic conditions among the scheme areas, therefore, most farmers' income level is laid on the poverty line. There are ethnically diverse area, and people's educational level is low. The villages formed by single ethnic group are isolated each other. Even though formation of village farmers' organization is facilitated, community works over the entire area will require time to smooth and effective operation and management. In order to solve these circumstances, implementation of community development is indispensable.

(v) Upper Tay-Un scheme:

Farmers earn relatively high income from their farming. The peoples in the area are set up the ethnically homogenous villages. Their cultural backgrounds are different from the other ethnic groups in the plateau. These ethnic sub-groups have a behavioral pattern on collective action by all villagers and a strong sense of identity. The educational level of villagers is a little high in comparison with the other areas. Hence, formation of farmers' organization and its management is facilitated, but voluntary participation of women to these organizations is relatively difficult because of their social system.

The proposed farmers' organizations will be set up in each villages of the priority scheme area and will be set up; 8 associations in Upper Champi area, 3 associations in Upper Tapoung area, 5 associations in Upper Kapheu area, 6 associations in Lower Xe Set area and 3 associations in Upper Tay-Un area.

3.4.5 Water Users' Organization

The operation and maintenance of irrigation and water supply facilities constructed by the scheme will be transferred to beneficiaries in line with the national policy. On this account, the water user's group/association will be organized by the beneficiaries under the guidance of the provincial agricultural authorities in accordance with the regulations, just before set about construction works, and then the group/association will be collaborated to the scheme. During the construction period, the provincial agricultural and health authorities will be conducted the seminar, and meeting for train the beneficiaries. Two month before the scheme is completed, proper regulations shall be defined by determining the association's name, the objectives and duration of the work plan, the limits of managed lands, the names of members, the rights and obligations of the members and the contributions brought by each member. These regulations will have to be officially approved, registered and published for legal application. After completion of the project, the administrative authorities shall hand over the irrigation facilities to the group/association for operation and maintenance, with legal procedures.

According to the regulations, rehabilitation and repairing of the irrigation and water supply facilities such as reservoir, main and secondary canals and diversion works, and pipeline of water supply system are conducted by the provincial agricultural and health authorities in collaboration with the MAF's DOI (Department of Irrigation) and MOH's DWSS (Department of Rural Water Supply and Sanitation). For the tertiary and quarternary canals and its supplementary facilities for irrigation and supplementary facilities for water supply, the repairs are done by the water user's group/association.

Considering the farmer's intention and willingness obtained from the village interview survey and farm household survey, a typical method of formation of these organizations in the scheme will be proposed as follows.

- (i) At very beginning of determination of the scheme implementation, an official notices on the scheme will be published immediately to the district authorities related to the scheme from the provincial authorities concerned. An explanation on the scheme to the village committee (administration) will be done by the provincial and district authorities concerned.
- (ii) Following after the explanation, villager's meeting will be held in the villages in the scheme, and the personnel of the provincial and district authorities and village head and members of the village committee will be explained to villagers on the present issues of water situation, i.e., irrigation water and drinking and domestic water, the scheme components to be solved for these issues, merits and benefits from the scheme, and formation of water users' organization.
- (iii) At the second step, the autonomous meeting by villagers and/or beneficiaries will be held in the village and discuss on the formation of these organizations and cooperation to the scheme implementation. The officers who take charge of the scheme will be consulted and cooperated with villagers and/or beneficiaries indirectly.
- (iv) For formation of these organizations, in order to form these organization by farmer themselves autonomously, the provincial and district authorities will be given the incentives to farmers and/or beneficiaries such as subsidies for farming materials, construction costs of tertiary and quarternary canals, and reduction of and exemption from taxes, and special favor to APB's loan for five years after completion of the construction work, due to obtain stable production resulted in irrigated agriculture. If someone who could not get

benefits from the scheme appear, the authorities will be given some benefits to these farmers such as subsidies for farming materials, and reduction of and exemption from taxes. For the beneficiaries of water supply, it will be also considered to set up low water fee for five years.

- (v) Through these steps, formation of these organizations which have a possibility of autonomous management and operation by farmer and/or beneficiaries themselves, will be made.
- (vi) It is expected that the involvement of women in the group will contribute in the long term to enhance the awareness on the women's role in irrigation among males as well as females.
- (vii) On the occasion of forming water user's group/association, it seems that sufficient support for beneficiaries on group formation, planning and operation of the facilities for irrigation and water supply could be anticipated difficulties carrying it out due to officers and staff of the provincial and district authorities concerned are little experienced in these matters. Therefore, in order to implement smooth and effective formation to operation of water users' organizations, build up the strong supporting organization for beneficiaries which is combined with the cooperation of the FIAT (Farmer Irrigated Agriculture Training Project supported by UNDP) of the Department of Irrigation, MAF, and volunteers of international aid organizations and NGOs, which carry out rural development activities in the study area at grass root level, will be proposed.

The groups/association will collaborate on the implementation of scheme during the implementing period. After completion of the scheme, the administrative authorities shall hand over a both facilities to the groups/associations for operation and maintenance, with legal procedures, entered into an agreement of technical and managerial assistance between water users' associations and relevant authorities. For this purpose, the formation of these organization is proposed as follows:

(1) Water user's group/association for irrigation

In accordance with the regulations (MAF,DOI), organization of the water user's group/association is proposed as follows:

(i) Village water user's group for irrigation (VWUG-irrigation)

In order to carry out smooth and effective operation and maintenance of the irrigation facilities and water management, a village water user's group will be organized in each village of the irrigation scheme area under the guidance of the provincial AFSs. The water user's group will set up a head, a deputy head, a water-man and a water fee collector (hold post of accountant), and also will organize the village water users committee by the representatives of sub-group). A head will be elected by members of the group and will take the responsibility for managing the group's activities. The water-man will operate water distribution to farm fields, and water fee collector will collect the water fee for the operation and maintenance of the irrigation facilities. The village water users committee will manage the group's activities. A participation of women to the committee will be encouraged.

(ii) Water users' association in the irrigation scheme area (WUA-irrigation)

At the irrigation level, the water users' association will be founded consisting of the village water user's groups which belong to the same irrigation scheme area. They will be organized in order to smoothly and effectively manage the

entire irrigation scheme. The association will carry out water distribution and control; operation and maintenance of the irrigation facilities; calculation of O/M costs as water fees; collection of water fees and responsibility of operating costs. Management of the association will be the managing committee composed of the heads of village groups, and the association will set up a head, a deputy head, secretary, accountant and water-man. A chief of the association will take the responsibility of managing the entire irrigation scheme. The secretary and accountant will be assigned by the committee members. The association will employ a water-man who is knowledgeable in irrigation. A woman selected among the women's groups in the district will be participated to the committee as a special member.

The provincial agricultural authorities will support the technical part, such as water control, operation and maintenance of the irrigation facilities, and an irrigation engineer will be assigned to the irrigation scheme. The provincial AFSs will conduct seminar and regular training on irrigation and water management techniques and operation and maintenance of the facilities for the beneficiaries. Moreover, implementation of the Farmer Irrigated Agriculture Training Project supported by UNDP for the beneficiaries of the scheme will be anticipated.

(2) Water user's group/association for water supply (VWUG-water supply)

In accordance with the regulations (MOH, DWSS), the water user's group/association is organized as follows:

(i) Village water user's group for water supply (VWUG-water supply)

In order to carry out smooth and effective operation and maintenance of the water supply facilities and water management, a village water user's group will be organized in each village of the water supply system under the guidance of the provincial and district health services. The water user's group will set up a head, a deputy head, a water-man and a water fee collector (hold post of accountant), and also will organize the village water users committee by the representatives of sub-group). A head will be elected by members of the group and will take the responsibility for managing the group's activities. The water-man will operate water distribution to tap, and water fee collector will collect the water fee for the operation and maintenance of the water supply facilities. The village water users committee will manage the group's activities. A participation of women to the committee will be encouraged. It is expected that the involvement of women in the water user's group will contribute to success of rural water program such as water, sanitation and hygiene. The role of women and girls in this respect is critical since they are the ones who draw and haul water, and is sanitation and hygiene activities.

