THE MINISTRY OF AGRICULTURE INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY, JICA

SOUTH SULAWESI REGIONAL AGRICULTURAL DEVELOPMENT PLANNING / ATA-140 PROJECT

FINAL REPORT ON PHASE I
VOLUME IV

A GUIDANCE FOR THE PLANNING ON REGIONAL AGRICULTURAL DEVELOPMENT

February · 1979

THE TEAM OF THE PROJECT ON SOUTH SULAWESI RADP/ATA-140
IN UJUNG PANDANG

S. Noor.

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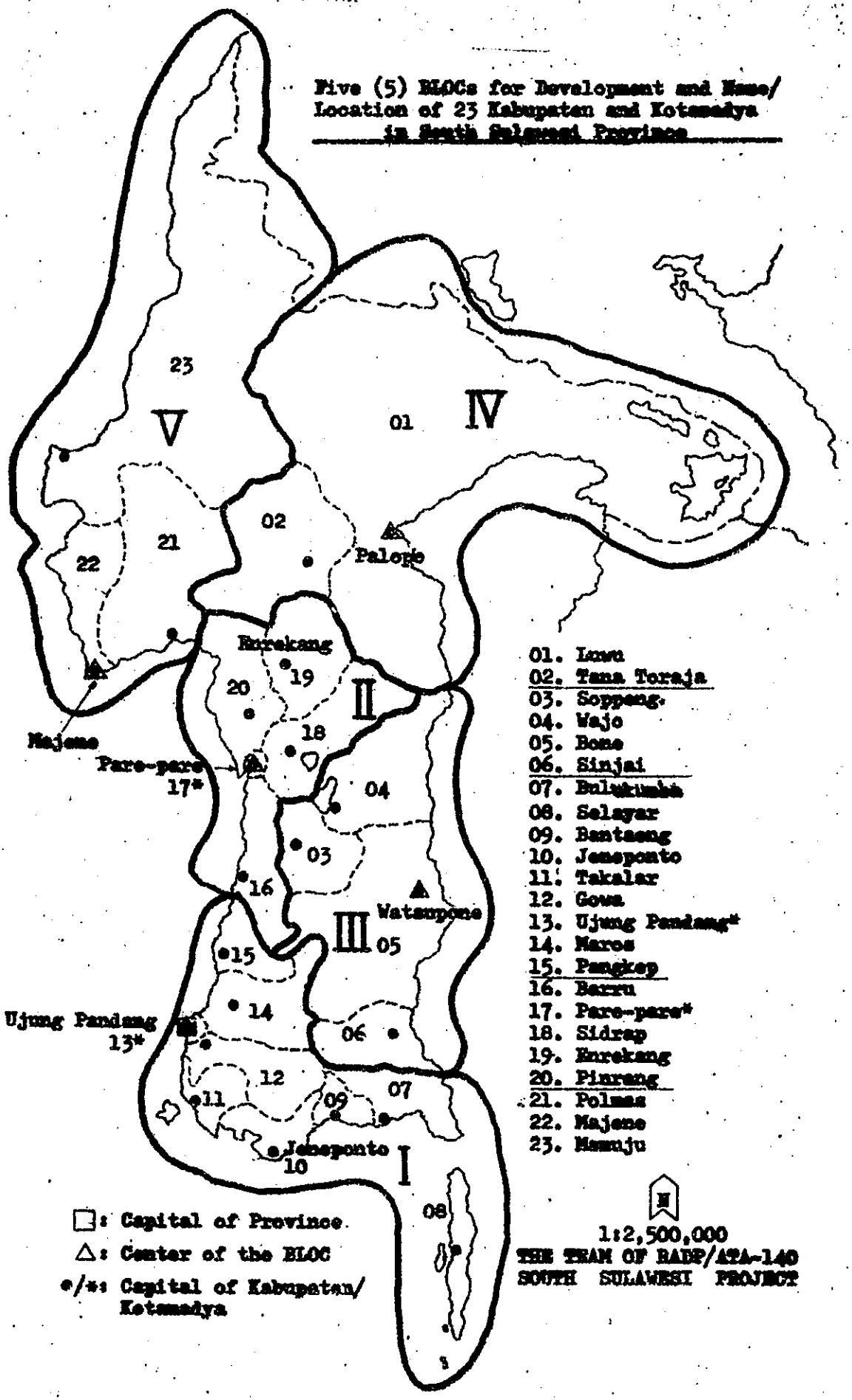
Five (5) BLOCs for Development and Name/ Location of 23 Kabupaten and Kotamadya in South Sulawesi Province
V
IV
II
III
I
23
01
02
21
22
04
03
05
06
07
08
09
10
12
14
15
16
18
19
20
Palopo
Enrekang
Majene
Pare-pare 17*
Watampone
Ujung Pandang 13*
Jeneponto
01. Luwu
02. Tana Toraja
03. Soppeng
04. Wajo
05. Bone
06. Sinjai
07. Bulukumba
08. Selayar
09. Bantaeng
10. Jeneponto
11. Takalar
12. Gowa
13. Ujung Pandang*
14. Maros
15. Pangkep
16. Barru
17. Pare-pare*
18. Sidrap
19. Enrekang
20. Pinrang
21. Polmas
22. Majene
23. Mamuju
□: Capital of Province
△: Center of the BLOC
●/*: Capital of Kabupaten/ Kotamadya
1:2,500,000
THE TEAM OF BAPP/ATA-140
SOUTH SULAWESI PROJECT

Volume IV.

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A GUIDANCE FOR THE PLANNING ON REGIONAL AGRICULTURAL DEVELOPMENT

I

INTRODUCTION

1.1. Definition of plan making

Plan making is divided into two categories. We shall call one the target determination and the other measures determination. The former is to decide the targets of strategies. Example is shown in Figure 1; curve (A) which is inferred population increase by tendency is changed into curve (B) which shows the target of strategies for population plan. It should naturally be explained why the target of strategies has to be employed in the operation of target determination. The latter is to decide the measures to be taken, for instance, how to change the population increase rate.

Another example; when the government decides to increase rice production, that is making one of the targets. In the next operation, the study on some measures such as 1) breeding, 2) improvement of rice production technique, 3) improvement of transportation system of input material supply, 4) improvement of irrigation system, 5) land reclamation, 6) etc. should be conducted in order to achieve the purpose. The method of implementation of several projects at the same time should certainly be included herein.

Fig. 1. Tendency and plan

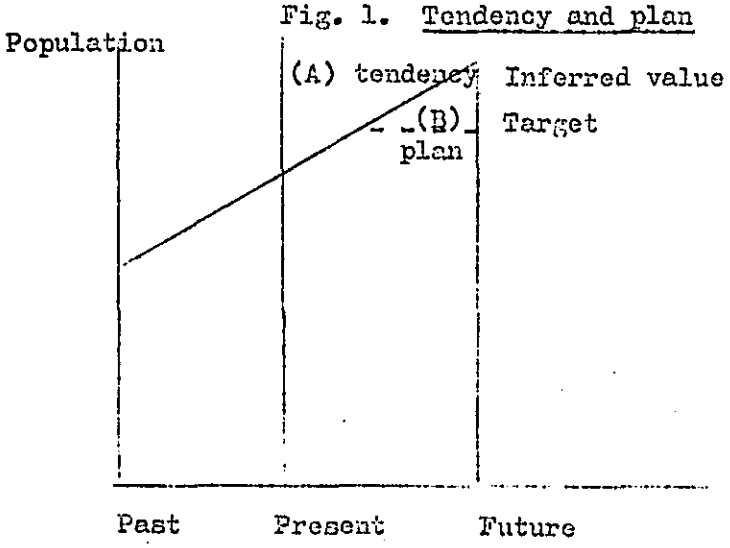
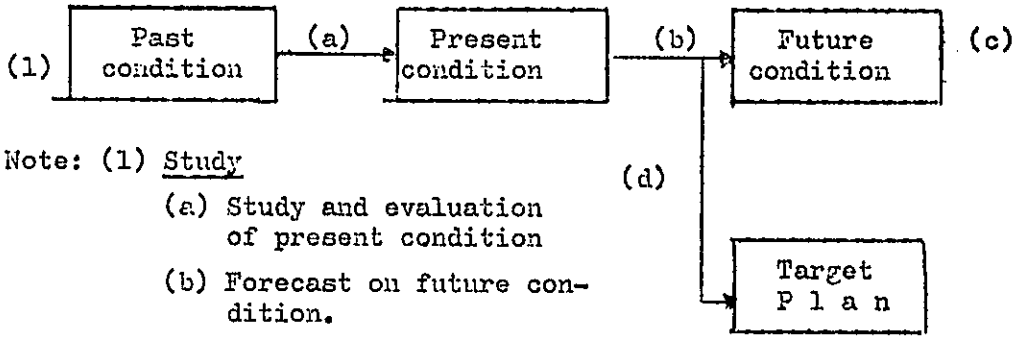


Figure 2 is a flow-chart of theoritical operation for target determination, and Figure 3 is one for measures determination.

Fig. 2. Mechanism of plan making



Note: (1) Study

(a) Study and evaluation of present condition

(b) Forecast on future condition.

(c) Evaluation on tendency.

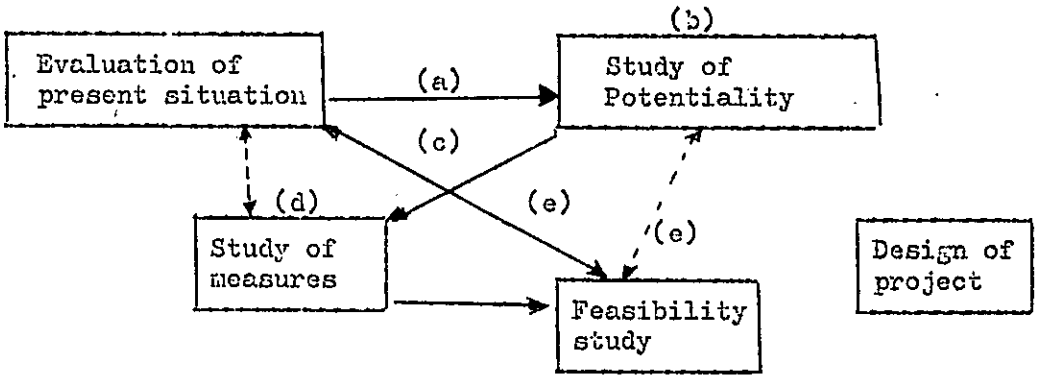
(2) Plan making

(d) Planning (Problem - Strategy - Plan/target).

(3)(e) Designing: project programs to attain the results of planning.

Source : Dr. Hyoriki Watanabe. Agricultural planning (in Japanese)/

Fig. 3. Mechanism for measures determination



(a) Description of objectives to be changed.

(b) Conclusion of a possibility of the development or improvement

(c) Examination of various measures or example projects.[1)]

(d) Selection of suitable measures

(e) Feedback to the evaluation and possibility

(f) Detail design of implementation project

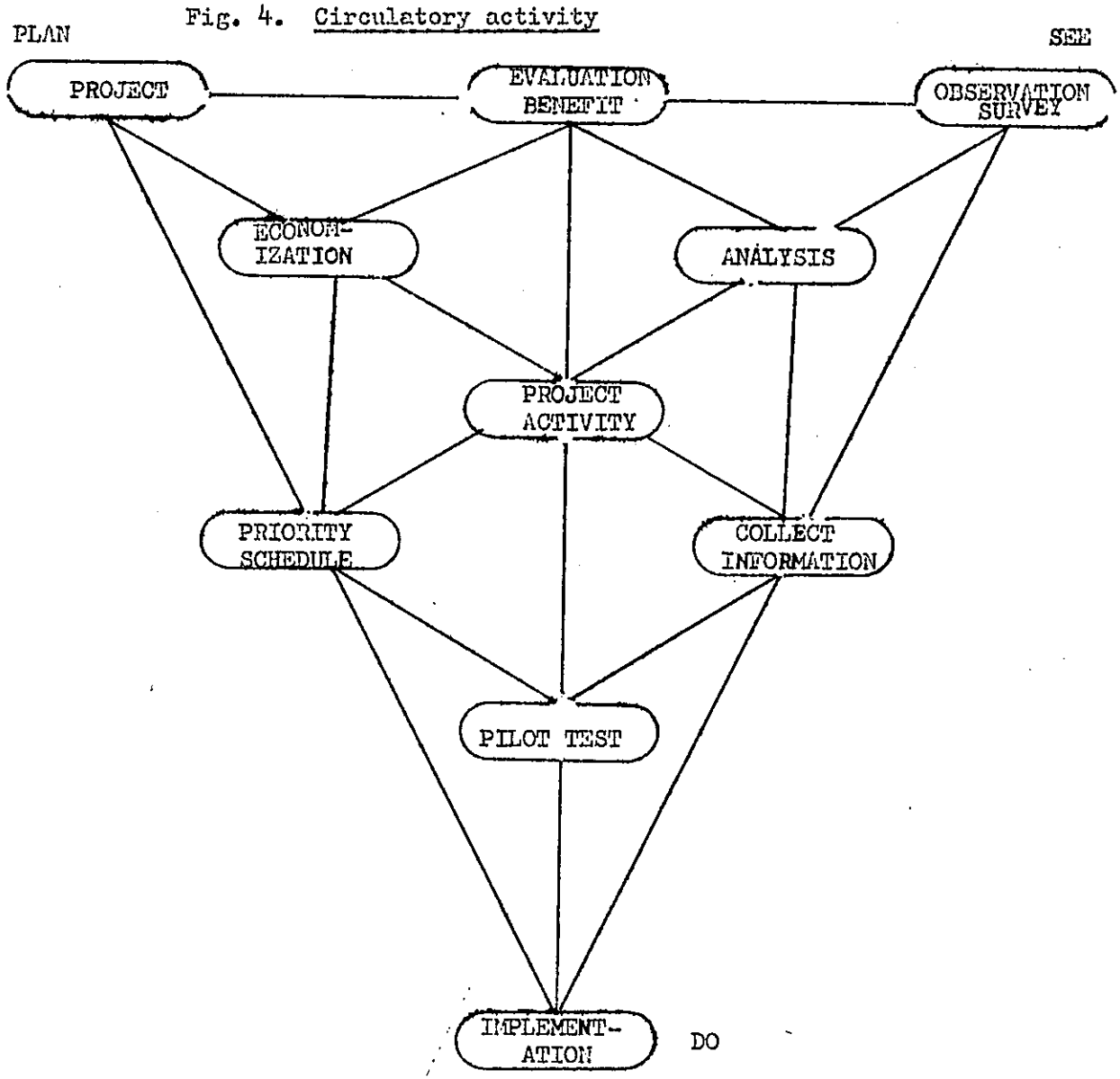
Note: 1) Work sheet of examination will be shown in Chapter III.

Source : Kunihiro Ozaki. Programs of agricultural development in Okinawa, 1976 (in Japanese)

1.2. Circulatory activity of"PLAN - DO - SEE"

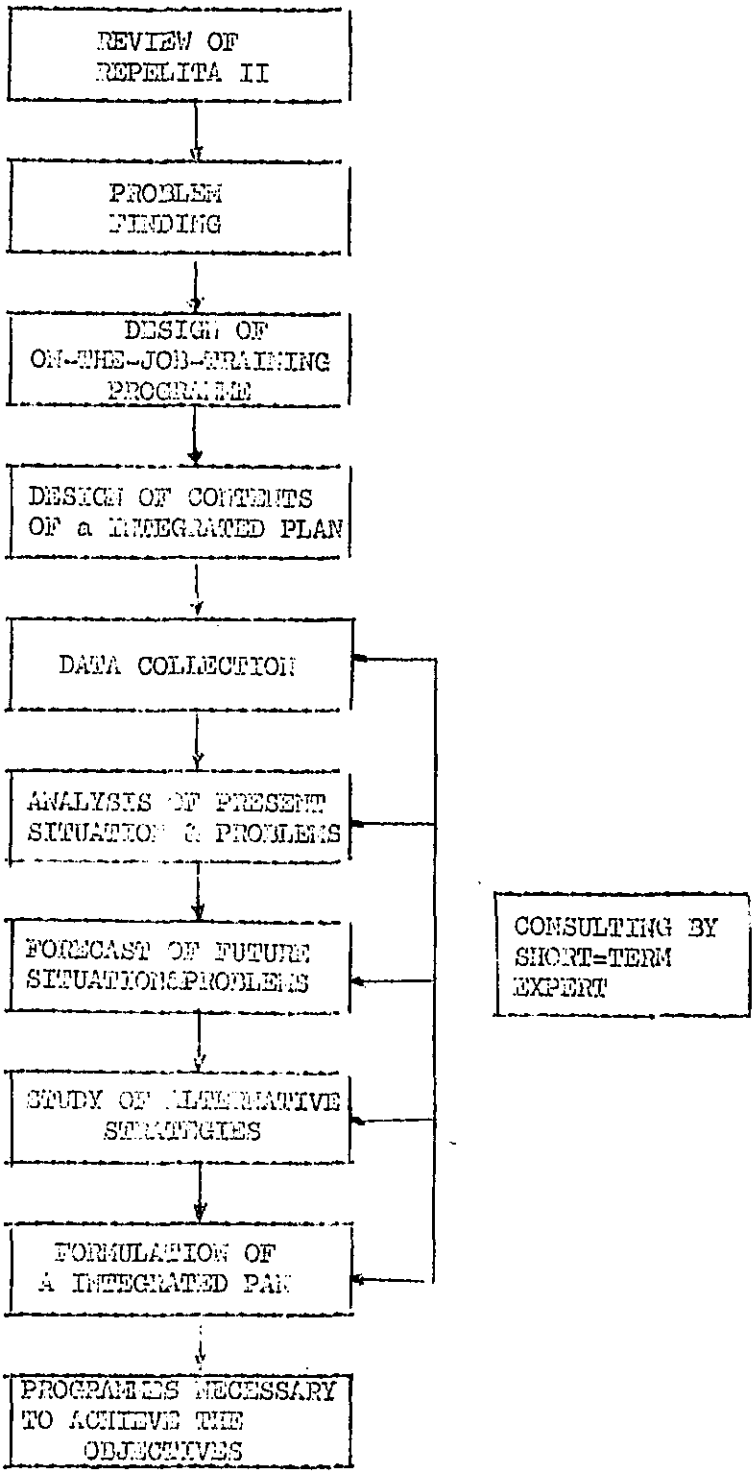
Figure 4 shows a circulatory activity of a project team. The general activity of a project team consists of minimally ten operations.

Fig. 4. Circulatory activity



In particular, the following procedure as shown in Figure 5 has been taken in this Project in order to make a regional agriculture development plan of South Sulawesi Province, which is one of the objective of the Team.

Fig. 5. Flow chart of the implemented training procedure.

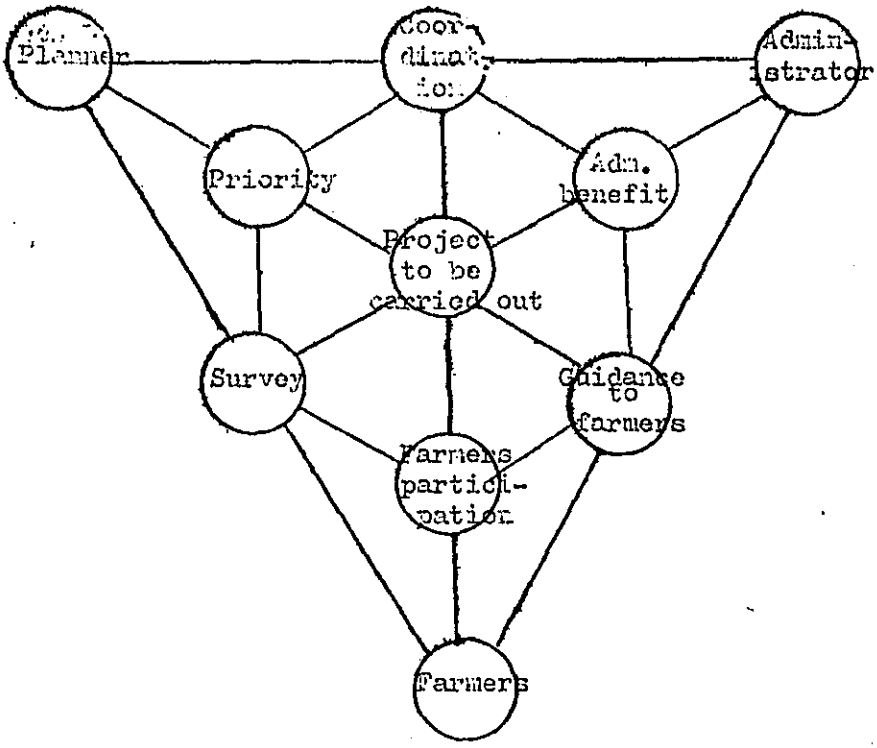


1.3. The planner's position and function

Figure 6 shows a system of project implementation and a planner's position toward administrator and farmer.

For instance, although a project is carried out through planner's activities as shown in figure 4, the administrator participates in plan making, considering the benefits from administrative point of view, while on the other hand they make approaches to farmers to carry out the agricultural project. Farmers participate as well in the plan making through their assistance in the field survey. If they can get much benefit from the project, they would even participate actively in the project. Consequently, when the agricultural project will be carried our on the basis of surveys, studies on priority, coordination, study on benefit, guidance to farmers and farmers' participation, the lack of one of them will make the execution of the project very difficult. A project which is of no benefit to the administrator, for example, will get no budget, while one without farmers' participation will be meaningless.

Fig. 6. Mechanism of project implementation



Source: Kunihiro Ozaki: "Mechanism of project implementation", 1977 (in Japanese).

II

THE TARGET DETERMINATION

The entire flow chart of operational procedure for the target determination is shown in Figure 7, and the detailed flow charts of each item are as follows:

Fig. 8 - Detailed flow chart of population planning
Fig. 9 - Detailed flow chart of land-use planning
Fig.10 - Detailed flow chart of agricultural production planning
Fig.11 - Detailed flow chart of marketing and transportation planning

And in Figure 12, the plans mentioned above are coordinated and integrated with one another.

The practical operation for planning was carried out with the application of the following Work Sheets and Tables.

Work Sheet 1 and 2 are for the estimation of population and labour force;

Tables 1, 2, 3, 4, 5, 6 and 7 are for the estimation of land-use potentiality;

Work Sheet 3 shows the potential/available resources such as land labour force;

Work Sheets 4, 5, 6, 7, 8, 9 and 10 are for the estimation of food and demand; and

Work Sheets 11, 12, 13, 14 and 15 are for the study of market conditions.

Fig. 7. Implemented flow chart for the formulation of Regional Agricultural Integrated Planning

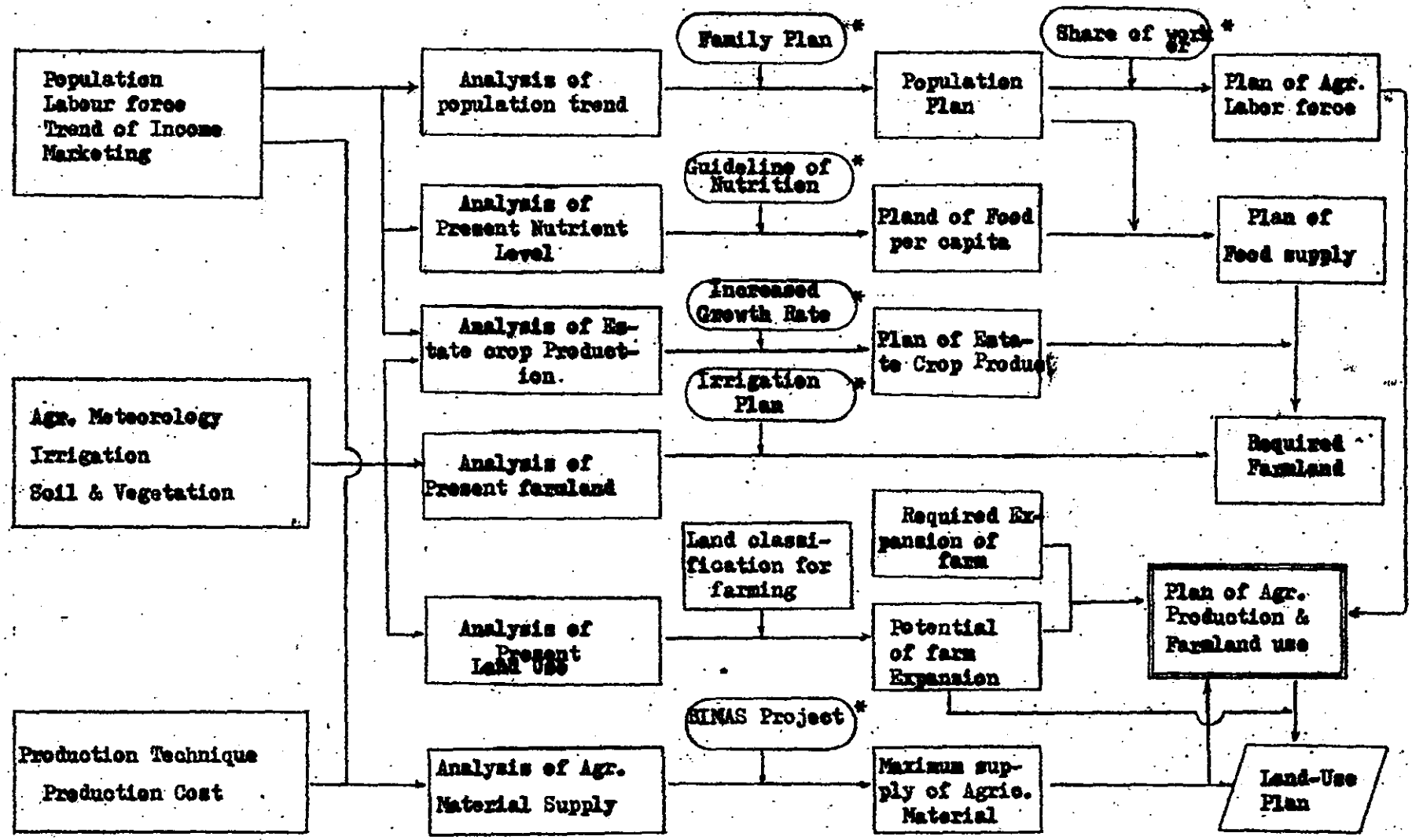


Fig. 8. Detail flow chart of population planning

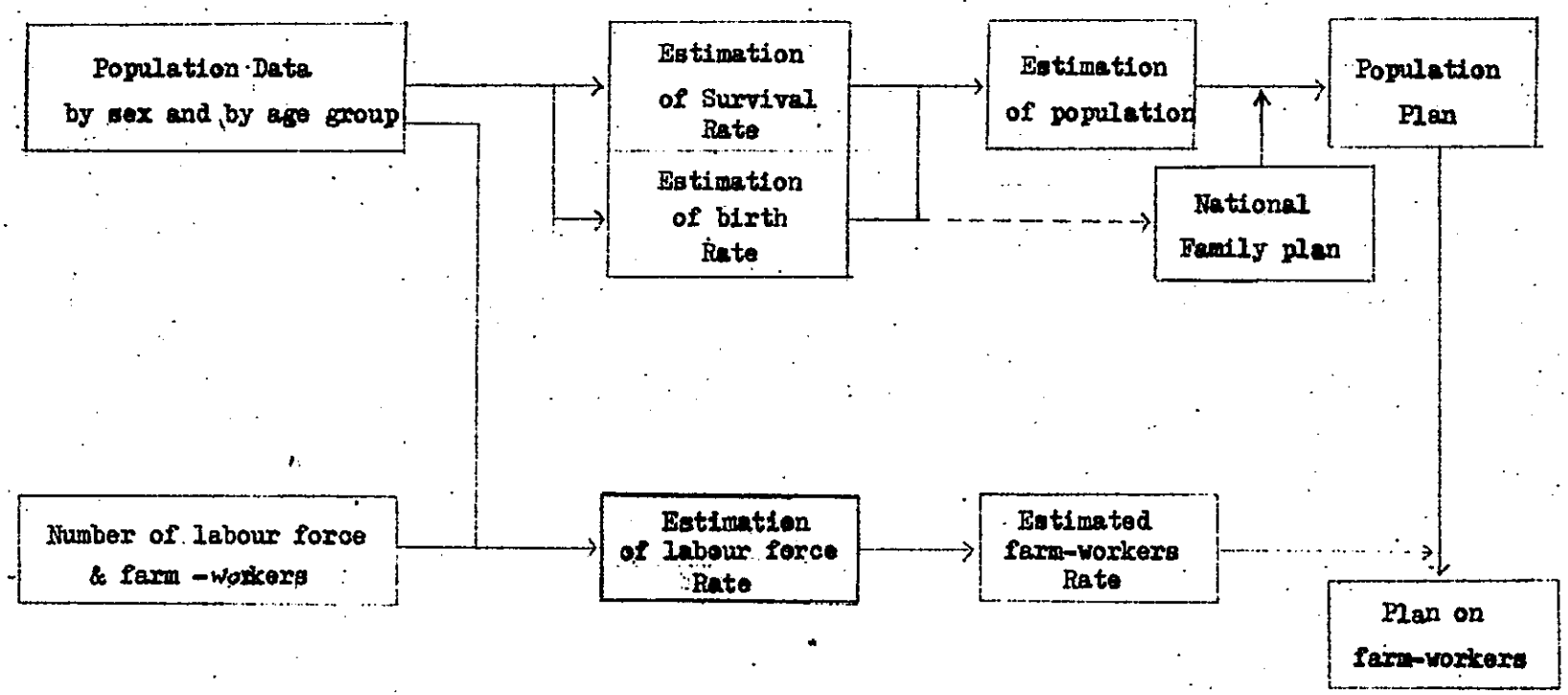


Fig. 9. Detail flow Chart of Land-Use Plan.

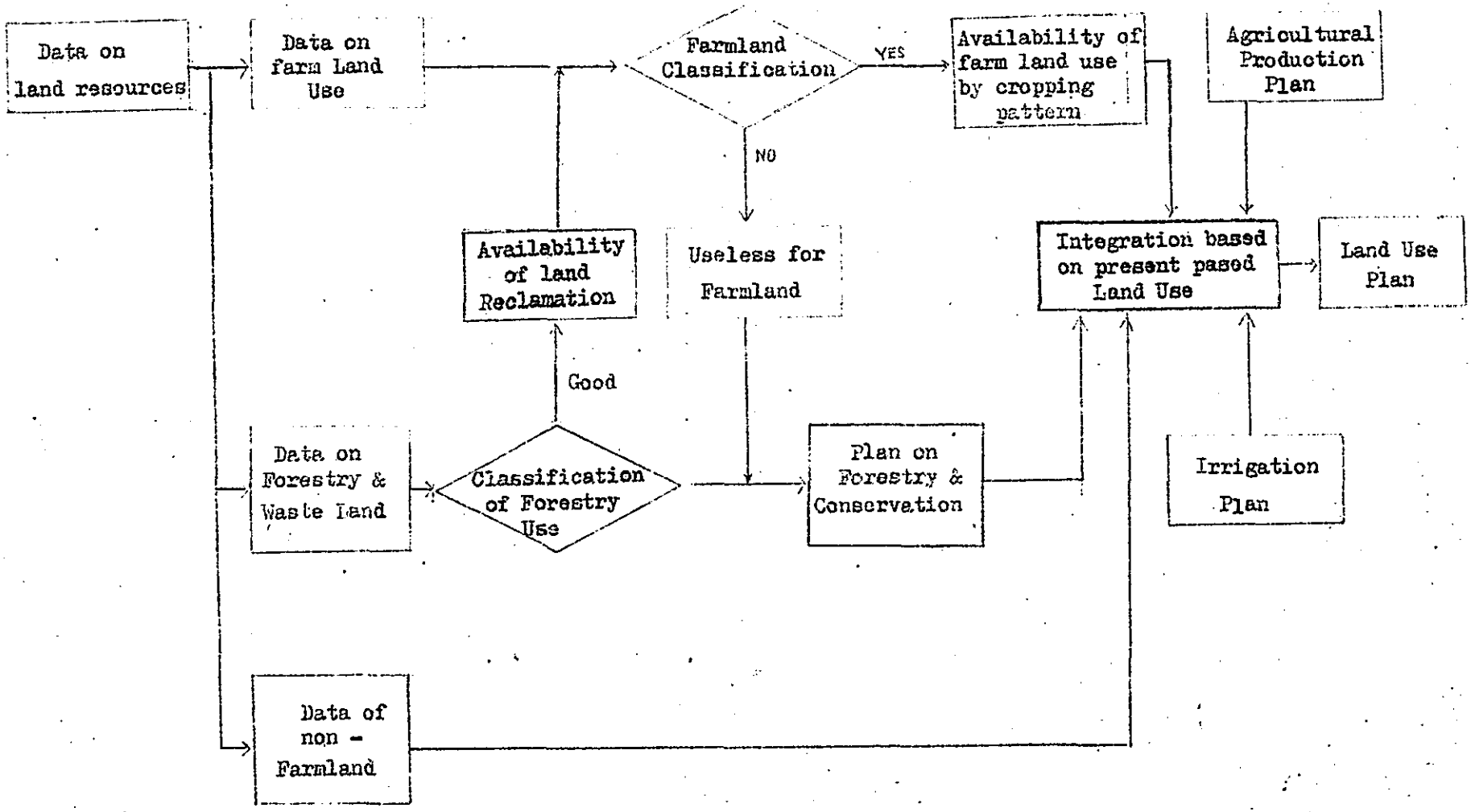


Fig. 10. Detail flow chart for Agricultural production Planning.-

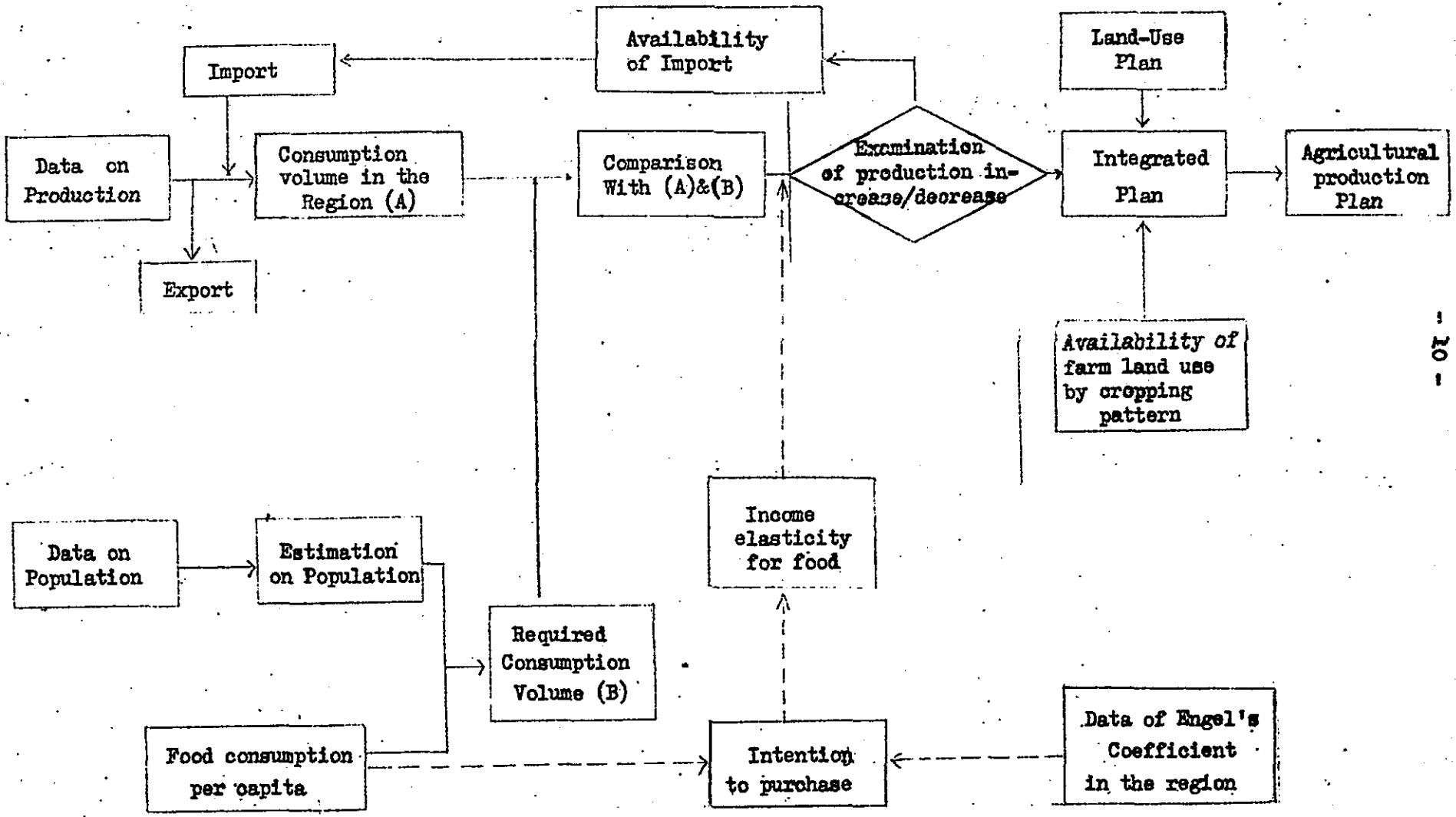
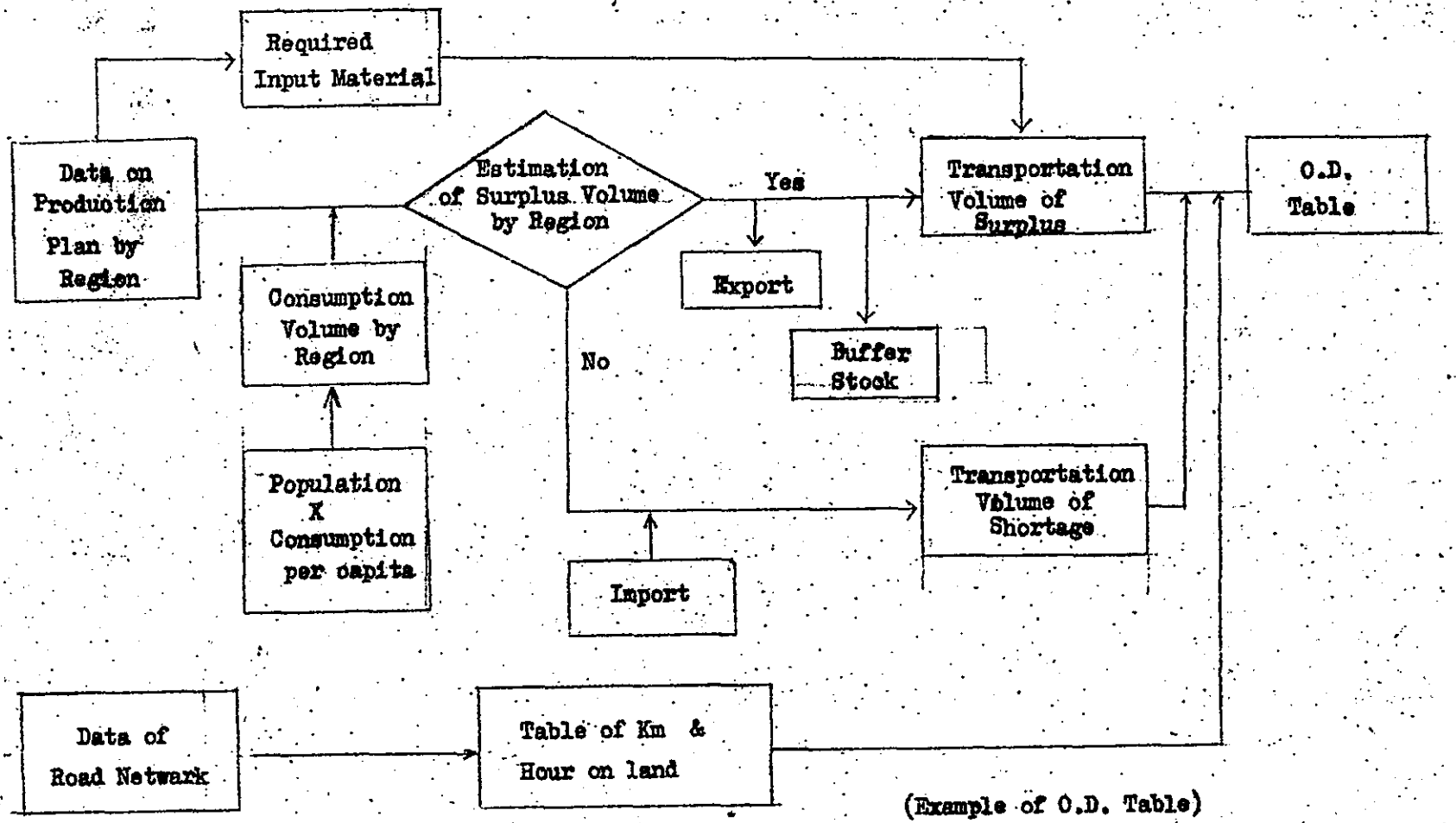