(ii) Water users' association in the water supply system (WUA-water supply)

At the water supply system level, the water users' association will be founded consisting of the village water user's groups which belong to the same water supply system. They will be organized in order to smoothly and effectively manage the entire water supply system. The association will carry out water distribution and control; operation and maintenance of the water supply facilities; calculation of O/M costs as water fees; collection of water fees and responsibility of operating costs. Management of the association will be the managing committee composed of the heads of village groups, and the association will set up a head, a deputy head, secretary, accountant and water-man. A chief of the association will take the responsibility of

managing the entire water supply system. The secretary and accountant will be assigned by the committee members. The association will employ a water-man who is knowledgeable in water supply. A woman selected among the women's groups in the district will be participated to the committee as a special member.

The provincial health authorities will support the technical part, such as water control, operation and maintenance of the water supply system, and a technician will be assigned to the water supply system. At the district level, health service administrated by the district office will support and coordinate to the VWUG-water supply' activities. The provincial health service will conduct seminar and regular training on irrigation and water management techniques and operation and maintenance of the system for the beneficiaries.

(3) **Committee for coordination of water users' associations**

The committee for coordination of water users' association will be established in order to coordinate both the associations for irrigation and water supply. The board comprises representatives of the central authorities concerned, such as MAF and MOH, and the provincial AFSs and health services concerned and both the associations. The role of this board will coordinate water distribution between irrigation and water supply, as a highest supervision for these issues.

3.4.6 Highland Vegetable Trial and Demonstration Station

The Boloven Plateau exceeding an elevation of 1,000 m has proved to be favorable for vegetable production from observing physical features. For the purpose of the promotion and extension of vegetable production which could greatly improve the farm household economy and the development of regional economy, the highland vegetable trial and demonstration station is proposed to be established. The proposed station aims to achieve adequate production methods for stabilized vegetable production, to conduct extension activities of production technology and to distribute improved seeds of vegetables. In addition, the station will research on tea cultivation and its processing for the purpose of upgrading the quality of the products.

The proposed station will be operated under the agricultural authorities (AFSs) of Champasak province, collaborating with the Department of Agriculture and Extension, MAF and the Hatdokeo agricultural research station. The proposed organization is composed of the cultivation section, extension and training section, farm operation section, laboratory of tea processing of the operation department, and the secretariat, with the staff required to smoothly and effectively operation and extension works. The proposed station will be operated under the operating plan by the following staff.

(1) **Staffing**

Administration:

- 1 chief for administration and management of the station
- 1 deputy chief as assistant to the chief

Operation Department:

- (i) Cultivation section (trials of crop production) 3 staff
- (ii) Extension and training section (extension work and training) 3 staff
- (iii) Farm operation section (management of farm field and facilities) 6 staff and
3 tractor operators
- (iv) Laboratory of tea processing 2 staff

Secretariat:

- (i) Clerical work of the station 4 staff
- (ii) Public relations 1 staff

- (iii) Miscellaneous
(driver, boading worker, janitor and guard)

11 workers

(2) Plan of operation

At the initial stage of the station, trials of vegetables and fruit trees conceivable to cultivate in the Boloven Plateau will be made. Then it will be selected appropriate varieties of vegetables and the appropriate cultivation methods of vegetables will be established. The extension system including demonstration farm will be prepared. The extension work to specific production area as the scheme area will be concentrated. In addition, The farmer's training in the station in order to immediate transfer farming technology established for farmers, will be held. Through the extension work, multiplication of seeds and seedlings of vegetables and those distribution will be conducted. Guidance of vegetable production will not be only conducted farm mechanization but also animal use for land preparation. On the other hand, the research for tea processing to aim at upgrading the quality of tea, will be carried out. The extension work including transfer technology of tea processing will be conducted for tea farmers.

At the second stage (medium period), the stability of vegetable production area will be planned. The station will be performed as a center of vegetable research and extension in the southern region of Laos. At the third stage (long period), vegetable seeds multiplication in the station will be established for the purpose of introducing and selecting superior varieties of vegetables. The station will be distributed improved seeds to farmers through the extension agencies such as the provincial and district AFSs. Further export of seeds to surrounding countries will be considered having an eye on aquisition of foreign money.

The station will prepare a definite plan for development and extension of vegetable farming techniques, and will carry out the research and extension programs in cooperation with the MAF's DAE and international organizations. In order to successfully achieve vegetable production, training of extension staff in the provincial and district AFSs and farmers in the production areas will be made in the station.

(3) Trials and demonstration for vegetables

The trials and demonstration for vegetables in the station will be carried out as cabbage, lettuce, chinese cabbage, cauliflower, onion, carrot, radish, ginger, potatoes, tomatoes and strawberry.

(4) Training plan

In the station, training room and its facilities will be provided for the purpose of improvement of vegetable farming and increase in productivity. Training plan in the station will be proposed as follows:

- (i) Trainee
- i) Extension staff for vegetable farmers
- training fee will be burden by the station.
 - ii) Vegetable farmers
- the station will be provided foods and labor costs to farmers in the training period, due to they offer their labor forces to production in the station.
 - iii) Extension staff of the other provinces
- training fee will be burden by their provinces.

(ii) Annual training schedule

I) Extension staff for vegetable farmers

- 8 persons x 3 days x 3 times/month x 12 months

ii) Vegetable farmers

- long term trainee: 20 persons x 90 days x 3 times

- short term trainee: 10 persons x 2 days x 6 times

iii) Extension staff of the other provinces

- 10 persons x 5 days x 4 times

(5) Source of operation

As a general, the sources of operation of the station will be based on the income derived from the sale of farm products produced in the station, on the assumption that the income of the station does not put into the revenue of province or state. In addition, the financial support by province and/or state as subsidy will be expected.

(6) Site and land

The propose site of the station is located at Lak 45, where irrigation water is available from the Upper Champi scheme, and it has convenient road access. Accordingly, it could be expected that the function of extension would be available to cover the entire highland of the plateau. The proposed station will be sited within 50 ha of fallow land situated in Lak 45 village.

(7) Facilities and equipment

This development plan comprises construction of necessary buildings, provision of farm plots with facilities and equipment. For this station, the following works are proposed to be carried out under this plan.

- (i) Construction of administrative office, laboratory, training room, work shop, storage and dormitory;
- (ii) Construction of water resources and irrigation and drainage facilities;
- (iii) Supply of farm machinery; and
- (iv) Construction of trial and demonstration fields.

The details of these items proposed are summarized as below.

(i) Construction of buildings:

(a) Main building with administrative office, study rooms and training room:	1 building	with 870 m ²
(b) Laboratory of tea with pilot plant of tea processing:	1 building	with 170 m ²
(c) Dormitory and dining room:	1 building	with 600 m ²
(d) Garage for farm machinery with work shop:	1 building	with 240 m ²
(e) Garage for vehicles:	1 building	with 100 m ²
(f) Farm administrative building with storages and room for laborers:	1 building	with 340 m ²
(g) Green house:	1 house	with 500 m ²
(h) Net houses:	5 houses	with 250 m ² each
(i) Manure house:	1 house	with 60 m ²