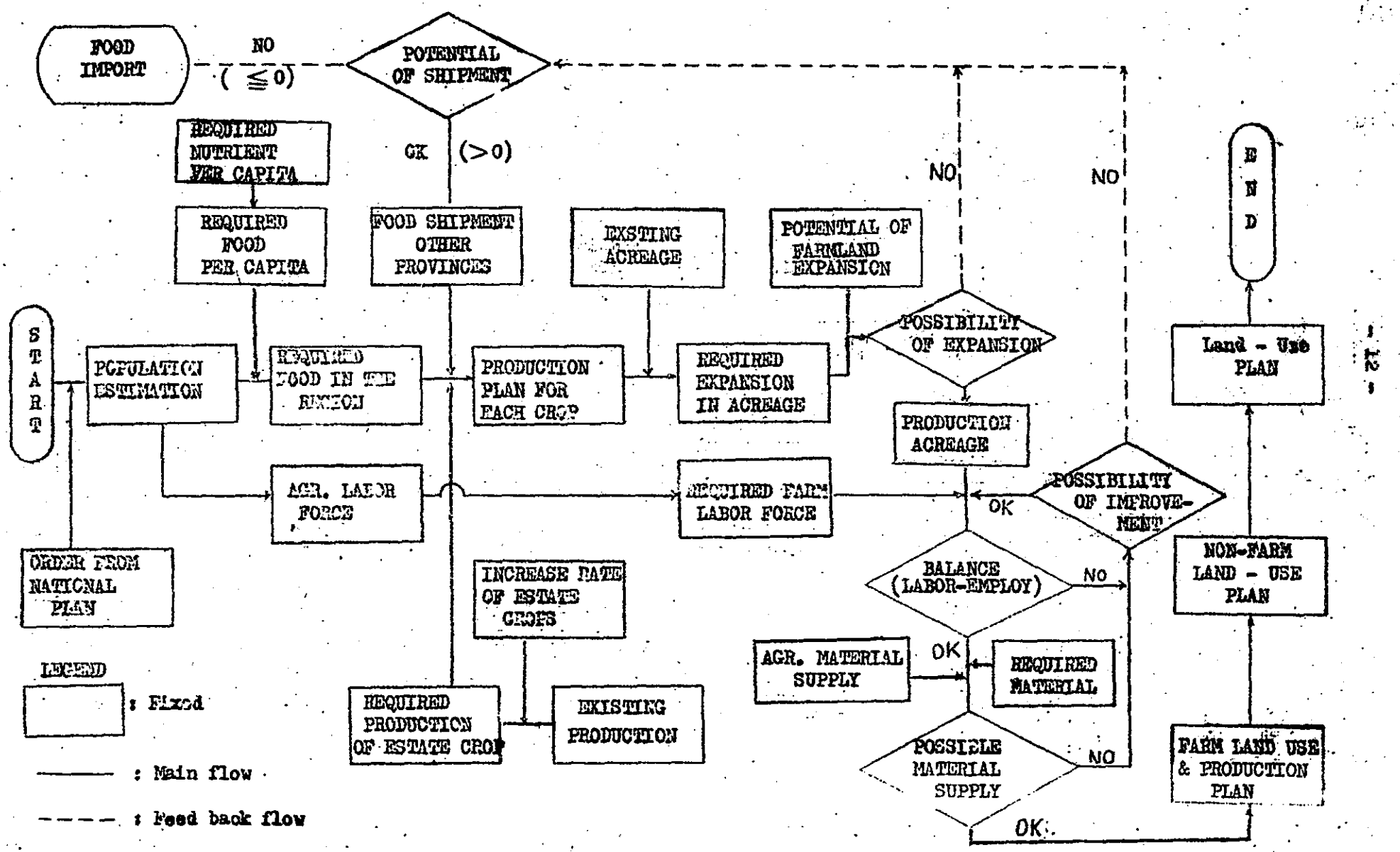
Fig. 11. Detailed flow chart of Marketing and Transportation Planning



(Example of O.D. Table)

Demand \ Suply	UP	Maros	Barru
U.Pandang			
Maros			
Barru			

Fig. 12. FOOD DEMAND & SUPPLY PLAN



2.1. Method for the estimation of population

2.1.1. Cohort Analysis and Share Trend Method
(Method for the estimation of population and farm workers)

(1) Definition of farm workers (Refer to Fig. 13 - 15)

Farm workers referred to here are the total of:

a) those who are in charge of merely farming, and

b) those who are occupied mainly in farming among the workers engaged not only in farming but in other works as well.

(2) Outline of the Method (Cohort Share-Trend Method)

The principles of the method are as follows:

a) Estimation of the population of the target year in the future based on the survival rate of the population in the future, fixed the same way as that of five years' interval in the past (Cohort Analysis), i.e. the principle is based on the fact that survival rate is stabilized in the population.

b) Next, the farm workers, full-time workers and so forth in farm household are to be estimated on the basis of the trend of share of the workers in the farm household population (Share Trend Method).

c) Then allocate the forecast total number of population to age groups based on the share of the age groups.

(3) Flow of Cohort Share-trend Method

This is translated for a textbook/example from a Paper in the Japanese, published by the Division of Planning, Bureau of Structure Improvement, Ministry of Agriculture, Japan.

a) Collection of Basic Data (of 1970 and 1975)

1) Population

2) Number of farm workers

b) Change of age interval (if necessary)

10 years' interval ------- 5 years' interval

example

P(16-19) -------- P(15-19)

P(15-19) = P(16-19) x 5/4

P(0-14) = P( )-15) - P(15-10) - P(16-19)

Note: P(1-m); P : number of age group/1

m : age

c) Survival rate by age group : n - n + 1

$$\gamma^{(1-m)}_{n-n+1} = \frac{Pn+1\ (1 + 5 - m + 5)}{P_n(1-m)}$$

$$\gamma^{(0-14)}_{45-50} = \frac{P50\ (15-19)}{P45\ (0-14)+3}$$

$$\gamma^{(60-64)}_{45-50} = \frac{P50\ (65- \quad)}{P45\ (60-64)+P45(65- \quad)}$$

d) Calculation of the share

To calculate the share of the number of farm workers against the population by age group.

e) Estimation of the Cohort of population

$$k^{(\text{in male or female})} = \frac{P(0-14) \text{ of Male/Female}}{P(20-39) \text{ of Female}}$$

f) Forecasting of share in the future based on the Share-trend Method.

To forecast the future share by age group based on the Share-trend of the number of farm workers against the population.

g) The allocation rate by age group

To calculate the share of the number by age group against the forecast total number of estimation.

h) Forecasting the number by age group

To allocate the forecast total number of population into age age groups based on the rate calculatedin (g)

i) Forecast number in Figure.

To draw a figure chart comparing the number of population in the basic year with that in the target year, by sex and age group.

WORK SHEET (1) Cohort Method

Sex	Age Group	Population T_1	Population T_2	Residual Rate	Estimated Population at T_3	Survival Rate	Estimated Population at T_4	Remarks
	A	B	C	D=C/B	E=C x D	F = D	G = E x F	
	0 - 5	b_1	c_1	d_0	e_1	d_0	g_1 =	d_0; the Birth Rate = $\frac{c_1}{\text{Total of Female (15-45) group}}$
	6 - 10	b_2	c_2	$d_2 = c_2/b_1$	$e_2 = c_1 \times d_2$	d_2	$g_2 = e_1 \times d_2$	
	11 - 15	b_3	c_3	$d_3 = c_3/b_2$	$e_3 = c_2 \times d_3$	d_3	$g_3 = e_2 \times d_3$	
	16 - 20	b_4	c_4	$d_4 = c_4/b_3$	$e_4 = c_3 \times d_4$	d_4	$g_4 = e_3 \times d_4$	
	21 - 25	b_5	c_5	$d_5 = c_5/b_4$	$e_5 = c_4 \times d_5$	d_5	$g_5 = e_4 \times d_5$	
	26 - 30	b_6	c_6	$d_6 = c_6/b_5$	$e_6 = c_5 \times d_6$	d_6	$g_6 = e_5 \times d_6$	

WORK SHEET (2) Cohort Share-Trend Method

Sex	Age Group	Agric. Population		Agric. Labor		Share and Trend			Estimated share		Estimated Agric. Labor	
		T1	T2	T1	T2	T1	T2	(T2/T1)	T3	T4	T3	T4
	A	B	C	D	E	F=D/B	G=E/C	H=G/F	I=G x H	J=I x H	K = B x I	L= C x J
	11 - 15	b_3	C_3	D_1	E_1							
	16 - 20	b_4	C_4	D_2	E_2							
	21 - 25	b_5	C_5	D_3	E_3							
	26 - 30	b_6	C_6	D_4	E_4							
	.	.	.	.	.							
	.	.	.	.	.							
	.	.	.	.	.							

Figure 13. Indonesian Labour Force Grouping

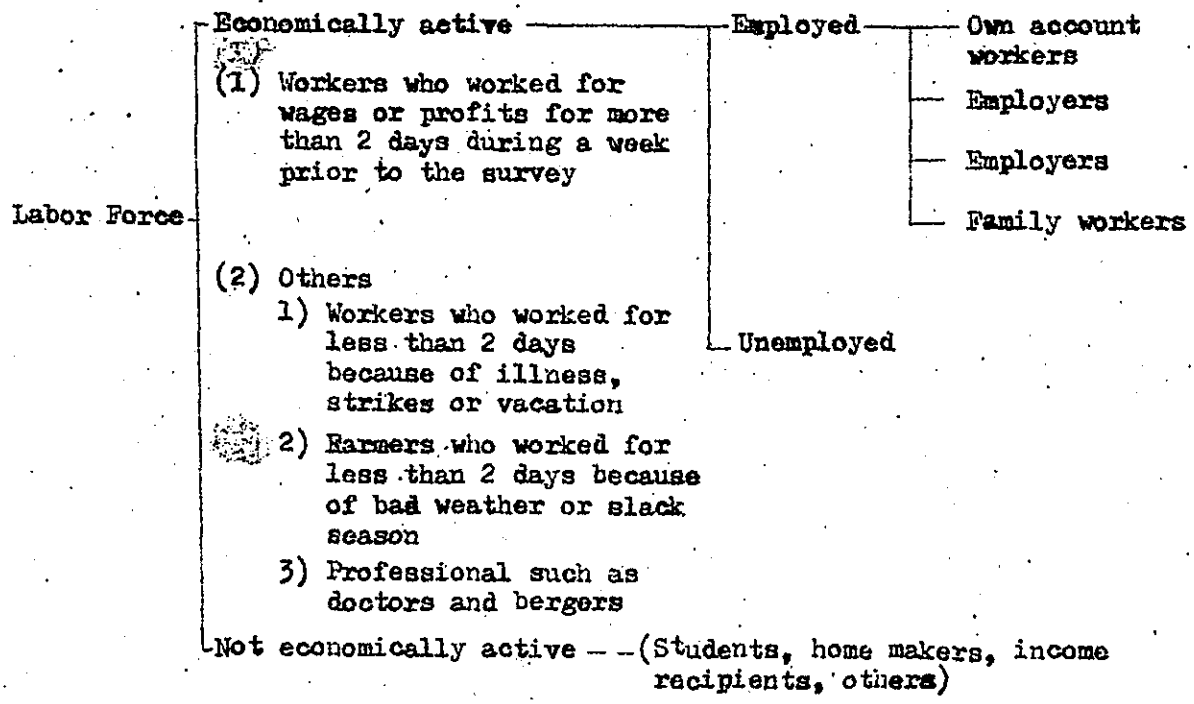


Figure 14. An example of Survival Rate of Cohort (1970-1975)

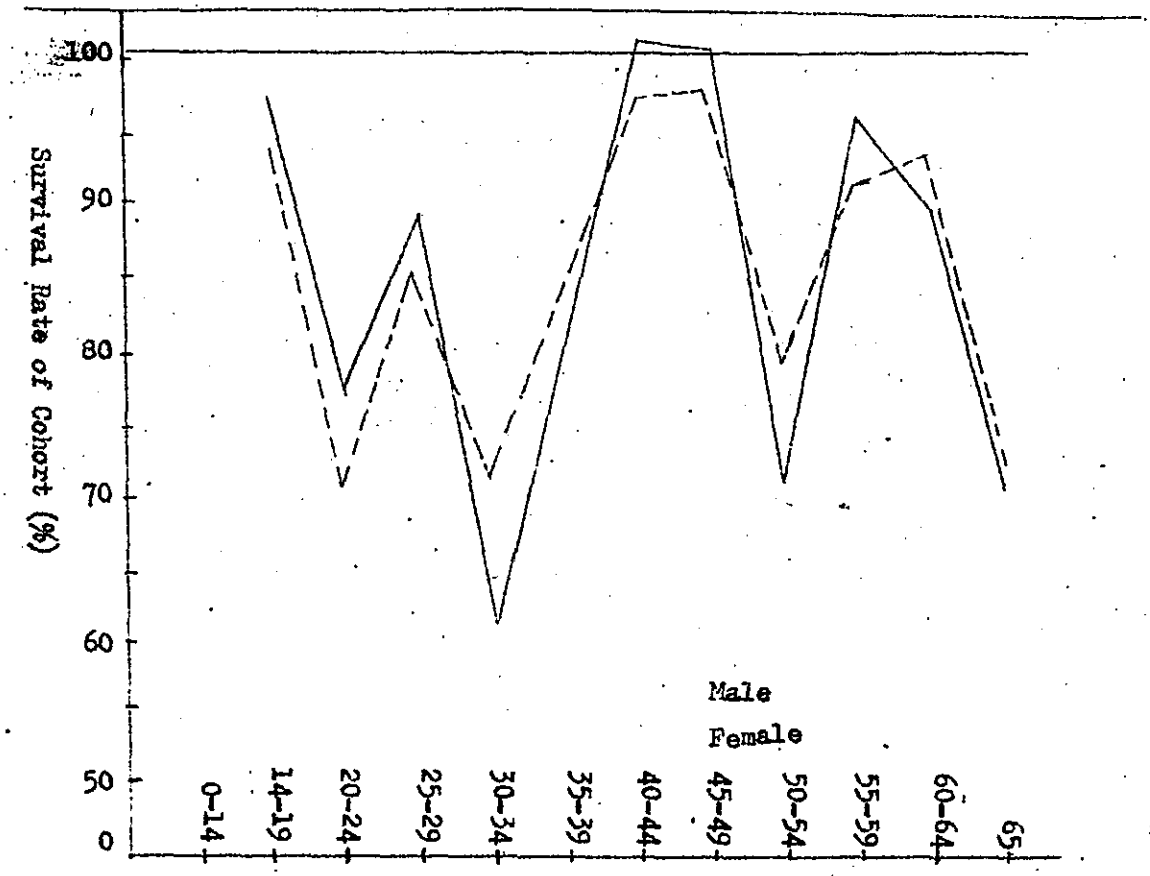
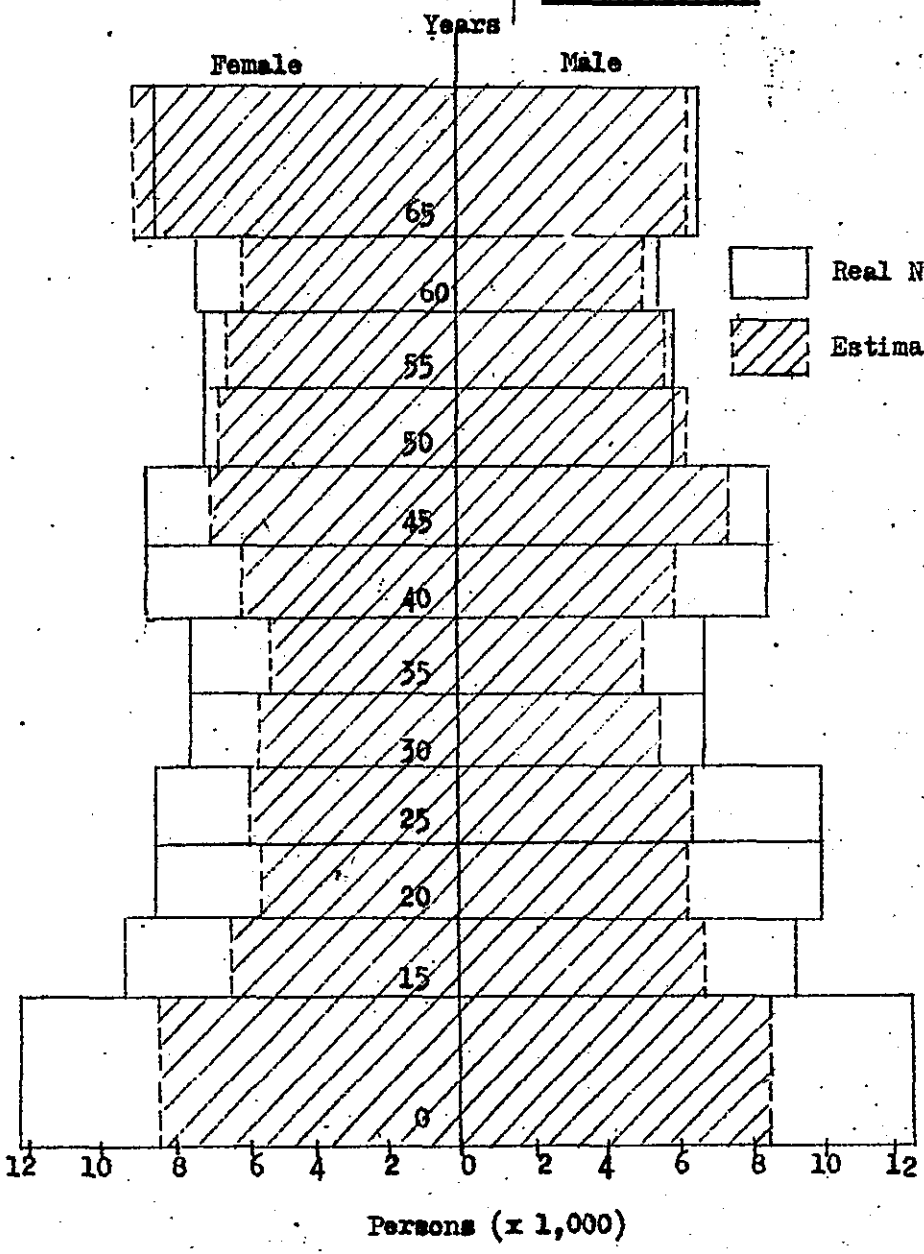


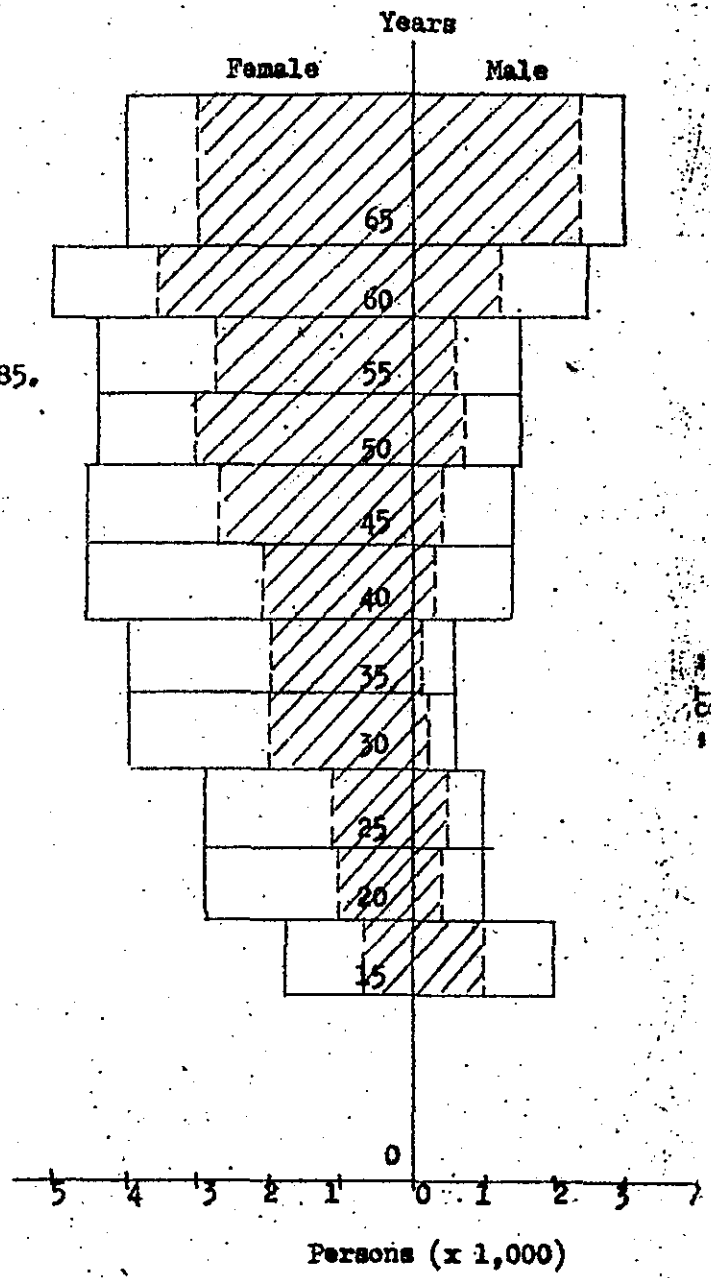
Figure 15. An example of Farm Household Population in 1975 - 1985



Real Number in 1975.

Estimated Number in 1985.

Number of Workers for Farming in 1975-19 5.



2.2. Land utilization in the future

2.2.1. Classification of farmland

The estimation of land utilization in the future is suggested by Mr. M. Funada, a short-term Expert for soil and vegetation, and is formulated for principal crops based on soil altitude, slope, texture, fertility and acidity.

The standard for the estimation of land utilization which has been established by Mr. M. Funada and his counterparts, based on discussions with Ir. Farid A. Bakar, Agronomist and Ir. E.O. Momuat, Head of Department of Soil and Soil fertility, L.P.P.M., is shown as follows:

1) Collection of standard maps from authorities concerned:
2) Preparation of basic maps, based on the natural conditions mentioned above;
3) Examination of each item by each commodity using table 2;
4) Group formation using table 3;
5) Land classification for farming, applying Table 1.

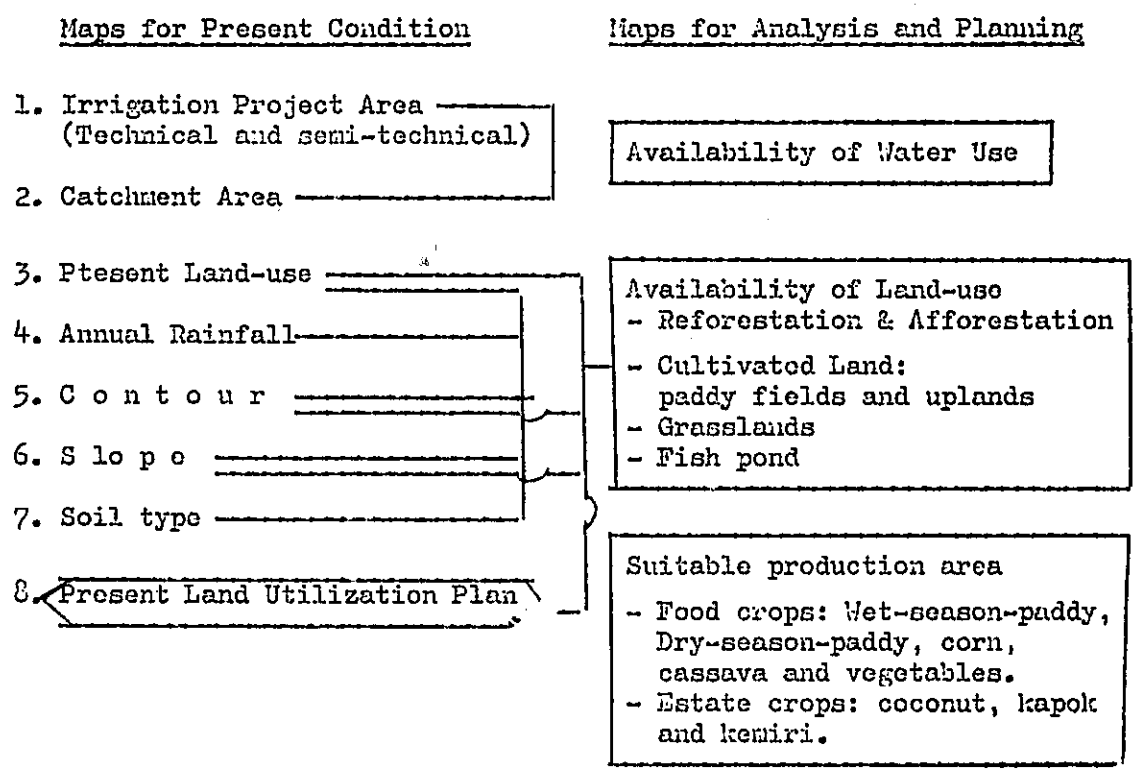
Table 1. Indices for Land/Soil Utilization

B e s t	:	All "O" - "O" 4 + "△" 2
Better	:	"O" 3 + "△" 3 - "O" 1 + "∠" 5
G o o d	:	All "△" - "O" 2 + "△" 3 + "X" 1
Less Good	:	"X" 2

Note : 1) Less good : May not be used
2) G oo d : The counter effects against it should be considered.

According to the method of classification for paddy fields, the condition of water resources is not included as the item in the standard mentioned above; the working plan in DPUP of South Sulawesi is expected as the more realistic data instead of the hydrologic analysis at present, because the effective observation networks have been systematized quite recently in the Province.

2.2.2. The indispensable maps



N o t e : 1 - 7 : These maps have been prepared by the authorities at several scales; thus they have to be drawn at the same scale (1 : 500,000) by the Team.

: This map will have to be rearranged by the Team based on the plan made by related authorities.

: These maps were done in detail by the Team

Table 2. Land/Soil Utilization Standard (A) Soil Type

Soil Type / Commodity	Aluvial	G l e y	Litosol	Regosol	Grumusol	Renzina	Andosol	Mediteran	Latosol	Lateritik	Podsolik
Seasonal crops:											
Paddy	0	0	X	Δ	0	Δ	Δ	0	0	X	0
Paddy Gogo	0	X	Δ	Δ	Δ	Δ	0	0	0	X	0
C o r n	0	X	Δ	Δ	Δ	Δ	0	0	0	X	0
Beans	0	X	Δ	Δ	X	Δ	0	0	0	X	Δ
Cassava	0	X	X	Δ	X	X	0	Δ	Δ	Δ	0
Estate crops:	0	Δ	X	Δ	Δ	Δ	Δ	Δ	Δ	X	Δ
(Sugar cane, Tobacco etc.)											
Vegetables:	0	Δ	X	Δ	Δ	X	0	Δ	Δ	X	Δ
Perennial crops:											
Coconut Tree	0	X	X	0	0	X	Δ	Δ	Δ	X	Δ
Citrus fruit	Δ	X	Δ	Δ	Δ	X	Δ	0	Δ	X	Δ
C l o v e	Δ	X	X	Δ	Δ	Δ	Δ	0	0	X	0
Coffee	Δ	X	X	X	X	Δ	Δ	0	Δ	Δ	0

Note: O: good for use; Δ : unite for use; X: not exactly to be use.

Table 3. Land/soil Utilization Standard (B) Soil Condition

Commodity	Altitude (m) 500	500/- 1,000	1,000	Gradient (%) 0-3	3-15	15-40	40	Soil Condition * Loamy	Medium	Sandy	Soil fertility ** Fertile	Medium	Poor	Soil pecidity *** Al-caline	Medium	Little acidic	Very acidic	Very alcali
Seasonal crops:																		
Rendengan	0	Δ	X	0	Δ	X	X	Δ	0	Δ	0	Δ	X	Δ	0	0	Δ	X
Paddy Gogo	0	0	Δ	0	0	Δ	X	Δ	0	X	0	0	Δ	Δ	0	Δ	X	X
C o r n	0	0	Δ	0	Δ	X	X	Δ	0	X	0	0	Δ	Δ	0	Δ	X	X
Beans	0	0	Δ	0	Δ	X	X	X	0	Δ	0	0	Δ	Δ	0	Δ	X	X
Tuber crops	0	0	Δ	0	0	Δ	X	X	0	Δ	0	0	Δ	Δ	0	Δ	X	X
Estate crops:																		
Sugar cane etc.	0	Δ	X	0	0	Δ	X	Δ	0	Δ	0	Δ	X	Δ	0	Δ	X	X
Vegetables:	X	0	Δ	0	0	Δ	X	X	0	Δ	0	0	Δ	Δ	0	Δ	X	X
Perennial crops:																		
Coconut tree	0	Δ	X	0	0	Δ	X	Δ	0	Δ	0	0	X	Δ	0	Δ	X	X
Citrus fruit	Δ	0	X	0	0	0	X	Δ	0	X	0	0	X	Δ	0	Δ	X	X
C l o v e	Δ	0	X	0	0	0	X	0	0	X	0	Δ	X	Δ	0	0	X	X
Coffee	Δ	0	Δ	0	0	0	X	0	0	Δ	0	Δ	X	Δ	0	0	X	X

Note: *) Loamy: heavy: soil/Medium: Clay -/(sandy loam) sand/

**) Fertile. no deficiency of 3 main elements/Medium: lacking one of 3 main elements/
Poor: deficiency of more the 2 elements.

***) Alcali: PH 7.5 /Medium: PH 7.5 - 6.0/Little acid: PH 6.0 - 4.5/Acid: PH 4.5
Very alcali: 7.5 - 8.6/Alcali: 8.6 - 7.5/Medium: 5.6 - 6.6/Little acid 4.6 - 5.5/
very acid: 5.5 - 4.5

2.2.3. Forest management in water reservation areas

In the South Sulawesi Province, rainfall condition is highly variable. Under such circumstance, the treatments of the forest lands in water reservation area for flood control, water resource conservation and soil conservation have been studied. The function of soil and water conservation by forest is subject to soil covering and infiltration capacity of the soil. Therefore the best forest possible should be made and maintained in stabilized conditions for years.

Especially in a scarce rainfall area where water resources are highly needed, it is recommended to select the trees which have the characteristics of a little interception and transpiration loss, and to conduct sparsely spaced planting.

Due to the difficulties in measuring the natural conditions, reliable data on transpiration of tree species are hitherto scarce. Pinus merkusii which is widely planted in the region is adaptable to dry fields; however, interception and transpiration losses of this tree species are considered to be of medium level.

The outline of management guide shall be decided by following three steps based on the recommendation made by a short-term Expert, Dr.H. MURAI:

Step 1 : The whole area of the South-Sulawesi Province is divided into two zones (I, II) by the mean annual rainfall. Namely, zone I is the area of over a,500 mm. and zone II is that of less than 2,500 mm. annual rainfall. The map used for this work should have a scale of 1 : 500,000.

Step 2 : The map is subdivided by meshes of 1 cm2. Soil conditions (fertility and depth) and elevation in each mesh is classified by several categories as follows:

Table 4. Categories of Soil Condition and Elevation

Division	Annual rainfall (m.m.)	Soil condition (firtility and depth) A	B	C	Elevation (m) 500	500-1,000	1,000
I	2,500	O	∠	X	O	∠	X
II	2,500	O	∠	X	O	∠	X

Note: If data of soil depth are not available, the judgement of soil conditions could be conducted by only means of soil firtility alone.

Step 3 : As the result of combination by evaluated physical factors, a management guide is determined by the following table 5.

2.2.4. A countermeasure for the restoration of denuded forest lands

As the outline of erodible degree, the following three steps are to be decided, based on the recommendation made by Dr. H. MURAI.

Step 1: Judgement by potential factors. Map on a scale of 1 : 500,000 is subdivided into meshes of 1 cm2 and each physical factor in the score of each category as shown in Table 6.

Step 2: Judgement by actualized factor is to be made as follows:

Ground cover condition
- I. Bare land (including cultivate field, overgrazed land, forest fire land)
- II. Grassland (including open forest land, shrub land, cut-over land)
- III. Forest land

Step 3: Synthetic judgement by combination of the potential and actualized factors is to be made such as the following in Table 7.

Table 5. A Management Guide of Each Condition

Division	Combination of physical factors: Soil condition	Combination of physical factors: Elevation	Sub div.	Management guide: Method of regeneration	Management guide: Planting density	Management guide: Trees introduced and the ratio
I	○	○	I_1	Artificial reproduction	2,500/ha	Economical tree species (only) (more than 2 kinds mixed in belts)
	○	△				
	△	○	I_2	ditto	ditto	Economical tree species (70%). Soil improving tree species (30%) (mixed in belt)
	△	△				
	×	○				
	×	△				
	○	×	I_3	Natural regeneration		Raise natural useful trees to good forest
	△	×				
	×	×				
II.	○	○	II_1	Artificial reproduction	400/ha.	Economical tree species (70%) Soil improving tree species (30%)
	○	△				
	△	○	II_2	ditto	ditto	Economical tree species (50%) Soil improving tree species
	△	△				
	×	○				
	○	×	II_3	Natural regeneration		Raise natural useful trees to good forest
	△	×				
	×	×				

Table 6. Category and Score or Each Physical Factor

Item	a) Annual rainfall (mm)	b) Gradient (%)	c) Soil structure	d) Geological structure	Count of score
Category	2,000 2,000 - 3,000 3,000	15 15 - 40 40	Clay Loam Sandy	Others Tertiary Quarternary	a+b+c+d
Score	1 2 3	1 2 3	1 2 3	1 2 3	Range (4-12)

Note: Classify by the total score as follows:

12. - 10. (I) > 9. - 7. (II) > 6. - 4. (III)

Table 7. Synthetic Judgement

Step - I	Step-2	Erodible degree	Probability of erosion development
I	I ——→	HH	Spread rapidly
I	II ——→	H	Newly occured or danger of spreading
I	III ——→	M	Little occured as long as undisturbed
II	I ——→	H	Danger of spreading
II	II ——→	M	Little occured as long as undisturbed
III	I ——→	M	Possible for natural regreening
III	II ——→	L	Keep stable despite some disturbance
III	III ——→	L	Keep stable despite some disturbance

Note: HH H M L

As for the restoration works on denuded forest land, the first step is classification of bare and critical lands by the level of denudation.

The methods of restoration should be selected and decided according to the level of their denudation. Grasses have the function of erosion control suitable for the introduced trees at the at the first stage of bare land improvement.

2.2.5. Standard of classification for land reclamation

(1) Category of each physical factor.

Item	Category	Classification
Eridible degree	HH : Rapidly spread	X
	H : Newly occured or danger of spreading	X
	M : Little occured as long as undisturbed	Δ
	L : No occurence as long as undisturbed	O
Gradient	15%	O
	15% - 40%	Δ
	40%	X
Altitude	500 m.	O
	500 m. - 1,000 m.	Δ
	1,000 m.	X
Annual rainfall	2,000 mm	X
	2,000 mm - 3,000 mm.	O
	3,000 mm.	Δ
Soil texture	Loamy : heavy soil	Δ
	Medium : clay	O
	Sandy : sandy loam, sand	Δ
Soil fertility	Fertile: No deficiency of the main 3 elements	O
	Medium : lacking one of the 3 main elements	O
	Poor : deficiency of more than 2 elements	Δ

(2) Land classification for reclamation.

Item	Indices for reclamation
Best	All 0 - 04 + Δ 2
Better	03 + Δ 3 - 0 1 + Δ 5
Less good	All Δ - 02 + Δ 3 + X1
No good	X 2

Source: Land classification map for reclamation in forest areas (Map No.23).

Table 8. List of Maps

Map scale: 1 : 50,000

No.	Name of Map	Source of original data/maps
1.	Present Land Use	South Sulawesi Agrarian Servi e & Institute of Soil Investigation
2.	Annual rainfall	Institute of Meteorology
3.	A l t i t u d e	Agrarian Service
4.	G r a d i e n t	Agrarian Service
5.	S o i l t y p e	Institute of Soil Investigation (I.S.I.)
6.	Soil texture	I.S.I.
7.	Soil fertility	I.S.I.
8.	Soil acidity	I.S.I.
9.	G e o l o g y	Directorate of Geology, Ministry of Mining
10.	Land Classification(L.C.) for paddy field areas	Map No. 3 - 8
11.	L.C. for upland paddy	Map No. 2 - 8
12.	L.C. for corn	Map No. 2 - 8
13.	L.C. for peanut	Map No. 2 - 8
14.	L.C. for cassava	Map No. 2 - 8
15.	L.C. for estate crops	Map No. 2 - 8
16.	L.C. for horticulture	Map No. 2 - 8
17.	L.C. for coconut	Map No. 2 - 8
18.	L.C. for citrus fruit	Map No. 2 - 8
19.	L.C. for coffee	Map No. 2 - 8
20.	L.C. for clove	Map No. 2 - 8
21.	L.C. concerning erodible degree in forest area	Map No. 1 - 3, 6, 9.
22.	L.C. for management guide	Map No. 1 - 3, 7.
23.	L.C. for reclamation in forest area	Map No. 1 - 4, 6, 7, 21.
24.	L.C. for reclamation in grassland area	Map No. 1 - 4, 6, 7, 12-16, 21
25.	L.C. for suitable cultivated area in shifting cultivation area	Map No. 1, 3, 12 - 16
26.	L.C for suitable cultivated area in uplands	Map No. 1, 3, 12 - 16
27.	Irrigated area	Map No. 1. South Sulawesi Public Works Service

Note: The error of total acreage is about 6%, between the data from statistics and the drafted map by smesh.

2.3. Potential/Available Resources

The main objective of this topic is to show the environmental condition and its usable resources.

(1) Land resources:

a) Acreage of available land resources

b) Distribution of land resources

c) Classification of difficulties in utilization

(2) Water resources:

a) Availability of water resources by location

b) Classification of difficulties in utilization.

(3) Labour/farmer:

a) Number of available labour/farmer by location

b) Distribution of labour in the agricultural sector

c) Classification of labour (e.g. family/employee/male/female)

(4) Capital/input materials & equipment:

a) Volume of available capital

b) Availability of transportation for materials from and to a place.

WORK SHEET (3). Potential/Available Resources in the Region

Type of resource	Present utilization	Potential utilization	Available utilization	Remarks
i) Land resource: paddy field	..... ha			
ii) Labour force:	man-power			
male	.....			
female	.....			

2.4. An Example of the Method of Plan Making

The target of planning in the agricultural sub-sector (Agriculture, Fishery and Forestry) divided into 4 aspects in REPELITA II such as the following:

Objective of planning : increase of fuud stuff
: increase of G.N.P.
: increase of farmers' income, and
: increase of employment opportunity.

This example of the method of plan making is shown for the increase of food stuff, naturally when the objectives of planning are determined, the method shall be modified.

WORK SHEET (4). Estimation of Demand for Food Stuff in the Target Year, including its supply to other regions.

Target year	Commodity	Consumption in the region		Export/inter-insular trade
		Per capita kg.	Total volume ton	

Attached paper:

1. Method for the calculation of export/interinsular trade volume.
2. Estimation of the number of consumer/population in target year.
3. Estimation of volume of consumption per capita by commodity.

WORK SHEET (5). Estimation of Required Land Resources for Food Stuff Production in the Target Year

Commodity	Total vol. of demand ton	Yield per ha. ton	Required land		
			Total ha	Existing ha	Increase ha

Attached paper:

1) Explanation of the reasons for the increase of yield per ha. by commodity.

2) Description of the method of adjustment of existing data, e.g. the data of the average of three years during 1974-1976.

WORK SHEET (6). Land Utilization Plan

Commodity	Increase land-use	Double cropping	Potential land		Land utilization	Land shortage
			Ist class	IInd class		
	000 ha.	000 ha.	000 ha.	000 ha.	000 ha.	000 ha.

Attached paper:

1. Method for the classification of potential area.

2. Some measures to be compared, e.g. import, interinsular shipment, and the use of 3rd class land resources.

WORK SHEET (7). Estimation of Labour Supply

Commodity	Land utilization plan	Required labour per ha.	Required labour supply	Monthly labour supply Jan. Feb. .....Dec.
	000 ha.	manpower		

Attached paper:

1. Estimation data of monthly labour supply by comodity in target year.
2. Draft animal supply plan year by year
3. Tractor supply plan year by year. If possible, tractor or other operational machinery will be introduced in case of a shortage.

WORK SHEET (8). Guidance of Cultivation Method

Type of operation	Manpower	Animal Machine	Remarks & recommendation (suitable area/input material)
	man/day	man/day	

WORK SHEET (9) Plan of Input Matrial Supply in Target Year

Commodity produced	Land utilization plan	Required input material by material					
		kg/ha	ton				

Attached paper:

1. Estimation of capital to purchase input material
2. Description of unit price by input material.

WORK SHEET (10) Plan of Food Stuff Demand and Supply (Target)

Commodity	Supply		Demand	
	Production	Import interinsular	Consumption	Export interinsular

2.5. An example of the Method of Market survey

The marketing condition in the province is surveyed, employing work-sheets 11 - 15 in the field, and the survey results are reported as shown in appendix 5.

WORK SHEET (11) Market List

Kabupaten	Number of villages with market	Market name	Market day	People going to market

WORK SHEETS (12) Marketed Goods by Market

Farm goods	Goods shipped from other reg.	Goods shipped to other region	Location/market name

WORK SHEETS (13) Condition of the Rural Area.