(j)	Cowshed:	1 building	with 250 m ²
(k)	Pump room:	1 house	with 30 m ²
(l)	Water tanks:	2 units	
(m)	Quarters for staff:		
(ii)	Construction of irrigation and drainage facilities:		
(a)	Preparation of trial and demonstration fields:		39.0 ha
(b)	Irrigation equipmet: sprinkler		4.0 ha
	drip		2.0 ha
	hidrant and pipeline		5.0 ha
(iii)	Supply of farm machinery and vehicles:		
(a)	Tractors with attachments:		3 units
(b)	Tillers:		5 units
(c)	Light weight tillers:		3 units
(d)	4WD wagon type jeep:		1
(e)	4WD pick up:		1
(f)	Truck 4 ton:		1
(g)	Motorcycles:		5
(iv)	Supply of research and extension materials and equipment:		
(a)	Laboratory and observatory equipment:		1
(b)	Pilot plant of tea processing:		1
(c)	Audio-visual equipment for extension works:		1
(v)	Supply of supplemental equipment:		
(a)	Personal computer with printer:		1
(b)	Copy machine:		1
(c)	Generator and air-conditioner:		1
(d)	Kitchenware and equipment:		1

Tables

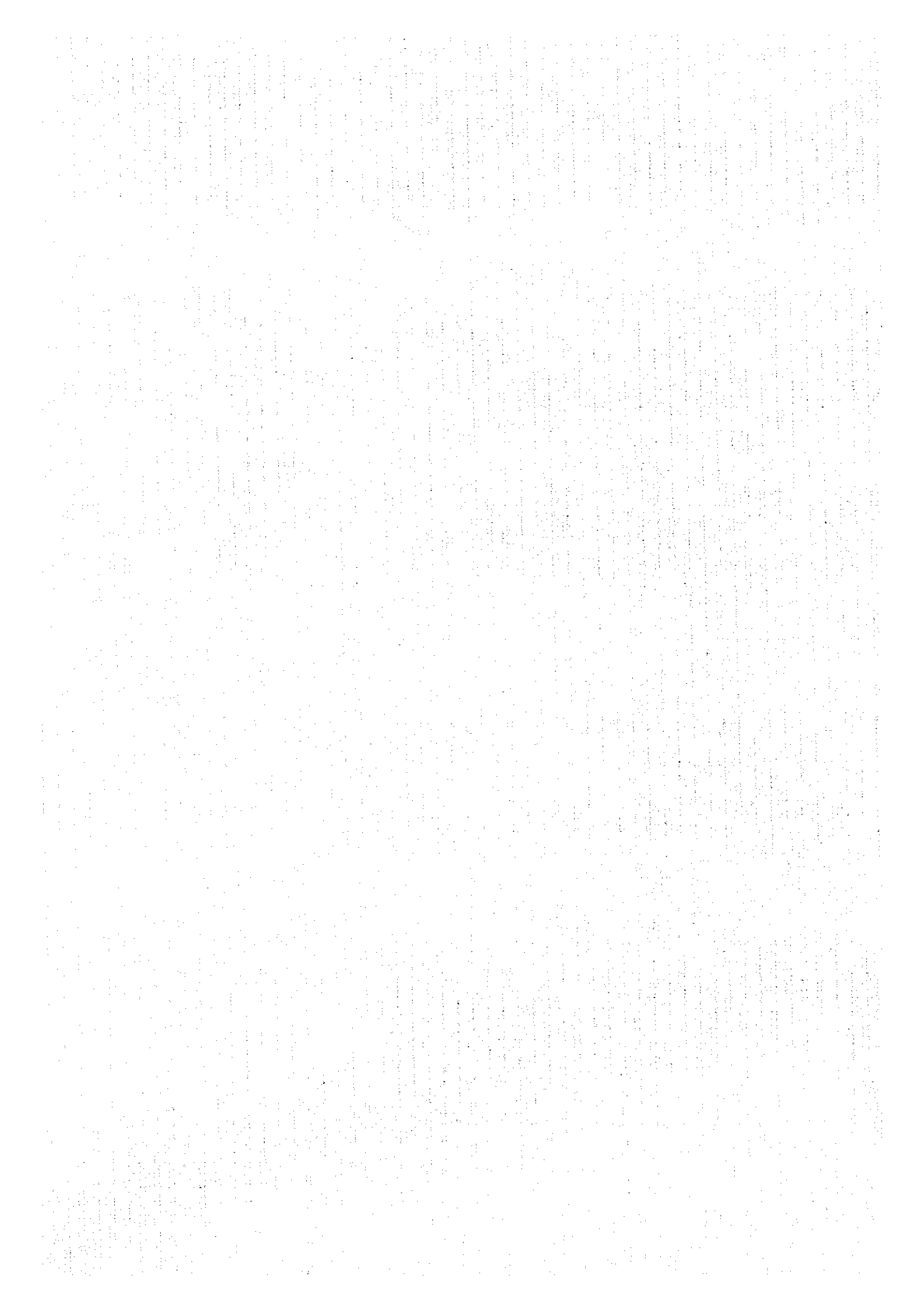


Table V-1-1(1) Present Staffing of District Agricultural and Forestry Services

Pakxong District:			
Section	Staffing	Grade of Staff	Activities
Chief	1	2	
Deputy Chief	2	2	
Administration			
Chief	1	2	
Staff	6	3	Planning, Statistics, Marketing, Accounting
Agriculture			
Chief	1	2	
Staff	1	3	Coffee improvement
Livestock and Veterinary			
Chief	1	2	
Veterinarian	1	1	
Staff	2	3	Fishery extension
Meteorology			
Chief	1	2	
Staff	5	3	Meteorological observation
Irrigation			
Chief	1	3	
Forestry			
Chief	1	1	
Staff	5	3	SIDA Project, reforestation

Note: Grade 1: University graduate

Grade 2: Collage graduate

Grade 3: High school graduate

Grade 4: Secondary school graduate

Grade 5: Primary school graduate

Data Source: District Agricultural and Forestry Services concerned

Salavan District:			
Section	Staffing	Grade of Staff	Activities
Chief	1	3	
Deputy Chief	2	2	
Administration			
Chief	1	2	
Agriculture			
Chief	1	2	
Staff	3	3x1p, 4x2p	Lowland rice, upland crops
Livestock and Veterinary			
Chief	1	2	
Staff	9	2x3p, 3x5p 4x1p	Livestock raising, vaccination
Meteorology			
Chief	1	2	
Staff	5	3	Meteorological observation
Forestry			
Chief	1	2	
Staff	11	2x9p, 3x2p	

Data Source: District Agricultural and Forestry Services concerned

Table V-1-1(2) Present Staffing of District Agricultural and Forestry Services

Laongam District:

Section	Staffing	Grade of Staff	Activities
Chief	1	3	
Deputy Chief	2	1x1p, 2x1p	
Administration			
Chief	1	2	
Staff	2	3	Clerk, Accounting
Agriculture			
Chief	1	2	
Staff	3	3x1p, 4x2p	Coffee improvement, upland crops
Livestock and Veterinary			
Chief	1	2	
Staff	5	2x1p, 3x2p 4x2p	Livestock raising, vaccination
Meteorology			
Chief	1	2	
Staff	2	3	Meteorological observation
Forestry			
Chief	1	1	
Staff	16	2	SIDA Project
SFA			
Chief	1	1	
Staff	21	1x1p, 2x20p	Forest conservation, reforestation

Note: Grade 1: University graduate

Grade 2: Collage graduate

Grade 3: High school graduate

Grade 4: Secondary school graduate

Grade 5: Primary school graduate

Data Source: District Agricultural and Forestry Services concerned

Thateng District:

Section	Staffing	Grade of Staff	Activities
Chief	1	2	
Deputy Chief	2	1x1p, 2x1p	
Agriculture			
Chief	1	2	
Staff	1	2	Coffee improvement
Livestock and Veterinary			
Chief	1	2	
Staff	2	2	Livestock raising, vaccination
Irrigation			
Chief	1	2	
Staff	3	2	Irrigation, water management
Forestry			
Chief	1	1	
Staff	12	2	Forest conservation, reforestation