Area Name		Population	Production volume	Distance (km/hr.) from Kab. centre	Number of villages
Kecamatan	Desa				

WORK SHEETS (14) Agricultural Condition in Kabupaten

1. Extent of farm land
2. Percentage of farmland against the extent of kabupaten
3. Total extent of irrigated paddy field

Technical	.....	ha
Semi-technical	.....	ha
Village ..	.....	ha
Rainfed	.....	ha
T o t al	.....	ha

WORK SHEE S (15) Management Condition

I t e m s	Agr.	Fishery	Estate	A.Husb.	Forestry
1. Number of field extension workers					
2. Number of specialist extension workers					
3. Number of rice mills and shortage					
4. Number of banks					
5. Equipemnt storages					
6. Number of farming enterpreneurs					
7. Farmers' organization					

2.6. An Example: A Result of Survey for Marketing in South Sulawesi

(1) Marketing of Rice out of South Sulawesi

Table 9. Production and Purchasing

Year	Production (1) (equivalent of rice)	Pirchased by DOLOG (2)	Percentage (2)/(1)
1972	628,957 ton	10,815 ton	1.7
1973	812,160	28,049	3.4
1974	649,160	8,586	1.3
1975	902,696	56,943	6.3
1976	1,135,260	65,621	5.8

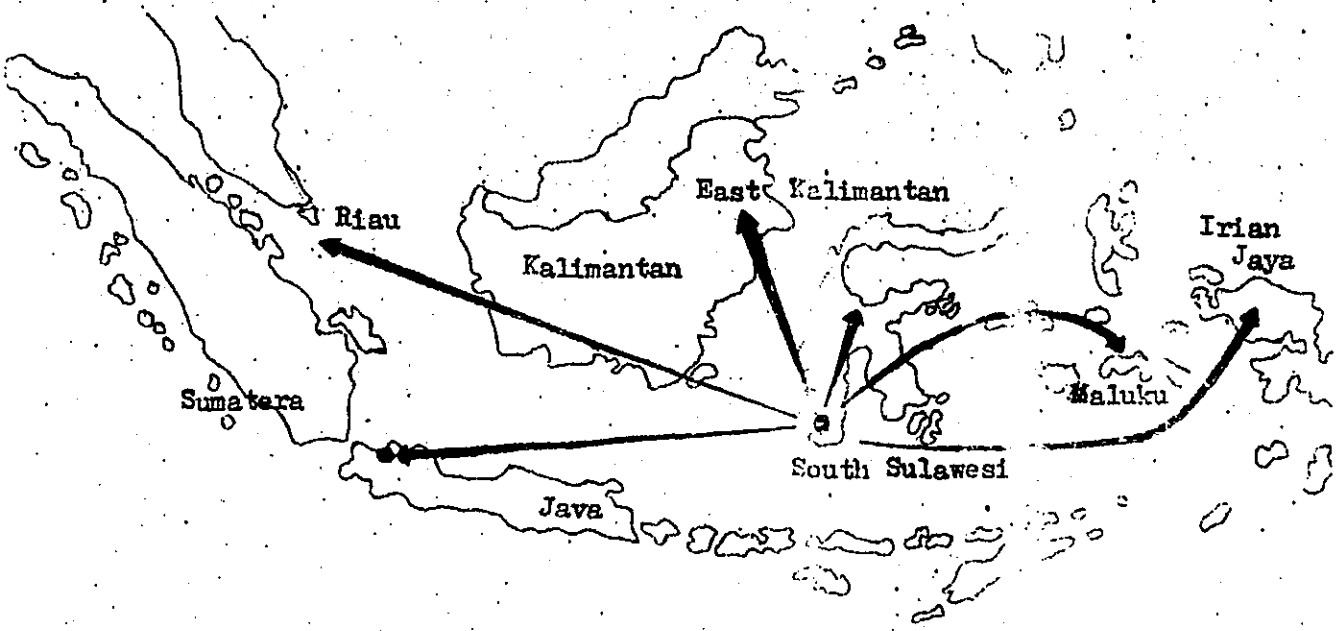
Source : DOLOG South Sulawesi

Table 10. Destination of Rice shipment by DOLOG out of South Sulawesi (Apr. 1, 1975 - Mar.31, 1976.

Destination	Volume of Rice	Percentage
South East Sulawesi	9,000 ton	15.1 %
Middle Sulawesi	4,000	6.7
M a l u k u	14,054	23.5
East Kalimantan	8,050	13.5
Irian Jaya	6,053	10.1
Riau/Dumai	3,000	5.0
North Sumatera	4,000	6.7
J a v a	11,600	19.4
T O T A L	59,757	100.0

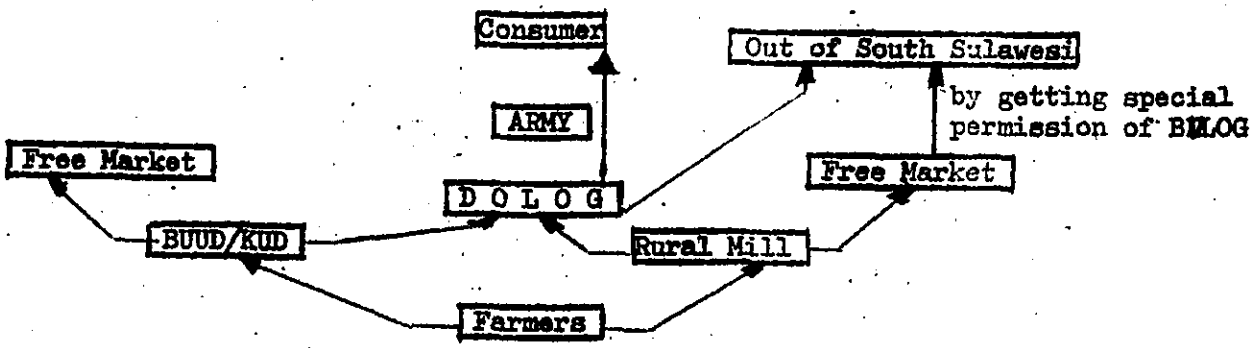
Source : DOLOG South Sulawesi.

Fig.16. Destination of Rice/Flow of Rice from South Sulawesi (1975).



DOLOG's Warehouse:	at Ujung Pandang	6 Unit	for rice
	Pinrang	2 "	
	Polmas	2 "	
	Sidrap	4 "	12 Unit for gabah/unhusked paddy
	Wajo	3 "	
	Palopo	1 "	

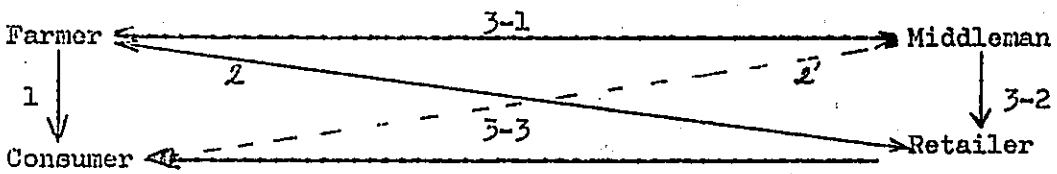
Fig. 17. Marketing System of Rice:



(2) Marketing of Other Foods than Rice

In South Sulawesi the main agricultural products through commercial distribution are rice, other food crops such as corn, cassava, green pea, soy-bean, peanut, vegetables and fruit. Urban and rural markets in general are not so developed as shown in Fig.18

Fig. 18. Standard Marketing System



Three marketing systems are shown in Fig. 18 mentioned above, (1) transaction between farmer and consumer is most primitive, (2/2') transaction through the middleman or retailer only shows a slight advance, (3-1--3) transaction through the middlemas and retailer is by a more improved method than the others. Transaction in markets (pasar") in Indonesia has two systems, underdeveloped system and developed system as Fig. 19 and 20.

Fig. 19. Flow of Agricultural Products/Underdeveloped system

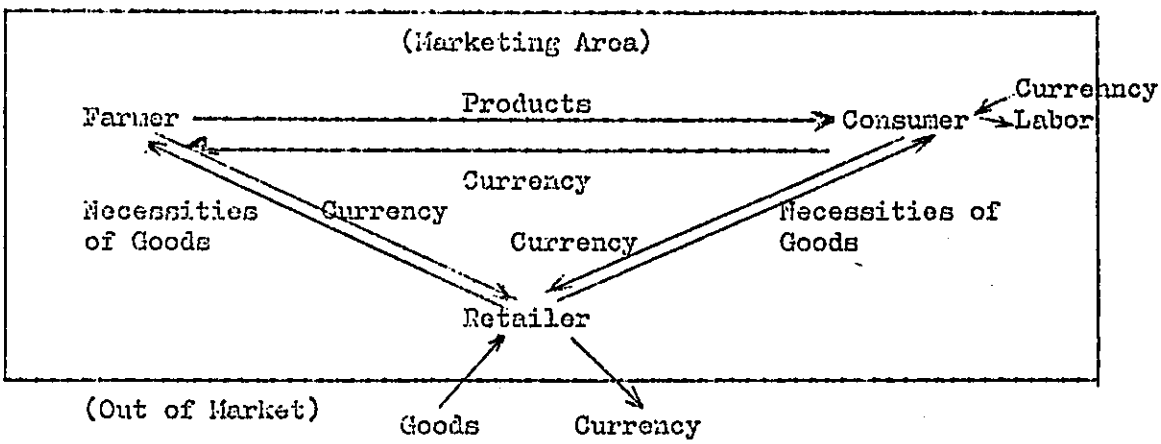
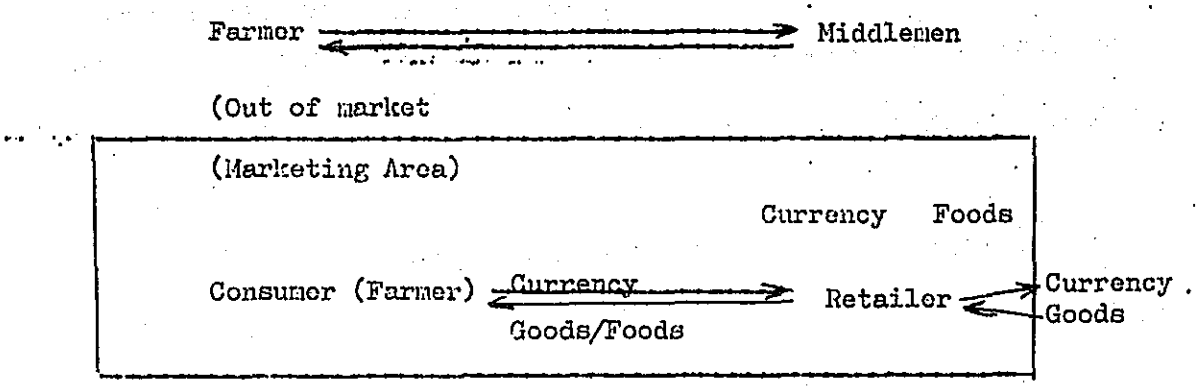


Fig. 20. Developed system



Markets of all village level and majority of Kecamatan level belong to the farmers, the later existing only in big cities. In part of the Kabupaten-s commercial distribution of products is made, like in Kabupaten Enrekang, Jeneponto and Gowa (at Malino).

Fish, small animals and products of processing industry flow on the same route, but special products like vegetables and shrimps have more developed marketing systems, Far-off Marketing System as Fig.22

Fig. 21. Agricultural Marketing System/Local Marketing System

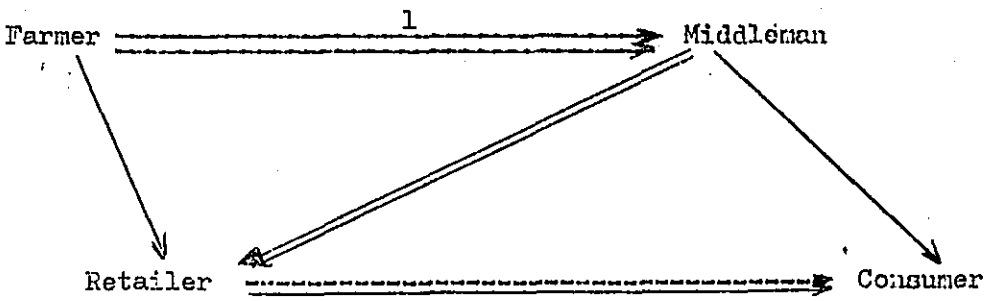
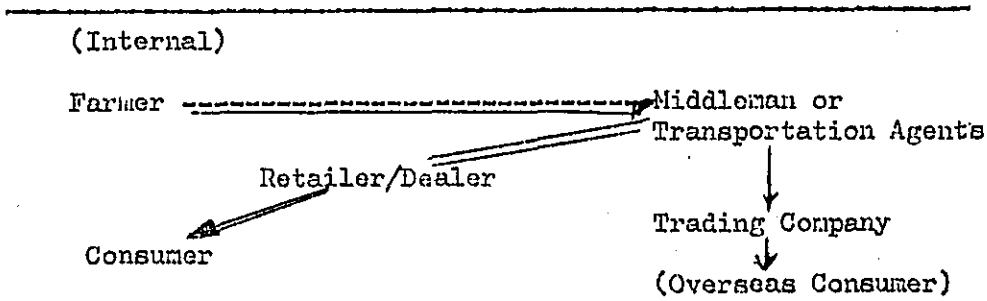


Fig. 22. Agricultural Marketing System/Far-off Marketing System.



(3) Outflow and Inflow of Goods

In agricultural development planning, serious attention should be paid on the following matters:

a) In which stage products of a specific area (place) have been marketed.

b) To which blocs the products have flowed out from the producing area (bloc)

Fig. 23 and Fig. 24 are only results of field surveys in ten Kabupaten-s, but it is an important consequence surveyed by Counterparts, and the data will be completed in the future.

Fig. Flow of Vegetables.

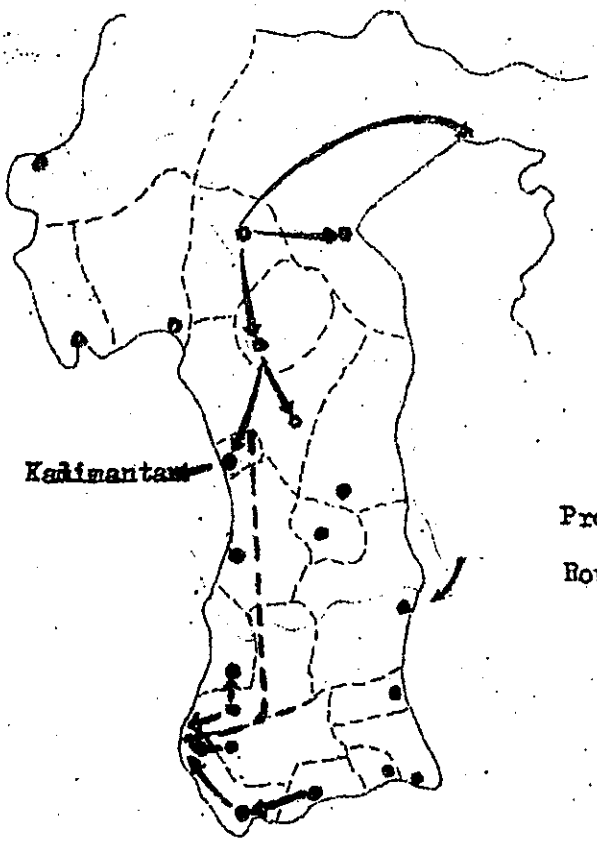
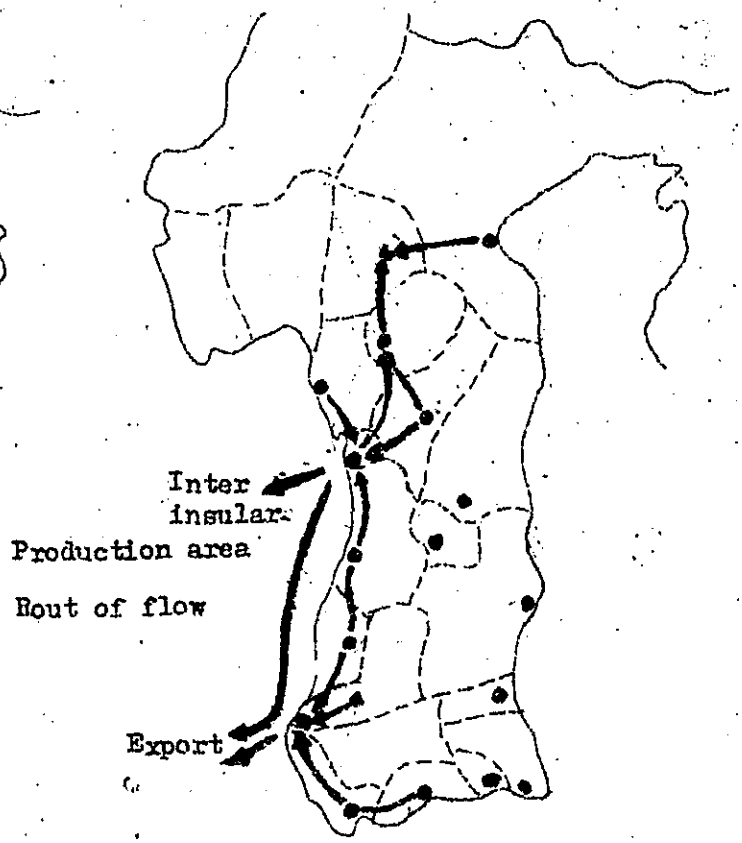


Fig. Flow of Fishes.



2.7. An example of integrated method

In cases where the potential land is smaller than the required one for the supply of agricultural products, the following method will be useful; but as there is sufficient potential land in South Sulawesi, we did not use this method.

Fig. 25. Systematic approach to the formulation of land-use plan in cases where the potential land is less than the requirement

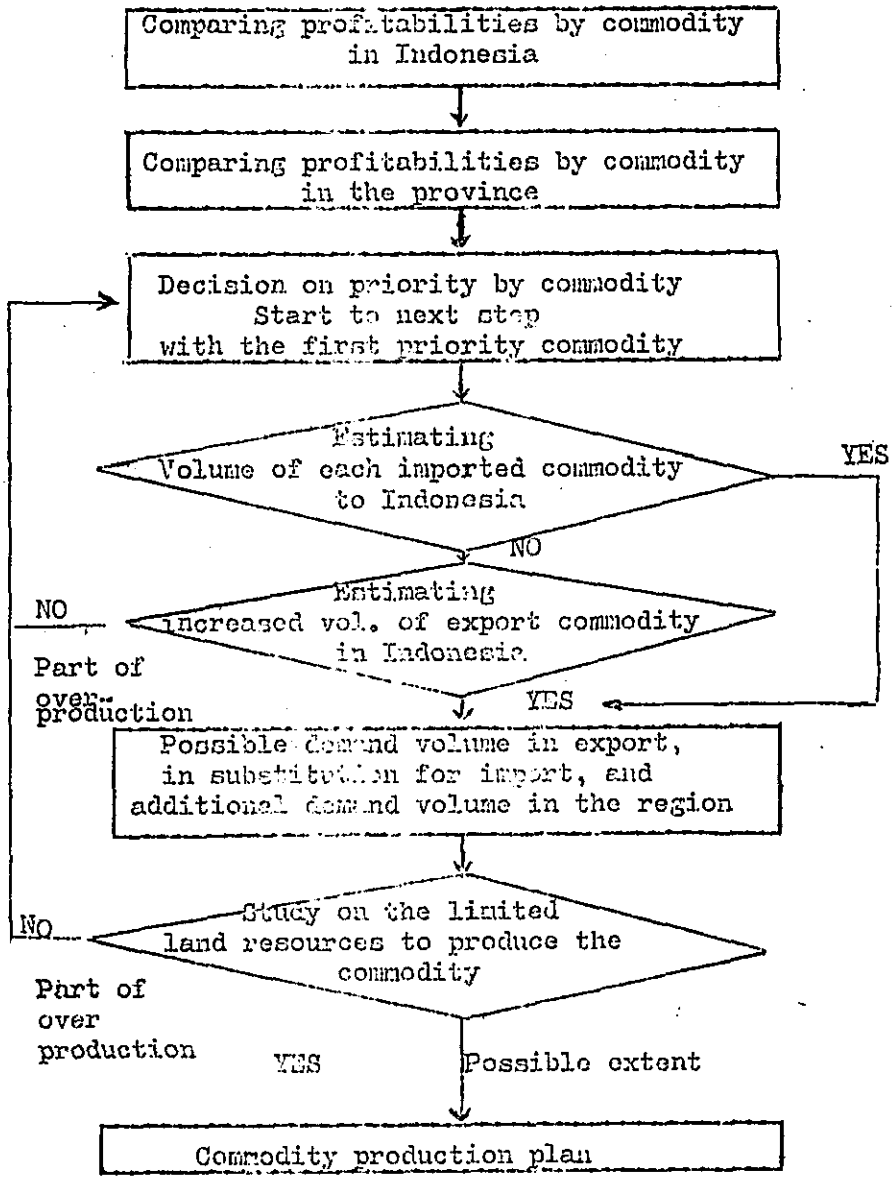


Table 11. A Model Table: An example of calculation

Priority No. unit	Possible demand 000 ton	Yield /ha ton	Required acreage 000 ha	Potential acreage 000 ha.	Cultiv- ation pl. 000 ton	Product- ion plan 000 ton
1	10	0.4	25	100	25	10
2	2	0.2	10	75	10	2
3	15	1.0	15	60	15	15
4	4	0.4	10	50	10	4
5	6	0.3	20	30	20	6
6	20	0.8	25	20	20	16
7	30	2.5	12	0	0	0
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.

When the required acreage of agricultural production is larger than the potential acreage, e.g. the potential land in 100,000 ha. for several commodities in a region, while the required land is more than 100,000 ha., and farmers want to produce the commodities according to the profitability, a production plan should be estimated like shown on the model table above. In this table, priority No. 6 is cultivated on 80% of the required acreage and No. 7 is not cultivated

However, if the priority should be switched to another commodity because the production has declined, commodity No. 7 should be increased.

III

MEASURES DETERMINATION

The existing problems which retard agricultural development should be studied before programmes for agricultural development are arranged.

Work Sheets (16) shows an example of the method for the indication of agricultural development stages and problems.

In Section 2 there are several examples of programmes necessary to achieve some objectives. The planner should study what kind of programmes are necessary.

3.1. Indication of development stages and problems

The main objective in this topic is to find out the necessary project considering the development stages.

WORK SHEET (16). Regional development stages

Item or measures \ Location name	District ( )			( )		
	Bloc (1)	Bloc (2)	Bloc (3)	Bloc (1)	Bloc (2)	Bloc (3)
1. Technique						
2. Crop intensity						
3.						
4.						

General ranking

Mark	Ranking
I	Very good or developed - higher than Indonesian level
II	Good or developing - national average
III	Less good or requiring improvement - lower than Indonesian level
IV	Bad or impossible to improve in present society

Example

1) Technique - by examination of the yield per ha.

I : very good : more than 150% against the average of national yield per ha.

II : G o o d : 150 to 100% of national average

III : less good : less than 100% against the average national yield per ha.

IV : b a d : the area is impossible to be improved due to several factors such as soil, water and climatic conditions.

2) Crop intensity - by examination of the percentage of crop intensity.

I : land utilization of over 150

II : " " " 100 - 150

III : " " " less than 100

IV : by other factors such as soil, water and climate.

3) Etc.

3.2. Study of programmes necessary to achieve the objectives

3.2.1. A plan for food stuff increase

The following measures are generally studied in order to increase food stuff, and effective policies well-adapted to each region are employed by raising the basis of extension and research service and other institutional services.

a) Improvement of agricultural technique, i.e. fertilizer application, pest control/prevention, types of cultivation, the right crop on the right location;

b) Breeding, i.e. best quality, high yielding, disease/pest resistance, adaptability to heavy manuring, drought resistance;

c) Intensive farming, i.e. multiple cropping, intercropping and mixed cropping, upland paddy rotation, crop rotation;

d) Land improvement, i.e. irrigation, drainage, farm road works, land consolidation, soil improvement;

e) Soil and water conservation.

The various measures mentioned above are taken in an organization of several projects rather than in a single project. However, it is possible to divide them into categories: one is called the Leading Project (L.P.) and the other the Supportive Measures (S.M.) (Refer to Fig. 26).

Projects in the field should be carried out on the basis of the feasibility study for each project without diverting from the recommendations, and also based on a consideration whether the project is an L.P. or an S.M. If the S.M. goes ahead of the L.P., it would fail to bring about the desired effect.

3.2.2. A plan for developing the employment opportunity

The following measures are generally studied in order to increase labour employment in agriculture, and proper measures are taken in the region:

a) Labour intensification, i.e. shifting from traditional extensive farming to labour intensive one, changing the cropping pattern, i.e. converting "less labour cropping" into "more labour cropping".

b) Farmland expansion, i.e. expanding farmland by land reclamation, and reclamation in water land by means of drainage.

c) Land intensification, i.e. introducing diverse crops a year and paddy upland rotation.

d) Specialization, i.e. making a speciality of each agro-management, e.g. division of livestock, fishery, sericulture and agroprocessing, and special occupations of marketing and transportation.

e) Home industry, i.e. handicraft, sericulture and agro-processing.

In making the plan of developing labour employment in agriculture, the following three methods should be studied:

a) In Figure 27, a plan which converts a distribution (A) into a planned distribution curve (B) to take away the peak of labour requirement in busy farming seasons;

b) A distribution curve plan (C) which is shifted from (A) simple by labour intensification, land reclamation etc.

c) A distribution curve plan (D) which is shifted from (A) or (C) by crop conversion, land intensification and specialization.

Fig. 26. Procedure on Selection of necessary programs.

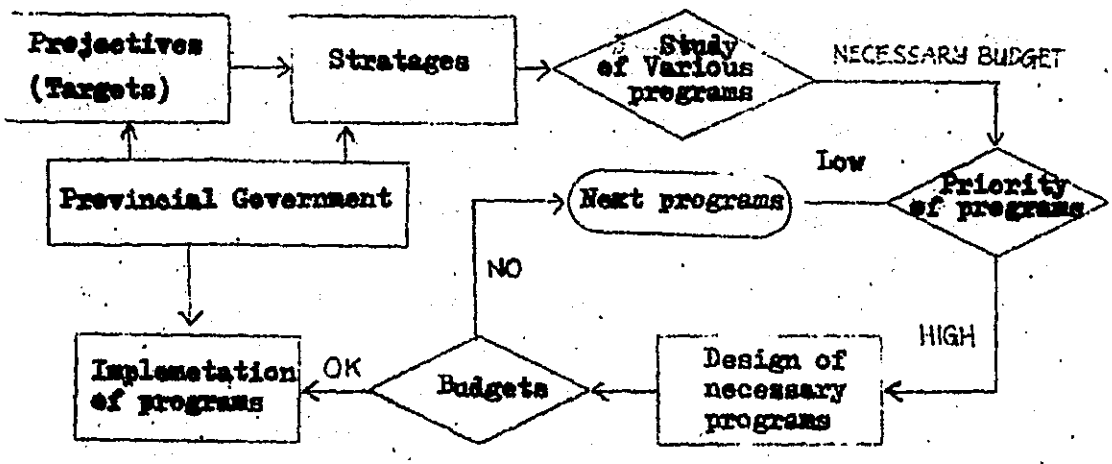
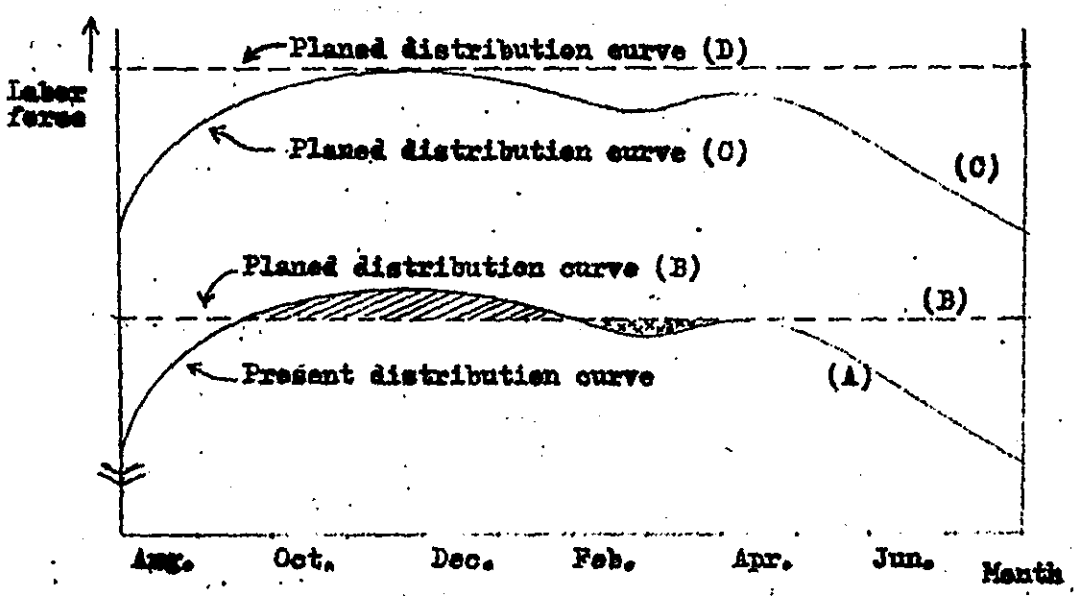


Fig. 27. Distrebution Curve of monthly laber force.



If such a target as a distribution curve (B) is taken, the measures b), c) and e) will act effectively, but is possible to convert the distribution curve (A) inti (B) through other measures, i.e. a) and d). Based on a systematic organization of various measures, expectations to some distribution curve (D) must naturally be realized.

In the report, the measures of farmland expansion was only given a trial for estimation of distribution curve (C). And no proper operation was done for the study of programmes necessary to achieve objectives of alternative plan 2 (a plan of increasing labour employment in agriculture).

In developed capitalist nations, the specialization of each agricultural sector has made a progressive advance. To say nothing of agro-management by the agricultural sector, marketing and transportation works (e.g. collecting, selecting, shipping, wholesale, distribution and traffic operation etc) have been progressively specialized, and employment opportunities in these sectors have been expanding with the advance of socio-economic condition.

3.2.3. A plan for development in agriculture

The following measures are generally studied in order to increase agricultural income, and the proper measures in this region are taken.

a) Intensification of land productivity such as "diverse cropsa year" and "paddy upland rotation" etc. through extension workers;

b) Reducing costs by means of "intensification of labour productivity", "less labour farming" and "introduction of mechanization system" through land improvement;

c) Farmland expansion by land reclamation;

d) Specialization such as division of each agricultural sector and special occupation in marketing and transportation;

e) Increase of value through agro-processing and quality improvement;

f) Home industry.

In the province, for instance, the following policies and measures should be emphasized as programmes necessary to achieve the purpose of income development in agriculture:

a) Conversion and expansion of agricultural commodities possible of being sold, with the advance in marketing and transportation, i.e. rice, coffee, coconut, clove, tobacco, sesame, nutmeg vegetables and some fruits;

b) Introduction of poultry farming and sericulture because these two commodities can be managed in small areas through some facilities are required; mulberry trees can be cultivated on waste lands, while feed the fouls is easy to get, e.g. from wastes of crops, fish etc.

c) Introduction of agro-processing in the effort of quality improvement for agricultural products, i.e. coffee, clove, sugar cane, tobacco (Virginia), fruit juice, and canned/bottled food;

d) Improvement of some agro-processing methods such as rice mills, palm sugar manufacture, traditional tobacco, coconut oil etc.

WORK SHEET (17). Example programmes

Kind of Project	Location	Supportive hectarage	Construction cost/ha.	Total investment
		ha.	000 Rp	000,000 Rp
Irrigation				
Land improvement				
Reclamation				

Attached paper:

1. Description of construction cost per ha. around the existing project.
2. Map of the area showing the location of construction.

N o t e : Detailed design will be made by specialists. This is only to show the rough planning for the formation of a Master Plan.

WORK SHEET (18). Required input materials for farming

Input measures	Total supply	By farmers themselves				By supporting cooperation		
		supply volume	Unit price	Total cost	Cost/ farmer	Supply volume	Unit price	Total cost

WORKS SHEET (19). Required mental projects

Kind of Project	Location	Supportive hectarage	Farmers	Work contents
Extension works/system				
Farmers' organization				
Institution work/system				
Etc/				

Attached paper:
1) Re-education project for extension workers.
2) Various intensificational projects of extension.

3.3. Evaluation of projects

There are various method for the evaluation of each project and programme in the world at present; however, the following items are studied in every method:

a) What are the objectives?
b) What are the problems and why are the objectives proposed?
c) What kinds of measures were adopted to achieve the objectives and to solve the problems?
d) If possible, the benefit or effectiveness would be judged quantitatively or qualitatively such as shown in Work Sheet (20). Additionally, we have reviewed the REPELITA II according to such items.

WORK SHEET (20). Evaluation of programmes

Items or measures	Rank of development stage			Final prospects
	Past	Target	Present	
1) Technique				
2) Cropping intensity				

Note: This work sheet is connected with Work Sheet 16.
(See the explanation on general ranking and the examples on the sheet).

IV

ANALYSES OF INCOME, FARM LABOUR AND INPUT MATERIAL

Agricultural economic calculation of farm income has been studied as the following:

a) Counting the family income by commodity per hectare.
(method of calculation)

gross income by commodity (output)	—	prod. cost by commodity (input)	=	family income by commodity	(Work Sheets 21 - 22)

b) Counting family by farm household.

gross income by household	—	input cost by household	=	family income by household	(Work Sheets 23 - 25)

c) Summing up of the regional agricultural income.

Total output in region	—	Total input in region	=	Regional income

The methods (a) and (b) mentioned above are micro-methods, and (c) is a macro-method on the calculation of regional income.

The regional income already been used by the Hasanuddin University, where the calculation was summed up in the regional income by year from 1969 to 1973 in the South Sulawesi Province.

The methods (a) and (b) are difficult to obtain the correct data, but the method can get much contents of agricultural economic activity such as the amount of input material by commodity by farm, income distribution by farm and labour force and by commodity. Especially the survey form we used was to show the data of labour force, by month and by commodity, too.

The following reason is, that the result of survey will be used in making a demand plan for farm labour force by commodity, when some commodity increase or decreases on the agricultural development plan. But hitherto the data we surveyed are not sufficient for the purpose of planning. Therefore data should be collected for the purposes mentioned above.

The analyses of the items mentioned above were conducted using the Work Sheets 21 to 22 and Work Sheets 23 to 25.

Note for the work sheets, No.22-1(P.58),24-2(P.66)and 25-7 (P.70):

1) Products : Average nealy harvested products during 3 - 5 years.
2) Unit price : Received by farmer.
3) Gross product : (Sales + produce for human consumption on the farm + or - stock variations)
4) Production cost : (Purchase of goods and service (including water) + depreciation and taxes + wage, rent, interest (real)
5) Family income : (Cash + Produce consumed on the farm) = (Gross product - production cost)
6) From profits : (Return on family's own funds) = (Family income- Notional remuneration of farmer and family worker)

The report in made by the followings .....

1) Farmers did not keep stock variations for next year.
2) Water change is only forced labor on Gotong Royong.
3) Survey is done on farmings of their own lands.

WORK SHEET (21 - 1) Production Cost Survey for annual crop (survey card)

Commodity : Production : Name of farmer : Official's name:
Acreage (Ha): Price per unit/Rp.: Village/Kec/Kab : D a t e :

Activity \ Month	Jan. Feb. . . . . Nov. Dec.	Total Unit	Rp/unit	R e m a r k s
1. Soil tilling				
2. Seedbed/nursery				
3. P l a n t i n g				
4. W e e d i n g				
5. Fertilization				
6. Pest eradication				
7. Harvesting				
8. Product processing				
9. O t h e r s				
Expenditure elements				
Intern				
M a l e				
Manpower Female				
Outside				
M a l e				
Female				

WORK SHEET (2i - 2) Continued

Activity \ Month		Jan. Feb. . . . . Nov. Dec	Total unit	Rp/unit	R e m a r k s
Animal and Machinery	Self-owned				
	a.				
	b.				
	Not self-owned				
	a.				
	b.				
Materials	Seedling				
	Fertilizer				
	D r u g s				
	Others				
Equip-ments	a. H o e				
	b.				
	c.				
	d.				
Other Costs	a.				
	b.				
	c.				

WORK SHEET (21 - 3) Production cost survey for pernial crops
(Survey card)

Commodity: Production : Farmer's name : Officials:
Acreage : P r i c e : Village/Kec/Kab: D a t e :

Type of / Activity phase	Cost of labour force				Material cost			Other costs			Remarks
	Month	Type of power	Man-day	Rp. Man-day	Type of material	Total unit	Rp. unit	Type of cost	Total unit	Rp. unit	

Note : The work sheet are employed on tree of more than two years old and pernial crops of new planting are employed work sheet (21).

WORK SHEET (21 - 4) Production cost survey for divestock
(Survey card)

Commodity : Production : Farmers' name : Official :
Quantity : P r i c e : Village/Kec/Kab: D a t e :

Month / Place of breeding	Jan. Feb. . . . . Nov. Dec.	Total Unit	Rp. unit	R e m a r k s
In the stable On mountains On Paddy-field On grass lands Other places Expenditure				
Intern manpower Male Female Outside manpower Male Female				
Machinery a. b. c.				
Material and a. b. c. d. Equip-ment a. b. c.				
Other costs a. b. c.				

WORK SHEET (22 - 1) Economic Aspects of Farm Products (Summary card) Result of cost Production survey

Index \ Commodity					
METHOD OF CULTIVATION (TRADITIONAL: NEW TECHNIC) MIMAS, IIMAS, ETC.					
GROSS PRODUCT	Area planted	ha			
	Products	ton/ha			
	Unit price	Rp/ton			
	(A) Cross products				
LABOR FORCE	Family labors	day			
	Employed labors	day			
	(B) Total labors	day			
	Animals	day			
	Machines	day			
PRODUCTION COST	Cost of employed labor	Rp.			
	Cost of material	Rp.			
	Cost of depreciation	Rp.			
	Charges and fees	Rp.			
	T a x	Rp.			
	(C) Production Cost	Rp.			
INCOME PROFIT	(D) Family income (A-C)	Rp.			
	(E) Cost of family labor	Rp.			
	(F) Farm profit (D-E)	Rp.			
	(G) Labor productivity (D-E)	Rp.			

Note: Refer to the note on page 53.

WORK SHEET (22 - 2) Management aspects of farm products
(Summary card)

Commodity

No. Hectarage	Production			Seed			Fertilizer			etc			Taxes
	Kg	Rp/Kg	Total Rp.	kg	Rp/Kg	Total Rp.	Kg	Rp/Kg	Total Rp.	Kg/oc	Rp/Kg/oc	Total	
1.													
2.													
.													
.													
.													
.													
Total													
Average													

WORK SHEET (22 - 3) (Continued)

Commodity

No. Hectarage	Land tilling			Seed bed			Transplanting			Weeding			Fertilization		
	Month	Day	Rp.	Month	Day	Rp.	Month	Day	Rp.	Month	Day	Rp.	Month	Day	Rp.
1.															
2.															
3.															
4.															
5.															
6.															
7.															

WORK SHEET (22 - 4) (Continued)

No.	Pest control			Harvesting			Product processing			Location of Survey			Remarks
	Month	day	Rp.	Month	Day	Rp.	Month	day	Rp.	Kabupaten	Kecamatan	Desa	

WORK SHEET (23 - 1) Farm Practice survey (Survey card)

Survey workers

1. .....

2. .....

Questionnaire for farm management

N u m b e r : .....

Kabupaten : ..... Kecamatan ..... Desa .....

Lingkungan ..... RT .....

Name of household head : ..... Male / Female

A g e : ..... Education : .....

Religion : .....

Occupation : Major .....

Part-time .....

Extent of cultivated land .....

Landholding: Owner/Tenancy/Others

Structure of dependent household

No.	N a m e	Age	Relationship	Marital status	Education	Field of employment	Remarks
1	2	3	4	5	6	7	8

WORK SHEET (23 - 2) Extent and type of farm (Survey card)

Land type	Extent of farm land (ha)			Kind of major crops	Location of farm land	Systems of cultivation & product sharing			
	Owned	Hired	Total			self-cultivated	By tiller	Rented by other person	Uncultivated
Wet land paddy									
Dry land paddy									
Upland field									
Dry land farming									
Home yards									
G a r d e n s									
P o n d s									

WORK SHEET (23 - 3) Crop rotation pattern (survey card)

Type of land	Extent (ha)	Kind of crop	Crop Rotation							
			First year				Second year			
			Planting	Harvest	Planting	Harvest	Planting	Harvest	Planting	Harvest
1	2	3	Month	Month	Month	Month	Month	Month	Month	Month

WORK SHEET (23 - 4) Farm labour force (Survey card)

Comparison of labour use

No.	Kin of crop	Family labour force			Extra-familiar labour force		
		Male	Female	Children	Male	Female	Children

WORK SHEET (23 - 5) Calculation of labour force (Survey card)

Kind of crop / Job phase	Acreage	Type of labour force							Duration of work							Remarks
		Machine	Animal	Male	Female	Hour/day	Day	Month	Machine	Animal	Male	Female	Hour/day	day	Month	
Land cultivation																
Seedbed / nursey																
Transplantation																
Fertilization																
Pest/disease control																
Maintenance I																
Collection & transportation																
Processing																

WORK SHEET (23 - 6) Activity of family labour force (Survey card)

No.	Relation ship of farmer	Work in one year days	Own land days	Side - job days	Other land (mutual help) days	Seeking outside job
1.						
2.						
.						
.						
.						
.						

WORK SHEET (23 - 7) Farm equipments (Survey card)

No.	Kind of equipment	When purchased (year)	Purchase Price(Rp)	Size/model	Owned/rented	Manner of obtaining the equipment

WORK SHEET (23 - 8) Farm input material (Survey card)

No.	Kind of crop	Type of input used			Price of input used			Manner of obtaining	Manner of paymentfor input material
		Seed/seed-ling	Fertilizer	Pesticide	Seed / Seedling	Fertilizer	Pesticide		

WORK SHEET (23 - 9) Farm production (Survey card)

No.	Kind of crop	Extent (ha)		Productivity (ton/ha)	Amounth of product (ton)	Self-con-sumption (ton)	S a l e s (kg / ton)		
		Transplant-ation	Harvesting				Amounth (ton)	Unit price Rp.	Where sold

WORK SHEET (23 - 10) Marketing of farm products (Survey card)

No.	Kind of crop	Duration of storage before sales	Channel of sales		Market information		
			Merchant	Market	Official	Neighbpur	Merchant

WORK SHEET (24 - 1) Farmers conciousness survey
(Survey card)

Income

No.	Type of income	Amount Rp	Percentage (%)	R e m a r k s
1.	Agriculture			
2.	Part-time			
3.	Others			
	T O T A L			

WORK SHEET (24 - 2) (Continued)

Expentiture

No.	Type expenditure	Family income	Percentage (%)	R e m a r k s
1.	Agriculture			
2.	Household			
3.	Household utensils			
4.	Caremonies			
5.	Others			
	T O T A L			

Note: Refer to the note on page 53.