Data Source: District Agricultural and Forestry Services concerned

Table V-1-2 Loan Condition of Agricultural Promotion Bank

Item	Loan Term	Condition and Interest	
Draft Animal	Medium Term	Loan period: 3 years	Loan by 2 phases 8 % per annum
Coffee Production	Medium and Long Term	Loan by 2 phases;	
		1. For Improvement and maintenance	
		Loan period: 3 years	8 % per annum
		2. For replanting and pruning	
		Loan period: 5 years	7 % per annum
Crop Production	Short Term	Loan period: 8 months	10 % per annum
		For rice, soybean, peanut, tobacco, etc.	
Farm Input	Short Term	Loan period: 8 months	10 % per annum
		For fertilizer, pesticides, etc.	
Farm Machinery	Medium Term	Loan period: 3 years	8 % per annum
Livestock Production	Medium Term	Loan period: 3 years	Loan by 2 phases 8 % per annum

Data Source: Agricultural Promotion Bank, Pakxe Branch

Table V-1-3 Agricultural Credit-APB in the Study Area

Item	Unit: Kip				
	Bachiang District	Paxxong District	Laongam District	Salavan District *	Thateng District
Total Loan Amount (Released)	18,145,000	536,888,400	75,012,060	120,065,000	17,818,000
Purchase of Draft					
Animal	1,245,000	0	0	73,905,000	0
Land Clearing	4,750,000	0	0	46,160,000	0
Crop Production	10,005,000	0	0	0	0
Coffee Production	0	536,888,400	75,012,060	0	17,818,000
Livestock Production	6,420,000	0	0	6,880,000	0
Farm Machinery	8,590,000	0	0	11,950,000	0
No. of Village	14	36	27	42	10
No. of Family	215	1,455	842	851	205
No. of Group	24	146	82	94	21
Total Loan Amount (to be released in 1995)	42,170,000	966,137,200	32,541,000	207,000,000	86435000
No. of Village	13	36	27	42	10
No. of Family	228	1,455	842	851	205
No. of Group	52	146	82	94	21

Note: * the whole Salavan District.

Data Source: Agricultural Promotion Bank, Pakxe Branch

Data Source: The Phatai Bank (Southern Bank)

Note: Agricultural credit by the Phatai Bank for livestock production in Paxxong District is loaned to individual farmer as follows;

Total Loan Amount: 243,330,100 Kip

No. of Family: 22 families

No. of Enterprise: 1 enterprise

Table V-1-4 Financing Condition of Phak Tai Bank

Item	Condition and Interest		
	Kip	Dollar	Baht
Annual Interest Rate of the Deposit (%)			
1. Saving	12	3	5
2. Fixed Deposit			
2.1 3 months term	13	0	7
2.2 6 months term	15	0	8
2.3 12 months term	16	0	9
3. Share of Bank Credit 6 months	18	0	0
Annual Interest Rate of the Loan (%)			
1. For kip currency			
- Loan for agriculture and forestry	10	8	7
- Loan for industry and handicraft	20	16	14
- Loan for construction and its materials	22	19	17
- Loan for commerce and services	22	19	17
2. For foreign currency (Short term only)			
2.1 Dollar	13		
2.2 Baht	16		
3. Over lending			
3.1 Kip	24		
3.2 Dollar	15		
3.3 Baht	18		

Data source: The Phak Tai Bank (Southern Bank), Pakse

Note: Agricultural credit by the Phak Tai Bank for livestock farmer in Pakxong District is loaned as follows:

Total loan amount: 243,330,100 kip

No. of family : 22 families

No. of enterprise : 1 enterprise

Table V-2-1 Agricultural Credit by Agricultural Promotion Bank

1. Pakse Branch		* Pakxong Office
Founded Year :	1994	1995
No. of Staff :	48 staff	5 staff
Total Amount of Credit (released):	4,003,384,923 kip	818,750,330
Land Clearing :	190,913,581 kip	
Coffee Production :	812,120,330 kip	812,120,330 kip
Crop Production :	117,045,571 kip	
Livestock Production :	81,825,895 kip	
Purchase of Draft Animal :	894,267,826 kip	
Purchase of Farm Machinery :	227,254,000 kip	6,630,000 kip
Tractors :	46,034,000 kip	6,630,000 kip
Water Pumps :	150,000,000 kip	
Rice Mills :	31,220,000 kip	
Purchase of Farming Materials :	128,501,485 kip	
Purchase of Fertilizer :	182,400,000 kip	
Transport and Labor Charge :	287,017,315 kip	
Crop Trading :	936,653,350 kip	
Handicraft :	18,343,600 kip	
No. of Group :		139
No. of Family :		240
Data Source: Agricultural Promotion Bank		
2. Salavan Branch		* Laongam District
Founded Year :	1995	
No. of Staff :	19 staff	4 staff
Total Amount of Credit (released):	1,117,116,300 kip	308,772,200 kip
Land Clearing :	243,136,000 kip	
Coffee Production :	258,097,200 kip	258,097,200 kip
Cardamom Production :	29,486,000 kip	29,486,000 kip
Crop Production :	21,189,000 kip	21,189,000 kip
Irrigated Rice Production :	17,166,000 kip	
Livestock Production :	125,535,000 kip	
Purchase of Draft Animal :	255,510,000 kip	
Purchase of Farm Machinery :	43,172,500 kip	
Tractor :	18,492,000 kip	
Water Pump :	24,680,500 kip	
Purchase of Fertilizer :	67,350,600 kip	
Construction of Irrigation Facilities :	2,100,000 kip	
Crop Trading :	51,200,000 kip	
No. of Group :		95
No. of Family :		648
Data Source: Agricultural Promotion Bank		

3. Sekong Branch

Founded Year :	1995	
No. of Staff :	8 staff	
Total Amount of Credit (released):	120,000,000 kip	
Coffee Production :	63,000,000 kip	(Thateng District only)
Crop Production :	2,500,000 kip	
Livestock Production :	13,000,000 kip	
Handicraft :	1,500,000 kip	
Crop Trading :	30,000,000 kip	
No. of Group :	122	(No. of Village : 50)
No. of Family :	1,058	

Data Source: Agricultural Promotion Bank

Table V-2-2 Loan Conditions for Coffee Production by APB

1. Improvement (pruning) per ha		2. Improvement (pruning of old tree) per ha	
- Weeding :	120,000 kip		120,000 kip
- Pruning :	40,000 kip		70,000 kip
- Scraping :	60,000 kip		60,000 kip
- Fertilizer :	100,000 kip		100,000 kip
- Insecticides :	11,000 kip		11,000 kip
- Fence	0 kip		158,000 kip
Total	331,000 kip		519,000 kip
Loan period :	2 years		5 years
<hr/>			
3. New planting per ha			
- Land preparation :	100,000 kip		
- Dig hole :	125,000 kip		
- Planting :	125,000 kip		
- Fertilizer :	100,000 kip		
- Insecticides :	11,000 kip		
- Weeding :	80,000 kip		
- Fence :	158,000 kip		
Total	699,000 kip		
Loan period :	5 years		

Data Source: Agricultural Promotion Bank

Table V-2-3 Agricultural Credit by APB in the Priority Scheme Areas

1. Upper Champi Priority Scheme Area

Name of Village	Purpose	Area (ha)	Loan Amount (kip)	No. of Group	No. of Family
Lak 33	Coffee Production	12.65	3,740,000	1	8
Lak 35	Coffee Production	120.5	25,861,500	5	51
Lak 36	Coffee Production	42	12,450,000	3	21
Lak 38	Coffee Production	130.6	30,410,000	3	33
Lak 40	Coffee Production	182	49,545,000	6	72
Lak 42	Coffee Production	35.5	9,965,000	2	30
Lak 43	Coffee Production	125.5	35,620,000	7	58
Lak 45	Coffee Production	73.5	23,240,000	4	37
Total		722.25	190,831,500	31	310

Data Source: Pakxong Office, Pakse Branch, Agricultural Promotion Bank

2. Upper Tapoung Priority Scheme Area

The APB does not make a loan to farmers in this priority scheme area.