WORK SHEET (24 - 3) Farmers' activity as community member
(Survey card)

No.	Name of organization	Relation of farmer	Activity joined	Duration of activity	Benefit of organization for farmer
1.	Farmers' Group				
2.	Farmers' Cooperative				
3.	BUUD / KUD				
4.	Mutual help				
a.					
b.					
c.					
5.	O t h e r s				

WORK SHEET (24 - 4) Farmers conciousness and urgent needs
(Survey card)

No.	Type of needs	Reason and benefit	R e m a r k s
1.	Price improvement		
2.	Farm utensils		
3.	Input materials		
4.	Extension		
5.	Road repairs		
6.	Irrigation		
7.	Cooperatives		
8.	Transportation means		
9.	Processing		
10.			

WORK SHEET (25 - 1) Number of Families and Farm employees (Summary card)(resultsef of farm Practice survey)

Contents / Code No.	Farm area (ha)	No. of Family	No. of Family labor	No. of Farm labor	No. of other Job than Farm in Family	yearly employee	Temporary total of year	Number of employee - month - 1 - 3	4 - 6	7 - 9	10 - 12
Sub Total											

WORK SHEET (25 - 2) Farm area and Land owneship (Summary card)

Unit : (ha)

Contents / Code No.	Total Owner	Total Tenant	Total Total	Shifting area	Paddy field Owner	Paddy field Tenant	Upland field Owner	Upland field Tenant	Home yard Owner	Home yard Tenant	other land	Area of rented land
Sub Total												

WORK SHEET (25 - 3) Animal husbandry and equipment for farming
(Summary card)

Contents / Code No	Animal (head)						Facility (m^2) / Equipment					Used & borrowed equipment & animal
	Cattle	Buffalo	Horse	Goat (Sheep)	P i g	Chicken (duck	House	Barn	Tractor	Pump	Hoe	
Sub Total												

WORK SHEET (25 - 4) Farmers' organization and loans
(Summary card)

Contents / Code No.	ORGANIZATION				LOAN					
	Kelompok Tani	BUUD KUD	Gotong Royong	WILUD	Total loan	Amount	Month	Amount	Month	Amount
Sub Total										

Notes : Kelompok Tani = Farmers' group
Gotong Royong = Mutual cooperation
Wilud = Village Unit Region.

WORK SHEET (25 - 6) Farmers income (Summary card)

Contents / Code No.	Farmers income (Rp.)				Harvested farm products (Rp.)						Enough or not for the living expenditure
	Self consumption	Sales income	Other income	Total income	Kinds of farm products					Amount of income	
					Paddy	Secondary crops	Upland crops	Fish and animals	Others		
Sub Total											

WORK SHEET (25 - 7) Farm income by each farmer (Summary card)

Code No	(				)	Code No.	(				)
Commodity	Production (kg)	Unit price Rp.	Gross income Rp.	Prod. Cost (%)	Family income Rp	Commodity	Production (kg)	Unit Price Rp	Gross income Rp.	Prod. Cost (%)	Family income Rp
Sub Total											

Note: Refer to the note on page 53.

APPENDIX

A detailed design of each programme should be made after the drawing up of the master plan and the feasibility study in the field. In that case, the planner should make a survey on farmers' needs, the rural condition or regional condition.

Appendix I is an example of the survey on farmers' needs, which used sampling surveys in Jeneponto and Enrekang. Appendix II is an example of the survey on rural condition, designed for irrigation projects by DPUT.

On the contrary, appendix III is an example of the optimum plan of regional agricultural production. The plan such as this example, is necessary to formulate a regional plan, by means of establishment of economics consistent with provincial or national plan.

APPENDIX I

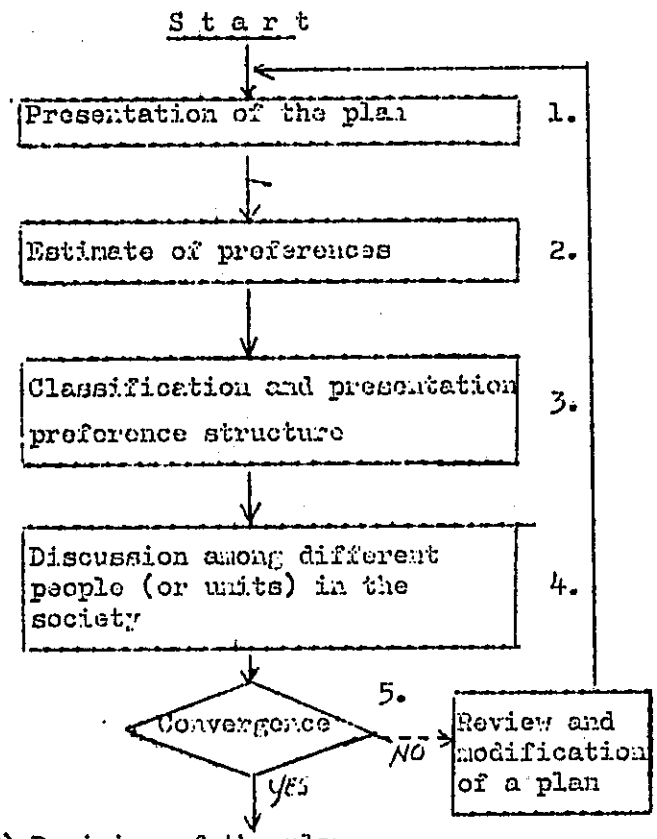
SOCIO-ECONOMIC SURVEY FOR AGRICULTURAL DEVELOPMENT

By Dr. Hiroyuki NISHIMURA

This paper was prepared by Dr. H. Nishimura for the Counterparts of the Project, aiming at transfer of techniques to make surveys on farmers' needs.

1. Systematic approaches to formulation of the economical and social preferences

(1) Formulation of a regional plan



(Procedures)

Step 1. Show all alnative plans.

Step 2. Estimate preferences/needs by the survey (questionnaire)

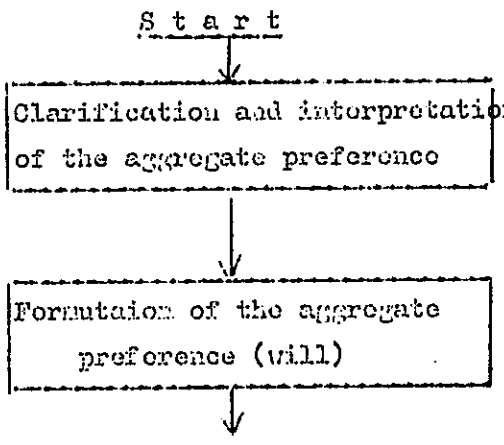
Step 3* Analyse the data

Step 4. Understanding and cooperation through communication

Step 5. Evaluation

Step 6. Review, modify and feed back.

(2) Decision of the plan

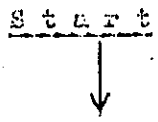


Step 7* Analyse and interpret the aggregate preference/needs

Step 8. Decide and adopt the plan.

(3) Execution of the plan

Note: * Statistical analysis.



2. Memorandum to "Socio-economic Survey for Agricultural Development"

Part A. General information

1) a common part for Part B and Part C

2) Ask operator of farming

Part B. Formulation of farmers needs

1) Place : a desa/Enrekang

2) Type of farming : vegetable
reclamation work

3) Ask 6 family members ..... (age class)

(1) Operator and his wife ..... 30 - 50 years

(2) Father and mother ..... over 40 year

(3) Son and his wife (or daughter) ... under 30 year

4) Sample size : 30 farms/desa

Sampling depends on type of farming, size of hectareage, and ownership. (of. full-time or part time, forestry, fishery and estate, etc).

Example:

Size	large	medium	small	total
owner	over ha		under ha	
Owner	7	7	7	21
Tenant	3	3	3	9
Total 10	10	10	30	

Part C. Evaluation of alternative plans

1) Ask operator

2) Degree should be written for each item independently

1. most important (necessary)
2. normal accept
3. reject (do not want unnecessary)

3) Place : 3 Desa's/Jeneponto

4) Sampling: 30 farms/desa x 3 desa's = 90 farms

1. rice farming - fish pond
2. vegetable farming
3. fruit farming - new development program.

Part A. General information Village ....., Name of respondent ....., Sample No. .....

Questionnaire 1. Family and labour-force (mark on the alphabet)

Relation	Sex	Age	Kinds of work (* , 0)					Education career					Region	
			Agr.	Forest	Fish	Off-farms	Not to go school	Primiry school graduate	Primiry school drop	Secondary school graduate	Secondary school drop	Advance	Moslem	Christian	Others
A. Operator (husband)	M														
B. (wife)	F														
C. Father	M														
D. Mother	F														
E. Son	M														
F. Sons wife	F														
G.															
H.															
I. Nos. of children below 10 y. old		Total main labour force in Agr.													
Total member															

Q. 2. Land (ha)

	Operated land			Land to others	Remarks (rent)
	Total	owned	rented (borrowed)		
Farms					
Forestry					
Fishery					
Others					
Total					

Q. 3. Land use, farm production, productivity.

Kinds	Hectar/Age	Total Produc.	(Productivity)	(Price)	(Gross revenue)	Marketing Method
Rice (Wet season)						
Rice (Dry season)						
C o r n						
B e a n s						
Potato						
Coconut						
(Sub Total)						
Livestock						
.....						Nos. to Keep.
.....						
F i s h						
(Total) (1)						

Q. 4. Non - farm income

Kinds	Monthly revenue	Amounts (yearly)	
Total	(2)		Grand total (1) + (2)

Q.5. Serious problems which farmers wants to solve.
(Most serious one: ◎, other one : ○)

Mark

A. Yields depends so much on wether
B. Shortage of water supply
C. Incomplete drainage
D. Poor soil
E. Difficulty to get draft animals
F. Hard (or dangerous) work
G. U certain prices of products
H. Uncertain prices of inputs (fertilizers, chemicals, etc).
I. Shortage of hired laborers
J. Lack of capital
K. Shortage of land
L. Tenancy problem (contracts, rent, etc)
M. Others

Part B. Survey for the Formulation of farmers'Needs

Choose 5 items (O) and write order of importance from the 1 st (most important) to the 5 th.

Example : (1), (2), ...

Q.6. What kinds of improvements do you expect related to your business of life?

1) For farming, forestry, and fishing businesses.

O	OW	F	M	S	SW	
						A. Seed and seedling
						B. Availability of fertilizer, feeds
						C. Machinery use
						D. C a t t l e
						E. Cultivation method
						F. Insecticides and pest control
						G. Natural sesasters
						H. Soil, topography
						I. Water control - drainage
						J. Water supply - irrigation
						K. Capital - crediets, loans
						L. Prices inputs - fertilizers, chemicals
						M Prices of machinery
						N. Labor availability - wage, quality
						O. Prices of product
						P. Marketing, storage, transportation
						Q. Rent of land
						R. Agricultural extension service, demonstration plot, technical advices
						S. Agricultural cooperatives
						T. Ownership of land
						U. Contract of tenancy
						V. Aforestation,reforestation,renewal of perennial crop
						W. Construction or remodel of fish ponds.
						.
						X.

2) For economical, social, institutional and infrastructural facilities/activities (except agriculture, forestry and fishing)

O	O//	F	M	S	S//	
						A. Market
						B. Storage facilities
						C. Transportation system, road system
						D. Processing, Agri-industry
						E. Educational system
						F. Religious facilities
						G. Community house, public facilities
						H. Cooperative works, mutual helps
						I. Taxation
						J. Land reform
						K. Regulation of trading
						L. Hospital
						M. Sanitary condition in a community
						N. Water supply
						O. Sewage system
						P. Electricity supply
						Q. Telephone service
						R. Amusement center, cultural center

3) For better family lofe

O	OW	F	M	S	SW	
						A. Lower price of the foods
						B. Stability of prices for the foods
						C. Lower prices of consumers goods
						D. Keep employment opportunity
						E. Enough standard of wage rate
						F. R a d i o
						G. T.V.
						H. Newspaper
						I. Magazines
						J. Movie (Theatre)
						K. Bicycle
						L. Motor cycle
						M. Car, trucks
						N. Accesories
						O. Furnitures, housing
						P. Better education
						Q. Participation in religious activities
						R. Group activities for cooking, sewing
						S. Guiding for off-farms jobs

Part C. Survey for evaluation of alte native plans

Q. 7. Degree of request for economic development Policies.

Degree	
	Aa. Overall and equal development within a region
	Ba. Positive development in the selected area within a region
	Cb. Wait and see (follow the natural trend)
	Da. Public works (construction, transportation, etc)
	Ea. Built up new road system
	Fb. Improvement of rural roads (repair and maintain)
	Ga. Industrial development
	Hb. Improvement of present marketing facilities
	Ib. Sight-seeing business
	Jb. Conservation of natural environment
	Kb. Increase in off-farm job opportunity
	Lb. Technical (business) schools/training centers for off-farm jobs
	Mb. Agricultural, forestr, , and fishery schools/training centers
	Na. Agricultural development
	Oa. Estate development
	Pa. Settlemen program for shifting cultivation
	Qa. Livestock development
	Ra. Land reform
	Sa. Forestry development
	Ta. Fishery development
	Ua. Tax policy

Q. 8. Degree of request for better living conditions and wellfare policies

Degree	
	A. Water supply
	B. Sewage system (cleaning used water)
	C. Electricity
	D. Telephone
	E. Hospital
	F. Kindergarten
	G. School integration
	H. Secondary school
	I. High school
	J. Public or community house
	K. Safety road system
	L. Improvement of the facilities for shopping
	M. Improvement of living condition in a community
	N. Reclamation of community
	O. R a d i o
	P. T.V.
	Q. Religious facilities
	R. Library
	S. Amusement center, cultural center
	T. Open space and facilities for sports.

Q.9. Classification of "desa"

-------- Grouping by the socio-economic characteristics

1. Total population
2. Population density
3. Rate of change in population during past ten years
4. Number of doctors/population
5. Literacy rate
6. Number of primairy school
7. % of primairy school students in total of the same age group (6 - year period)
8. % of Agriculture in total population
9. % of fishing in total population
10. % of forestry in totalpopulation
11. % of industrial sector in total population
12. % of service sector in total population
13. % of tenancy farmers in total number of farms
14. % of agricultural land in total hectareage
15. % of forestry land in total hectareage
16. % of fish pond in total hectareage
17. % of estate hectareage in total agricultural land
18. % of farm household who operate farmland over q.0 ha.
19. % of forestry producers who keep forestry over 10 ha.
20. % of fishpond operate with the size over 2.0 ha.
21. % of agriculture production in total
22. % of livestock production in total
23. % of forestry production in total
24. % of fishery production in total
25. % of estate production in total
26. % of gross production in total region
27. gross production per capita
28. Rate of change in gross production
29. Number of mosque/population (10,000)
30. % of Moslem inpopulation
31. % of Christians in population

A P P E N D I X II

PLANNING AND PROGRAMMING OF IRRIGATION PROJECT, SIMPLE RECLAMATION

By Directorate of Irrigation Development Programme
Directorate General of Water Resources Development
MINISTRY OF PUBLIC WORKS & ELECTRIC POWOR/DPUT

This paper is used for surveys to prepare small scale irrigation or simple reclamation projects by DPUT.

P L A N N I N G A N D P R O G R A M M I N G

O F

SMALL IRRIGATION PROJECT / SINGLE RECLAMATION

Y E A R : 197../197..

NAME OF PROJECT :

PROVINCE :

KABUPATEN :

KECAMATAN :

V I L L A G E :

DIRECTORATE OF IRRIGATION DEVELOPMENT PROGRAM

DIRECTORATE GENERAL OF WATER RESOURCE DEVELOPMENT

DEPARTMENT OF PUBLIC WORKS AND ELECTRIC POWER.

PROJECT NUMBER

PROVINCE/DEVELOPMENT CENTRE

1. NAME OF PROJECT

2. PROGRAM 2.1. New irrigation network development programs (simple irrigation)

2.2. Program of river ans swamp area coordination and improvement (simple reclamation)

Location and acreage of the project planned

3.1. Project location

3.1.1. Kabupaten

3.1.2. Kecamatan

3.1.3. Village

3.1.4. Nearest city

Distance from the Project ..... km.

3.1.5. Geographical location ..... Northern/ outhern latitude

..... West/Eastern Longitude

3.1.6. Acreage of planned project site: ..... ha.

4. CONDITION OF PROJECT SITE

4.1. Topographic condition

4.1.1. Altitude from sea level .....m

4.1.2. Topographical shape : 1. Plains 2. Montain range

3. Swamps 4. Others

4.1.3. Is there any problem on the topographical shape?

1. YES 2. NO

4.2. Climate

4.2.1. Type of climate (according to Schmidt and Ferguson)

.....

4.2.2. Rainy months : Jan. Feb. Mar. Apr. May June

July. Aug. Sep .Oct. Nov. Dec.

4.2.3. Name of reinfall station

Station distance from Project location

4.2.4. Temperature: Averege daily temperature ^{o}C

Maximum temperature ^{o}C

Minimum temperature ^{o}C

4.2.5. W i n d .

Wind direction in rainy season;

Velocity .....km/hour

Property of wind: hot/dry/wet

Wind direction in dry season:

Velocity ..... km/hour

Property of wind: hot/dry/wet.

4.3. Soil condition.

4.3.1. Land use at catchment areas

- Forest ..... ha
- Meadow/sedge grass ..... ha.
- Lakes/swamp ..... ha.
- Wet paddy yield ..... ha.
  - technical irrigation ..... ha.
  - semi-technical irrigation ..... ha.
  - village irrigation ..... ha
  - rainfed ..... ha
  - "tidepeak" irrigation ..... ha.
- Dry/unirrigated fields ..... ha.
- Residence quarter ..... ha
- Estates ..... ha
- Fishponds .....ha

4.3.2. Soil type at catchment area/Kecamatn

4.3.3. Soil characteristics at catchment area

- Property agricultural lands in general :

1. hard to be tilled
2. moderate
3. easy

- Chemical property of soil
  - date of research
  - laboratory
  - P_H .....
  - Content of organic compounds: 1. high
    2. average
    3. low

  $CaCO_3$ content 1. high 2. average 3. low

Physical property of soil

- "topsoil"layer
  - depth .....cm

- structure 1. soft clay 2. hard clump 3. prism

Is there any harmful substance for plant growth?

1. YES 2. NO

4.3.4. Soil colour : 1. Black 2. Gray 3. Yellow 4. Brown 4. Red 6. Other.

4.3.5. Mention the successive order of the most suitable plant at the catchment area: 1. paddy-corn 2. corn-sweet potato 3. sweet potato 4. other main food stuff.

4.4. AGRICULTURE.

4.4.1. Cropping pattern on paddy field

.....

4.4.2. Cropping patter on dry land farms

.....

4.4.3. Average of land owned by farmers:

Total : ..... ha.

Wet paddy fields : ..... ha

Dry field : ..... ha

Home yards :..... ha

4.4.4. Average production (qt/ha) and acreage of harvest during the last 3 years:

Paddy on irrigated paddy field ..... qt/ha

Paddy on rainfed paddy field ..... qt/ha

Dry land paddy

Corn on rainfed /lebak paddy field .....

Corn on dry land farms .....

Peanut on irrigated paddy fields .....

Peanut on rainfed/lebak lands .....

Peanut on dry land farms .....

4.4.5. Use of fertilizer and pest/disease drugs:

% Farmers who use it

U re a : 1. easily available

2. hard to obtain

Pesticides: 1. easily available

2. hard to obtain

Insecticides: 1. easily available

2. hard to obtai

4.4.6. S e e d s .

- Local superior variety
- National superior variety

4.4.7. Agricultural extension

- Distance to agricultural extension service
- frequency of extension: 1. Occasionally 2. Regular
- Farmers' attitude towards extension:
  1. Accepting 2. Doubtful 3. Refusing

4.4.8. Power for land cultivation.

1. man 2. mzn & animal 3. Machine

4.4.9. Use of manpower in agriculture:

- outside manpower used by farmer
- outside manpower are used for:
  1. landcultivation 2. transplantation 3. harvesting
  4. pest/disease control.
- Average total working hours per day
- Average number of manpower used per ha. by farmer.

4.5. Marketing of agricultural products:

4.5.1. M a r k e t

- Number of market in irrigation region. .....
- Distance of the nearest market to the Project
- Market days: 1. every day

2. on certain days

4.5.2. The use of ahricultural products.

	Consumed by farmers	Sold at total markets
R i c e	..... %	..... %
C o r n	..... %	.....%
Peanut	..... %	.....%

4.5.3. Price of agricultural products per kg. during the last year

Paddy Rp. ...

Corn Rp. ...

Peanut Rp. ...

4.5.4. R o a d s :

Road networks: 1. scarce density 2. average density

3. high density

Entrance way to the project:

1. present 2. absent

Distance of project to public road ..... km

Condition of road networks:

1. passable by car throughout tha year

2. passable by car in dry season only

4.5.5. Transportation means:

1. man-carried load 2. bicycle 3. horse-cart

4. car 5. train 4. sailing by boat

4.6. Population.

4.6.1. Number of population according to age at catchment area/Kecamatan on latest sensus.

Age group:

0 - 15 year	male	.....
	female	.....
16- 45 years	male	.....
	female	.....
over 45 years	male	.....
	female	.....

4.6.2. Average annual growth rate of population:

1. through birth 2. transmigration 3. birth and transmigration.