3. Upper Kapheu Priority Scheme Area

Name of Village	Purpose	Area (ha)	Loan Amount (kip)	No. of Group	No. of Family
Phouak-noi	Coffee Production	76	3,868,000	4	22
Sixiangmai	Coffee Production	17.5	3,220,000	1	7
On-noi	Coffee Production	35	2,650,000	4	10
Phouak-gnai	Coffee Production	20.5	5,250,000	1	11
On-gnai	Coffee Production	12.5	4,000,000	1	15
Total		161.5	18,988,000	11	65

Data Source: Salavan Branch, Agricultural Promotion Bank

4. Lower Xe Set Priority Scheme Area

Name of Village	Purpose	Area (ha)	Loan Amount (kip)	No. of Group	No. of Family
Natteu		0	0	0	0
Senvang-gnai	Crop Production	61	5,826,000	5	57
Houakhoua	Crop Production	14	967,000	2	14
Senvang-noi	Crop Production	30	2,048,000	2	21
Khonleng		0	0	0	0
Natou	Livestock	72 head	5,760,000	2	18
Total		105	14,601,000	11	110

Data Source: Salavan Branch, Agricultural Promotion Bank

5. Tay-Un Priority Scheme Area

The APB does not make a loan to farmers in this priority scheme area.

Figures

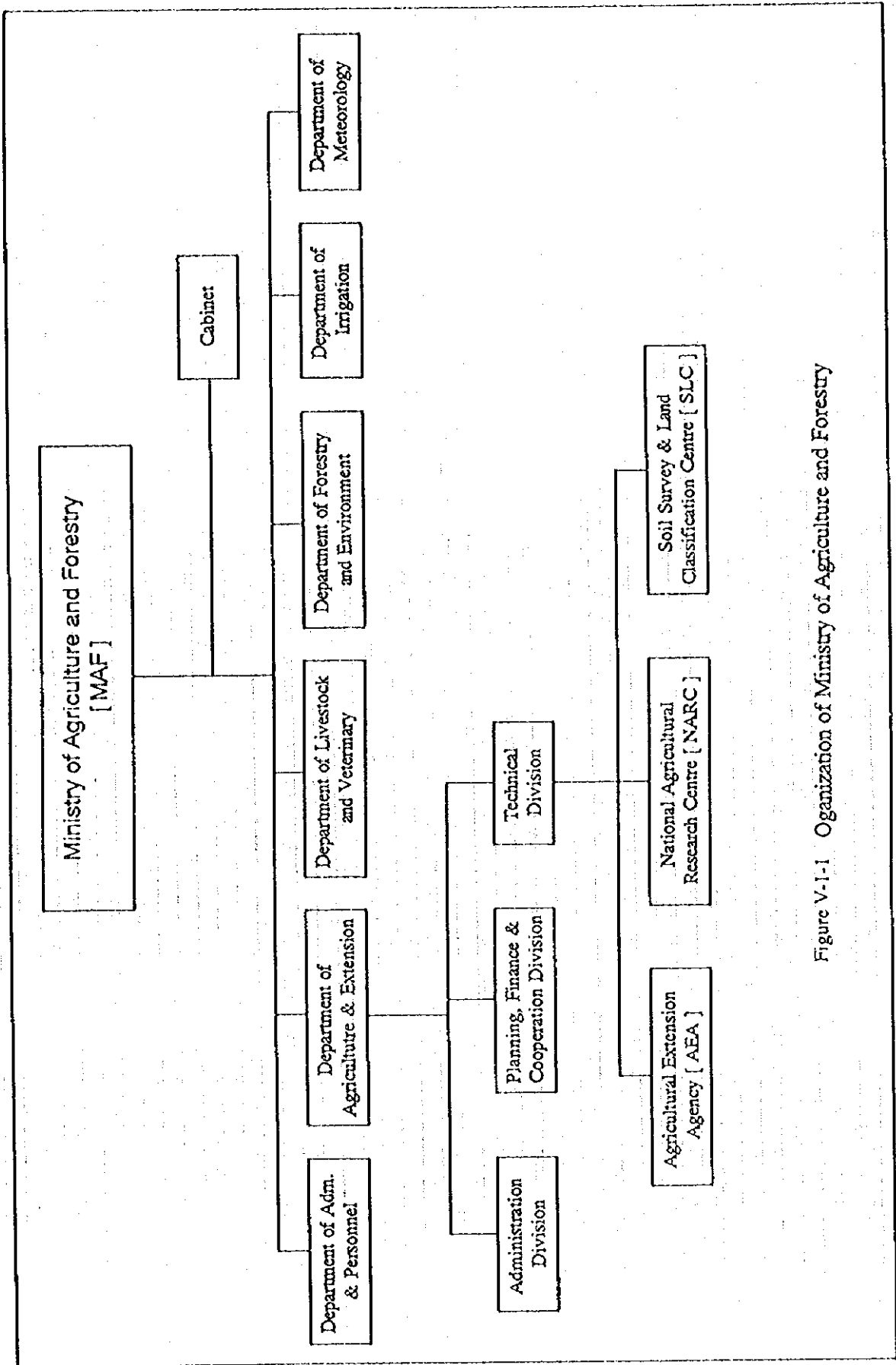


Figure V-1-1 Organization of Ministry of Agriculture and Forestry

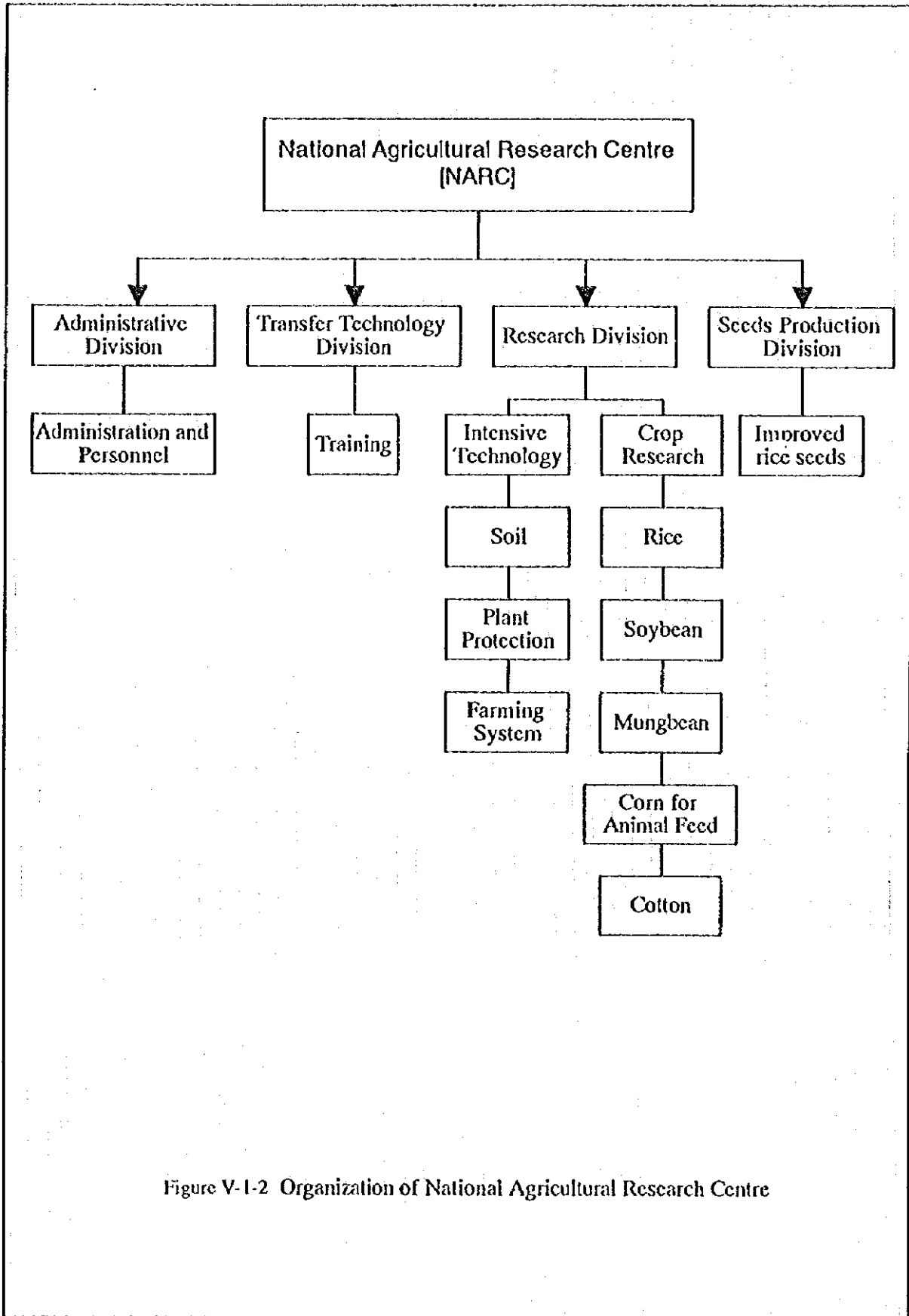


Figure V-1-2 Organization of National Agricultural Research Centre

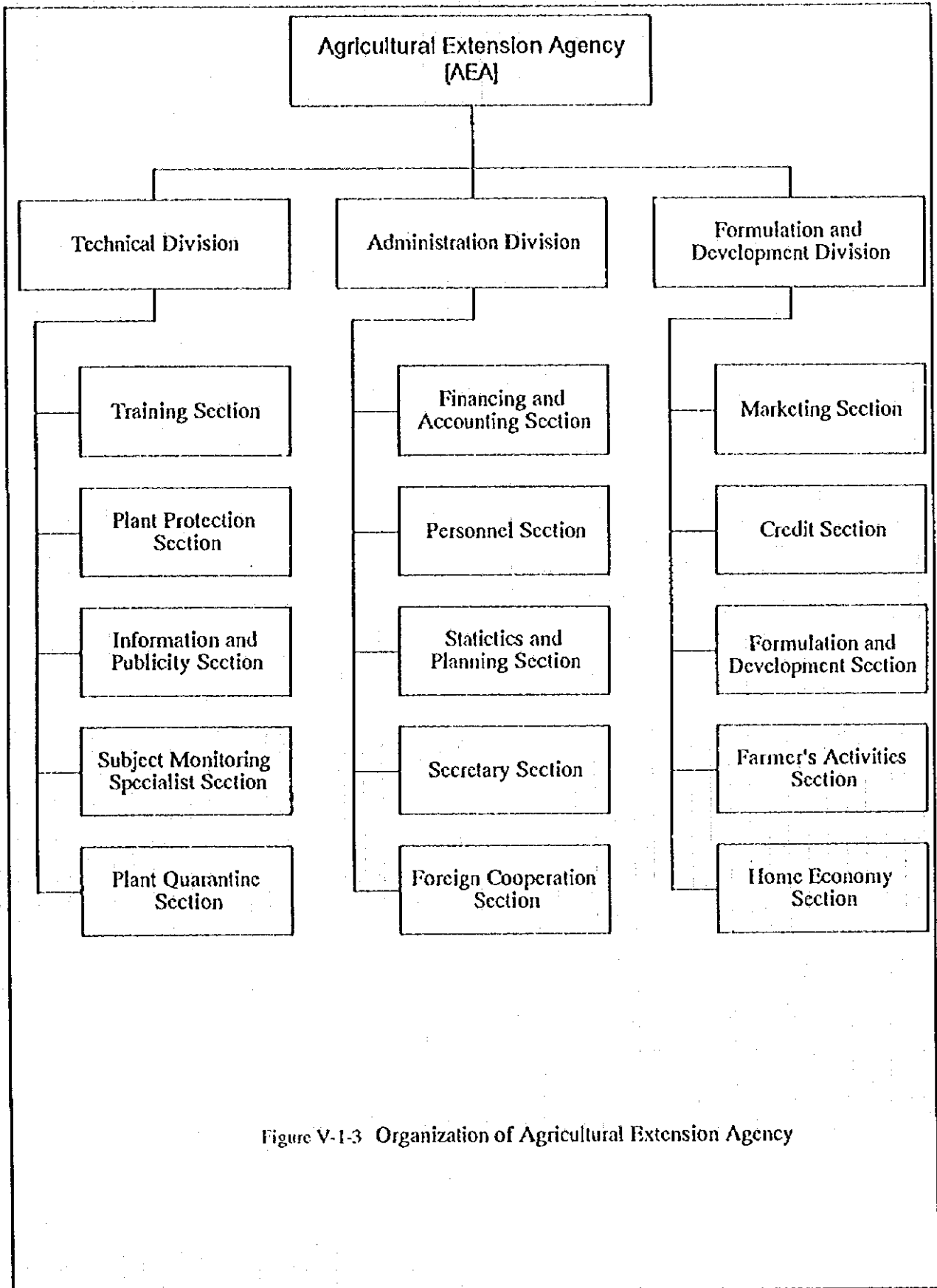


Figure V-1-3 Organization of Agricultural Extension Agency

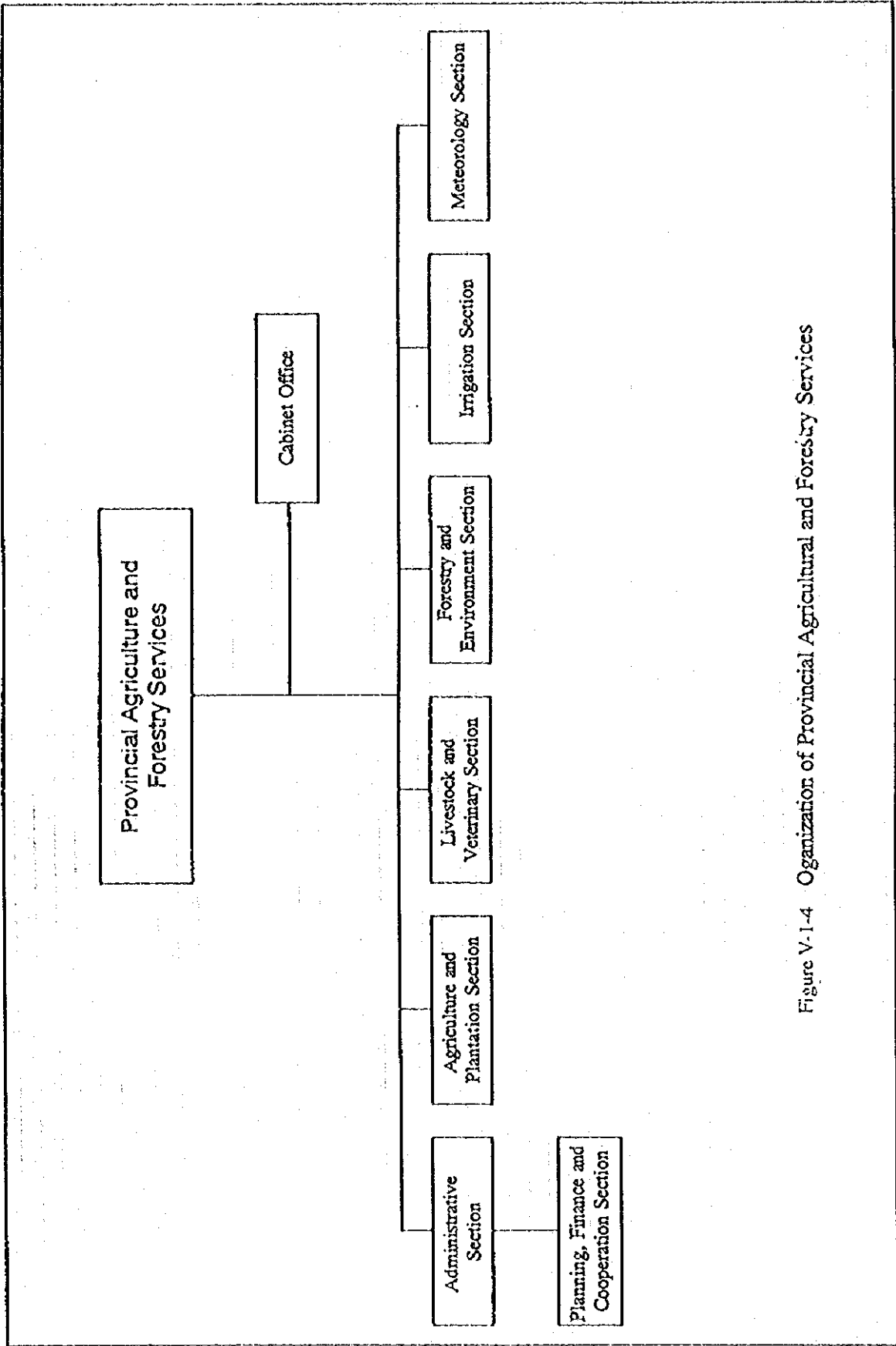


Figure V-1-4 Organization of Provincial Agricultural and Forestry Services

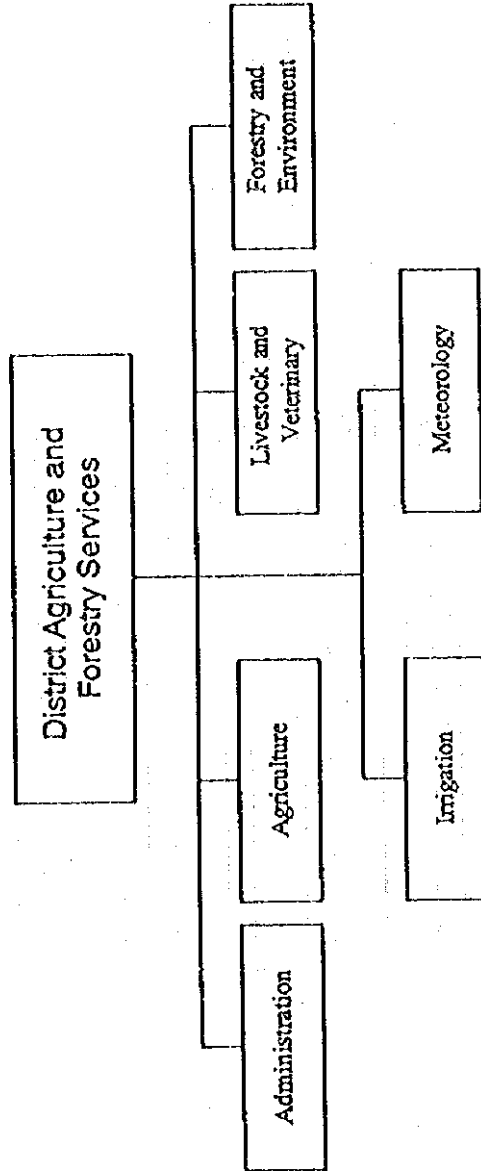


Figure V-1-5 Organization of District Agriculture and Forestry Services

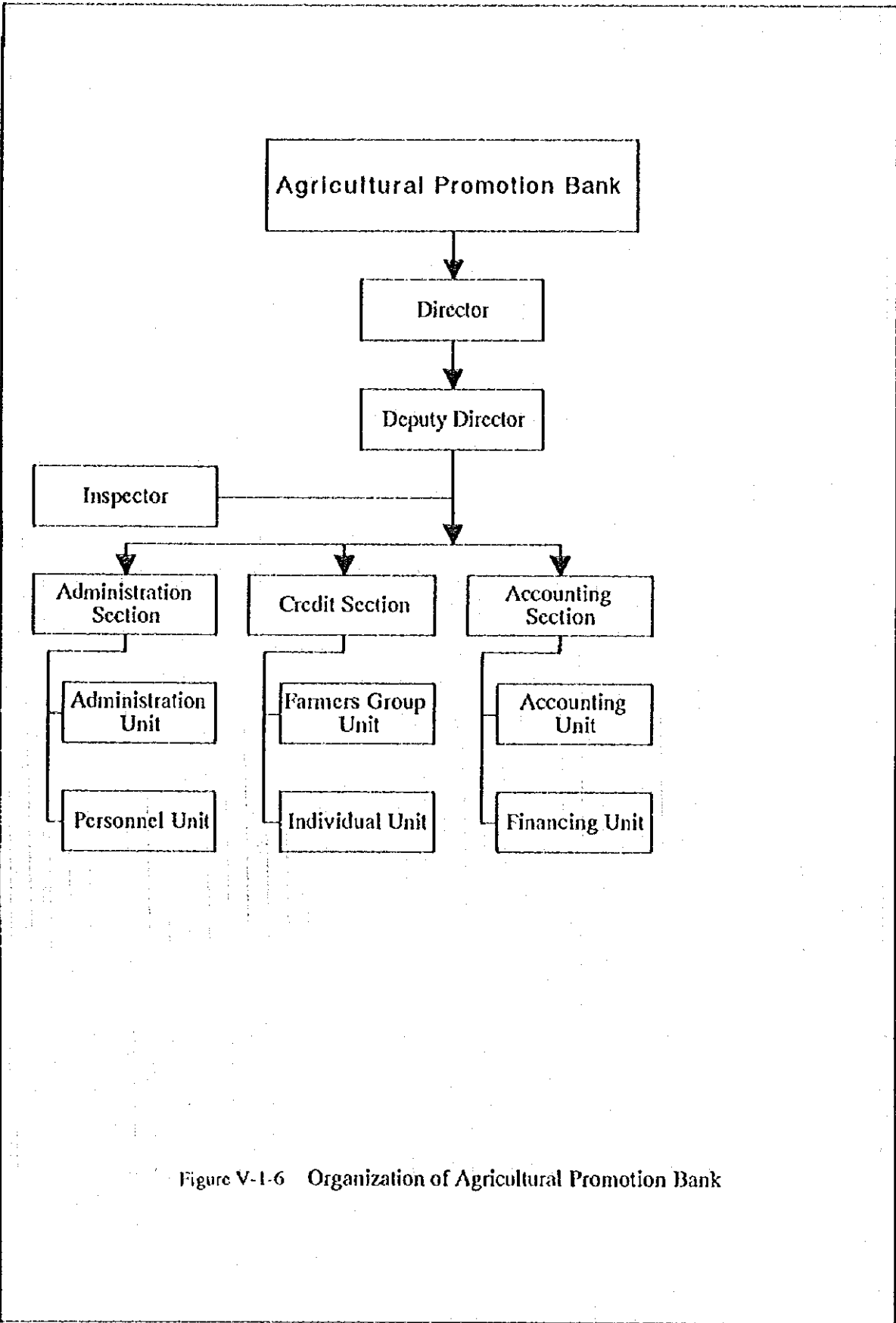


Figure V-1-6 Organization of Agricultural Promotion Bank

ANNEX VI
SOCIO-ECONOMY

ANNEX-VI SOCIO-ECONOMY

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ANNEX-VI SOCIO-ECONOMY

1. INTRODUCTION

This Annex-6 presents socio-economy based on the results of socio-economic survey in the Study Area as well as Champasak, Salavan and Sekong provinces, and in the priority scheme selected from the Master Plan Study, such as Upper Champi, Upper Tapoung, Upper Kapheu, Lower Xe Set and Upper Tay-Un schemes.

The rural socio-economic survey was carried out through, (i) direct observation, interview to the village leaders, farmers and officials concerned in the Study Area and the Priority Scheme selected by the Master Plan Study, (ii) farm household economic survey by questionnaire for 200 families in 10 villages in the Master Plan Study, and for 100 families selected by random in the five priority schemes, and (iii) data review including the data obtained from the provincial and district authorities and other reports on the rural survey in Laos. The survey have been concerned on the ethnic villages of Lao Loum (Lowland ethnic groups) and Lao Theung (Midland ethnic groups) in the Study Area and the Priority Scheme.

This ANNEX consists of :

- (1) identification of the rural society and living conditions in the Study Area;
- (2) study on current constraints for agricultural development from sociological view;
- (3) identification of the rural society and living conditions in the priority scheme areas;
- (4) study on current constraints for agricultural development from sociological view; and
- (5) proposal of the development plan of rural society in the Study Area and in the priority scheme areas.

2. NATIONAL RURAL DEVELOPMENT STRATEGY

The government's development objectives have progressed over the last several years in response to social and economic needs. While part of this progress was achieved by implementing the NEM (new economic mechanism), the government now realizes the need to expand the initial NEM steps to further market liberalization and improve living standards. Recently, an emphasis has been placed on rural development to spread economic gains nationwide, on the basis of the national development plan to the year 2000 determined by the CPC in conjunction with the relevant ministries and the provincial administration. As one of the strategies to achieve the goals of the plan are pursue integrated rural development by improving farming techniques to improve family farms and establish industrial processing bases, develop extension and institutional capabilities, including centralizing the rural development programs, and develop infrastructure for town centers for small communities to aggregate.

The envisaged project, resulting from the Master Plan Study, intend to increase the agricultural productivity in parts of the Boloven Plateau through the introduction of a small integrated schemes which could act as a model for sustainable agricultural development in other area of the southern region. This is in line with the national development program up to the year 2000 to ensure the development of rural communities, and to contribute to reduce urban and rural disparities which are evident in health, education and other quality of life areas.

Aiming to improve the present rural environment, a number of plans are envisaged; the strengthening and formation of farmers' organizations to improve agricultural production; the strengthening of rural financing institutions to assist the population in the rural areas to increase production and to improve livings; the training of community leaders and villagers to enlighten community activities, and assistance to rural women for rural life improvement.

The Master Plan Study sets out the overall integrated agriculture and rural development plan for improvement of agricultural and rural environments, including provision of irrigation facilities to the areas which have a potential to irrigated agriculture and rural infrastructures such as water-supply, community hall and school, and improvement of village roads. It is assumed that, with an increase in agricultural production through provision of irrigation facilities and rural infrastructure, together with appropriate support services, an improvement in the living conditions of the population in the Boloven Plateau under consideration will be achieved.

3. THE MASTER PLAN STUDY

3.1 Present Conditions

3.1.1 General

The Master Plan Study area consists of 2 districts, Pakxong and a part of Bachiang, of Champasak province, 2 districts, Laongam and a part of Salavan, of Salavan province, and 1 district, Thateng, of Sekong province. The total area of the study area is approximately 654,000 ha, and extends over the Boloven Plateau, with 468,000 ha in the Champasak province, 146,000 ha in the Salavan province, and 40,000 ha in the Sekong province.

The study area is dominated by coffee and upland rice fields. Most farmland is used for coffee while in some areas cardamom is grown. As staple crop, upland rice production practices by the traditional farming as slash and burn cultivation. The remaining land, except for the mountain areas, is used for homesteads, roads, grazing cattle, and upland crops.

The major roads in the study area such as the National road No. 16, 20 and 23, are passable and transportable throughout the year, and are linked with Pakse and Salavan by the No. 20 and 23, and Sekong by the No. 16. The secondary roads in the area are of poor quality and not suitable for sedans. Four wheel drive vehicles and motorcycles can pass but during rainy season this type of traffic is difficult to pass as well. The Laongam town, alongside of the No. 20, plays an important role of the commercial center of the western part in the area. The Pakxong town, alongside of the No. 23, performs the major part in the Boloven Plateau.

3.1.2 Administrative Jurisdiction

Administrative division in the study area is divided into three provinces (khueng); Champasak, Salavan and Sekong, and is an independent prefecture on an administrative parity with the provinces. Below the province is the district (muang), which are in turn divided into villages (ban). In the area, there are five districts; Pakxong and Bachiang in Champasak province, Laongam and Salavan in Salavan province and Thateng in Sekong province, as detailed below:

Province (Khueng)	District (Muang)	Zone (Tasseng)*	Village (Ban)
Champasak	Pakxong	9	105
	Bachiang	6	76
	Sub-total	15	181
Salavan	Salavan	4	58
	Laongam	10	110
	Sub-total	14	168
Sekong	Thateng	4	50
	Sub-total	4	50
Total		33	399

Note: * Zone (former sub-district) is out of administrative jurisdiction at present.

Data source: CPCs, Champasak, Salavan and Sekong provinces.

In terms of the local administrations, the provincial authorities have a fairly high degree of autonomy provided that they adhere to the directives and policy guidelines laid down by the central government. Provincial administration is organized similar to the central government and divided into departments which correspond to the ministries. Administration at the district is also formed in the same as the provincial authorities.

At the village level, a village head is managed and administered, and he is elected by the villagers, once in two years. The village administrative committee is organized by the village head, village deputy head, village unit heads (Nuay), formal representatives of the organizations under the government patronage, such as elder group including National Front, women's group and youth group, and tax collector. The representatives of farmer's groups such as extension group are participated to the committee as a member at some villages in the area. Village unit (Nuay) as neighborhood unit is organized by 10 to 15 households in every villages.

3.1.3 Population

According to the preliminary reports of the census 1995, the population of the province related to the study area is 500,994 with 84,230 households of Champasak, 256,550 with 42,381 households of Salavan, and 63,836 with 9,520 households of Sekong respectively. Annual population growth rate over the past ten years (1985/1995) is 2.4% (Champasak), 2.7% (Salavan) and 2.0% (Sekong) respectively. Average household size is 5.9 (Champasak), 6.1 (Salavan) and 6.7 (Sekong), respectively. However, the population statistics used originate from the provincial CPCs concerned, and the statistics in 1994 were adopted owing to still not processed the 1995 census. The total population in the Study Area was reported as 140,181, and its break down by district was as below:

Province	District	No. of H.H.	Total Population	Avg. H.H Size	Farm H.H (%)
Champasak	Pakxong	7,746	41,758	5.4	95
	Bachiang	4,695	22,275	4.7	89
	Sub-total	12,441	64,033	5.1	92
Salavan	Salavan	3,377	20,623	6.1	92
	Laongam	7,914	41,122	5.2	95
	Sub-total	11,291	61,745	5.7	94
Sekong	Thateng	2,702	14,403	5.3	97
	Sub-total	2,702	14,403	5.3	97
Total		26,434	140,181	5.3	94

Data source: CPCs, Champasak, Salavan and Sekong provinces.

Details of the population are tabulated in Table VI-1-1 to -1-3.

Population density in the area is 21.6 inhabitants per square kilometer, and the details are shown in Table VI-1- and Figure 6-1. According to the preliminary report 2 of the 1995 census, the density of the provinces related to the area, such as Champasak (32.5) and Salavan (24.0) provinces, are relatively higher than that of the area. However, the density (10.4) of the Pakxong district presents lower than that of the province. Among three provinces related, Sekong province is in the least populated (6.6) though the Thateng district shows 36.5, because of old settlement by coffee growers. In the area, most densely populated part is a part of the Salavan district which extends over the area.

The age group, sex and marital status population structure of Lao PDR in the 1985 census shows almost complete pyramid. However, reviewing the data obtained from the survey presented in Figure 6-2, the age group of 6-9 in the Study Area shows relatively low compared to that in the 1985 census. The ratio of males to females (15-24) shows that there are more men than women in the same age group. The male: female ratio of population in the area is about 49.7: 50.3 in total. The percentage of widow is more than 7% after age 45. This is hard to accept as a difference in the average natural life of men and women. According to the UNDP's report, the life expectancy of the Lao PDR is 50.4 years. However, the health services of Champasak reports about 45 to 50 years in the rural areas.