4.6.3. Population density:

geographical ..... person/km^2

agraric ..... person/km^2

4.6.4. Distribution of population by occupation:

Farmers	.....	persons	.....%
Merchants	.....	persons	..... %
Laborers	.....	persons	..... %
Civil servants	.....	persons	..... %
Fishermen	.....	persons	.....%

4.6.5. Number of farmers:

- landowners	.....	persons	..... %
- land-tillers	.....	persons	..... %
- tillerowner	.....	persons	.....%
- farm laborers	.....	persons	.....%

4.6.6. Condition of transmigration at project site:

1. none 2. being planned 3. present

Number of already exsisting transmigration:

5. STATUS OF THE PROPOSED PROJECT.

5.1. Reconnaissance Survey: 1. already 2. in proces 3. not yet

5.2. Specific survey:

5.2.1. Soil survey : 1. already 2. in proces 3. not yet

5.2.2. Geological survey: 1. already 2. in proces 3. not yet

5.2.3. Hydrological survey: 1. alredy 2. in proces 3. not yet

5.2.4. Water quality survey : 1. already 2. in proces 3. not yet

5.2.5. Land-use survey: 1. already 2. in proces 3. not yet

5.3. Measurement and mapping of the situation (1 : 5,000)

1. already 2. in proces 3. not yet

5.4. Mapping of partition and measurement of canal trace (1 : 5000)

1. already 2. in proces not yet

5.5. D e s i g n

5.5.1. D a m	1. already	2. in proces	3. not yet
5.5.2. Inlet structure	1. "	2. "	3. "
5.5.3. Division structure	1. "	2. "	3. "
5.5.4. Cross regulator	1. "	2. "	3. "
5.5.5. Energy breaking structure	1. already	2. in proces	3. not yet
5.5.6. Main canal	1. already	2. in proces	3. not yet
5.5.7. Secondary canal	1. "	2. "	3. "
5.5.8. Drainage canal	1. "	2. "	3. "

6. Implementation plan.

6.1. Estimation of project benefits : .....

6.2. Acreage of planned project site .....

6.2.1. Total acreage of project site ..... ha.

6.2.2. Acreage of existing paddy fields ..... ha.
(rainfed mutation)

6.2.3. Expansion of existing acreage ..... ha

6.2.4. New area ..... ha

6.2.5. Achievement of first year target ..... ha

Note: If the project implementation is completed within 1 year's period, the content of point 6.2.5. is consistent with that of point 6.2.1.

6.3. Present use of land to be owned by the project:

Forest	..... ha.
Meadows/alang-alang	..... ha
Dry fields	..... ha
Wet fields	..... ha
Swamps	..... ha
Valley	..... ha
Estates	..... ha

6.4. Acreage of agricultural crops in the project site (ha).

Wet season	irrigated paddy fields	Rainfed	Dry field
P a d d y	.....	.....	.....
C o r n	.....	.....	.....
Peanut	.....	.....	.....
Dry season			
P a d d y	.....	.....	.....
C o r n	.....	.....	.....
Peanut	.....	.....	.....

6.5. Expected production (qt/ha) after completion of project:

	wet season	dry season
P a d d y	.....	.....
C o r n	.....	.....
Peanut	.....	.....

6.6. Status of land proposed to be turned to project:

1. Private property 2. traditional property 3. state property

6.7. Water resources.

6.7.1. Name of river/lake/spring : .....

Length of river ..... km

Maximum discharge ..... m3/sec.

Minimum discharge ..... m3/sec.

Average discharge ..... m3/sec.

Maximum height of river water ..... m

Minimum height of river water ..... m

6.7.2. Condition of forest at catchment areas:

- Forest destruction/denudation.
  1. extensive 2. moderate 3. slight
- river sediment content: 1. heavy 2. average 3. light
- Reforestation: 1. necessary 2. unnecessary.

6.7.3. Swamps:

- N a m e : .....
- Acreage : km2
- Depth of water in wet season: .....m
- Depth of water in dry season: .....m
- Difference of tidal heights : .....m
- Acreage of swamp in the dry season km2

6.8. Water quality

- Examination: 1. Yes 2. No.
- D a t e :
- Laboratory :
- PH :
- Is there any element hindering plant growth? 1. Yes 2. No.

6.9. Water distribution:

- Wet season ..... m3/sec.
- Dry season m3/sec

Possible paddy fields to be irrigated:

- Wet season .....ha
- Dry season .....ha

6.10. Does the project site belong to the group of swamp areas which are:

6.10.1. entirely flood in the wet season 1. yes 2. no

6.10.2. entirely flooded in the wet season and dry in the dry season 1. yes 2. no

6.10.3. Flooded due to L

1. regular floods 2. flood-and-ebb-tides 3. low land
4. being a valley 5. originally swamps.

6.11. Project organization:

6.11.1. Is there a farmer organization to arrange water distribution at the project site? 1. yes 2. no

6.11.2. Does the farmer organization accept O & M for tertiary canals? 1. yes 2. no.

6.11.3. The project planning if coordinated with:

- The Agricultural ExtensionService 1. yes 2. no
- The Regional Government 1. yes 2. no
- Farmers 1. yes 2. no

6.12. Material, manpower and specific equipment of the construction:

6.12.1. Local construction material:

1. hard to obtain 2. easy to obtain

Distance of supply place ..... km

6.12.2. Industrial product as construction material:

1. hard to obtain 2. easy to obtain

Distance of supply place ..... km

6.12.3. F a r m e r s.

- Number of farmers required at the catchment area during the wet season ..... persons
- Number of farmers present ..... persons.
- Number of transmigrant farmers required ..... persons.

6.12.4. Construction job.

- Number of manpower required until project completion (man-day): ..... persons.
- Number of manpower required at summit phase of job ..... persons.
- Number of manpower present ..... persons.
- Number of transmigrant manpower required ..... persons.
- Construction and maintenance of tertiary canals per ha. Rp. .....
- Management of each tertiary unit per ha. Rp. .....
- Mention the fund resource expected to finance the operation and maintenance of tertiary level water use:
  1. national budget 2. Presidental instruction (INPRES)
  3. Regional Development Dues 4. The community.

Additional Questionnaire

7. SOCIAL AND CULTURE

Effect of outside manpower andtransmigrants

By the existence of labour force from outside for the requirement of projects completion and ransmigrants as supplementary labour force effects occur on the surrounding comunity, among other things:

7.1. Education : a. declining
b. no change
c. improving

7.2. People's handicraft: a. declining, b. unchanged c. increasing

7.3. People's art: a. declining b. unchanged c. increasing

7.4. Order and security: a. declining b. unchanged c. increasing

7.5. Mutual cooperation: a. declining b. unchanged c. improving

7.6. Religious devotion: a. declining b. unchanged c. increasing

7.7. Household and village cleanliness and sanitation:
a. declining b. unchanged c. improved

8. Market condition

8.1. Is there any Inpres market project? a. yes b. no

8.2. By the completion of the project, the market condition:
a. gets weaker b. remains the same c. gets busier

8.3. Possibility for additional new markets after completion of project:
a. none b. some

8.4. Mobility of dayli comodities, particularly food stuff/rice, after completion of the project, gets:
a. less smooth-running, b. no change, c. smoother.

9. Environmental sanitation

9.1. Pestilence

9.1.1. This plague spreads over the projects site: a. yes b.no
Note If the plague does not exost, you need not fill in the blank.

9.1.2. Efforts for the prevention and eradication of the plague:
a. vaccination 1. yes 2. no
b. quarantines 1. yes 2. no
c. extermination of plague carries (rats, rodents);
1. undertaken 2. not undertaken
d. Other methods: give brief explanation.

9.1.3. Condition of the plague:
a. lessened b. unchanged c. increased d. no case.

9.2. Schistosomiasis

9.2.1. Is there any presence of schistosomiasis at the project site: a. yes b. no

9.2.2. Efforts of prevention and control of the disease:
a. vaccination 1. yes 2. no
c. Other methods : give brief explanation.
b. extermination of the conductor of the disease/snails:

9.2.3. Condi ion of cases:
a. decreasing b. unchanging c. increasing d. no case

9.3. M a l a r i a

9.3.1. Is there an evidence of malaria around the project site:

a. yes 2. no

9.3.2. Efforts in the prevention and eradication of the disease:

a. vaccination 1. yes 2. no

b. speeding up up of the flow of water in ditches and draining of stagnant water 1. undertaken 2. not undertaken

c. mass spraying with mosquito & insect killing drugs 1. yes 2. no

d. other methods: give a brief explanation.

9.3.3. Condition ofcases:

a. decreasing b. unchanged c. increasing d. no case

9.4. Sanitation

9.4.1. What is the distance between the project location and the Community Health Centre .....km

9.4.2. At the kecamatan close to the project location:

a. Comunity Health Centre .....(number)

b. Mother & child Welfare Clinic ..... "

A P P E N D I X III

ESTABLISHMENT OF THE OPTIMUM PLAN OF REGIONAL AGRICULTURAL PRODUCTION

By Dr. Kazuo MUTO

This paper was prepared by Dr. K. Muto for the Second Seminar of the Project in April 1978 at Ujung Pandang.

Establishment of the Optimum Plan of Regional Agricultural Production

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I. Introduction.

Needless to say, agricultural production is to large extent influenced by various conditions existing in eacg area in which specific kinks of crop are grown. This different characteristic adhering to each region is called as "locally". In the field of agricultural economics, t the emphasis thus far has been placed on the analysis of locality and the optimim location of farm production since von Thuenen published his distinguished book entitled "die isolierte Staat" in 1826. In addition to this, with the development ofneconomy and with the technical progress of agricultural production, the problem with which farmers have to face is shifted to the so-called T.W. Schultz's "food" to "farm" problems. In accordance with this, "the optimum production in the most suitable region is increasingly becoming important either from the viewpoints of national economy or from individual farmer's interest.

II. Analysis objectives.

In their study of Regional Adjustment in Grain Production, A.C. Egbert and A.O. Heady defined the analysis objectives as follows:

"The general objective of the studies was to determine the most efficient pattern of grain production to meet annual requirements at least in producong grain.
Several exploratory models were used to determine which regions might shift from grain production if these objective were sttained. The more specific objectives of the analysis were;

1. To formulate several programming models with special characteristics for analysing particular facets of the grain-surplus problem.

2. To obtain empirical solutions to the analytical models that will indicate comparative regional efficiencies of resources use in production of wheat and feed grain.

3. To ose the empirical solutions to suggest optimum spatial production and land-use pattern for wheat and feed grain.

4. To estimate competitive rents for grainland, and prices of wheat and feed grain.

5. To analyze the weaknesses in the basic assumptions of the analysis and suggest ways of improving similar investigations.

6. To describe the problems encountered in collecting and processing data for the study, and to suggest means of acquiring improved data.

The objective mentioned above is comprehensively applicable for any other similar studies. In short, given thechosen level of production restraints, product prices and production cost, etc., the optimum region location of production is determined.

III. Preliminary study.

(1) Law of comparative advantage - basic economic principle by the optimum location is determined.

Ex

	Region A	Region B	(A/B)x100
Rice (kg)	500	300	60
Vegetable	1,200	600	50

Relative and simultaneous comparision of advantage between regions and within region.

	Region A	Region B
Rice (kg)	-	600 (300x2)
Vegetable (kg)	2.400 (1.200x2)	

Alternative choice between two enterprises.

(2) Concept of "region"

According to the definition proposed by French scholar J.R. Boudeville, "region" is classified into the following three categories:

1) Homogenous region - from the viewpoint of natural, socio-economic conditions, the space of which characteristics are uniformed is called as homogenous region.

In classical theoryof regional science, this type of region had ever played an important role particularly in the field of agriculture. The homogeneity of each space can be verified using such

statistical method as peincipal componen analysis and so on.

2) Nodal region - In this case, the homogeneity is not necessary important factor. The space in which activity flow concerning goods and services is compactly related is called as nodal or polar region. Accordingly, the function of economic activity is high y regarded as important. The concept of "nodal" is more frequently used than that of "homogenous" in the present regional science.

3) Planning region - The space for which some project with social investment is to be undertaken iscalled as planning region. This is principally based on forward-looking viewpoint, containing normative characteristic as compared with homogenous region of which the characteristic is rather descriptive.

IV. Mathematical expression

General spatial equilibrium model based on interregional linear programming method can mathematically be expressed in following way.

to maximize:

$$-\sum_{j=1}^{n}\sum_{k=1}^{p} C_{jk} X_{jk} + \sum_{i=1}^{f}\sum_{h=1}^{p} S_{ihk} Y_{ihk} + \sum_{i=1}^{f}\sum_{k=1}^{p}\sum_{g=1}^{q} (e_{ig} - t_{ikg}) Z_{ikg} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (1)$$

subject to:

$$-\sum_{j=1}^{n} a_{ijk} X_{ijk} - \sum_{h=k} Yihk + \sum Yihk +$$

$$\sum_{g=1}^{q} Z_{ikg} - b_{ik} \quad (i=1,2,\ldots\ldots,f;\ k=1,2,\ldots\ldots,g) \quad \cdots\cdots\cdots\cdots\cdots\cdots (2)$$

$$\sum_{k=1}^{p} Z_{ikg} - d_{ig} \quad (i=1,2\ldots\ldots,f;\ g=1,2,\ldots\ldots,g) \quad \cdots\cdots\cdots\cdots\cdots\cdots (3)$$

$$Z_{jk},\ Y_{ink},\ Z_{ikg} = 0 \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (4)$$

where,

i: restictive resource and/or condition (i=1,2, ...,f)

j: production and/or transportation process (j=11,2,....,n)

k: prodicong region (k=1,2,.....,p)

g: consuming market (g=1,2,.....,q)

C_{jk}: unit (variable) cost of j-th producing process in K-th region

$S_{ihk}(h=k)$: unit procurement cost of i-th resource from h-th to k-th regions

e_{ig}: price of i-th resource at g-th consuming market

t_{ikg}: unit cost od transportation of i-th resource from k-th producing region to g-th consuming market

a_{ikg}: technical coefficient of j-th producting process in the k-th region with regard to i-th resource, i.e. the amount of i-th resource input for one unit production of j-th process

b_{ik}: the restrictive amount of i-th resource in the k-th region

d_{ig}: the amount of demand for i-th resource at g-th consuming market

X_{jk}: level of production of j-th product in k-th region (unknown)

$Y_{ihk}(h=k)$: the amount of i-th resource procured from h-th to k-th region (unknown)

Z_{ikg}: the amount of i-th resource supplied from k-th producing region to g-th consuming market (unknown)

V. Structure of model - without resource transaction between regions

To simplify model, let us suppose that there are three producing regions and also three consuming markets for a specific farm commodity. Furthermore, there are m alternative farm products (or activities) in each region. Farm pro ucts produced in one region do not necessary the same with these produced in other re ions except for one product i.e. m-th farm product. Let us designate the 1-st product in the 1-st region as $P_1^{(1)}$, the 2-nd product as $P_2^{(1)}$ and m-th product as $P_m^{(1)}$, respectively. In this case, the figure shown in each parenthesis means the number of region, and subscript expresses the number of farm product. In each region, the m-th activity is to be the specific product

in question.

Now, rectangle ACJI in Figure 1 illustrates the production phase in respective region. The part with slash mark is simplex tableau in the terminology of linear programming met od. For example, in the 1-st region, there are m farm products of which levels of production are constrained by f restrictive resource shown as $R_1^{(1)}$, $R_2^{(1)}$, ..., $R^{(1)}$ in Figure 1. By the wya, the reason why these parts are arranged diagonally is based on the fact that mobility of production resources and substitutability of farm product between regions, i.e. $R_1^{(1)}$ and $R_1^{(2)}$, $P_1^{(1)}$ and $P_2^{(1)}$, etc. are not admitted. A case in point is land resource. Furthermore, the production in each re ion is done independently with each other.

Next, let us proceed to transportation phase. Suppose that there are n competitive processes concerning shipment of m-th farm product (P_m) in each region. In this case, the 1-st transportation process in the 1-st region is designated as $T_1^{(1)}$, the 2-nd transportation process as $T_2^{(1)}$ and the n-th $Tn^{(1)}$, and so on. Like production process, the figure with parenthesis shows the number of each region, the subscript means the number of shipment activity in this region. The competitiveness of shipping processes means, for example, the delivery of m-th product in different months and to different markets. Should the time and/or destination is different, the shipping activity of the same farm product is dealt seperately. These processes are shown in rectangle CDHG in figure 1.

A specifif farm product (or m-th product) produced in marketed. This transfer between production and transportation processes is done in the part IKHL. Let us designate the amount of m-th farm product produced in the 1-st region for one unit of production as $s_m^{(1)}$, and the level of production of this product as $X^{(1)}$. All the technical coefficients of transportation processes are unity based on ordinary Hitchcock-Koopmans model. Since the production processes imply supply and transportation processes show demand, respectively, the signs of the technical coefficients are negative for m-th production process ($s_m(1)$ and that of transportation processes - as mentioned above all of these coefficients are unity - are positive. The balance relation between amounts of supply and demand are expressed by the following formula;

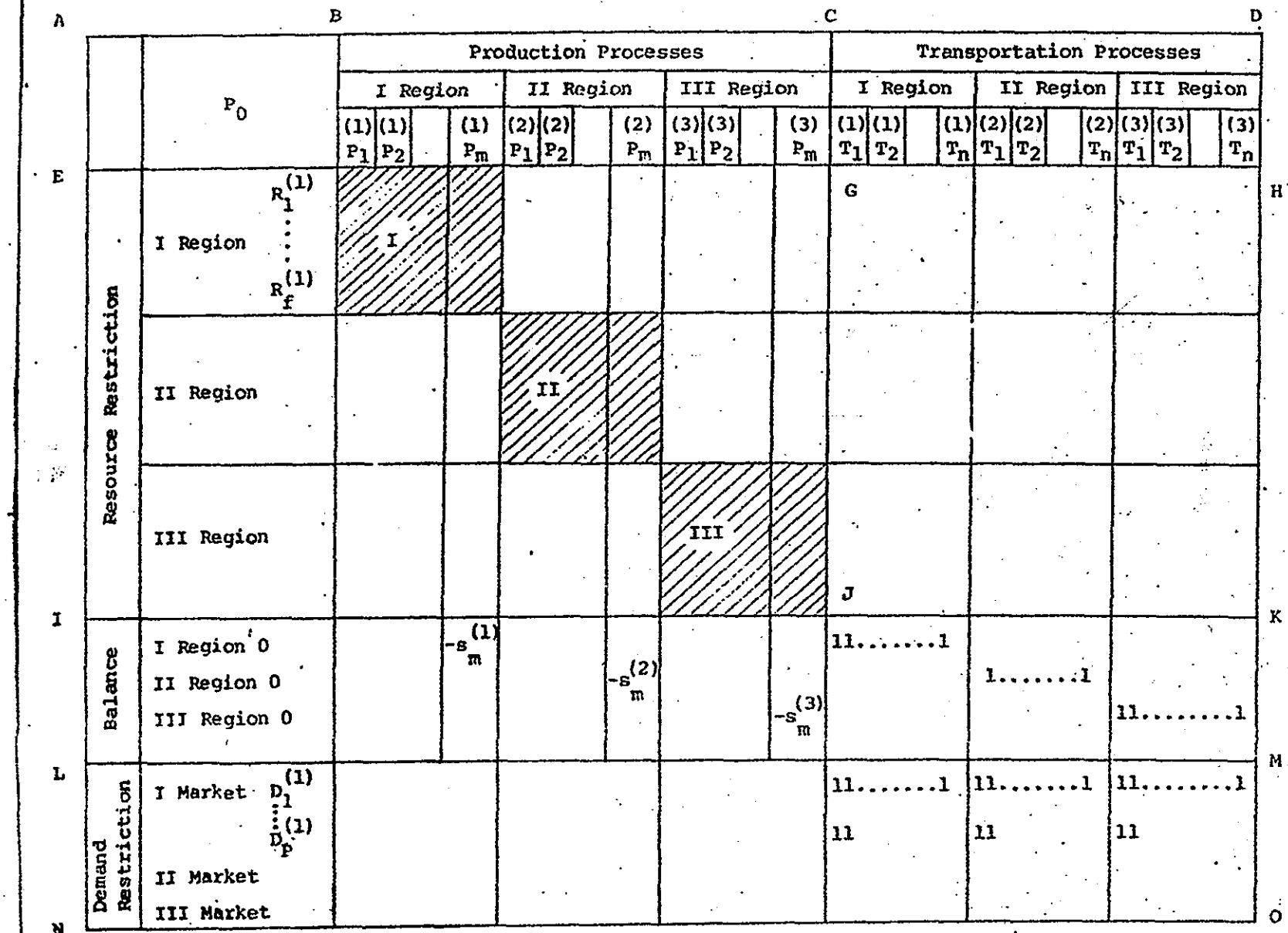


FIGURE 1 STRUCTURE OF SPATIAL EQUILIBRIUM MODEL

$$s_m^{(1)} x_m^{(1)} - (1Y_1^{(1)} + 1Y_2^{(1)} + \cdots + 1Y_n^{(n)}) \quad \cdots\cdots\cdots\cdots (5)$$

$$\therefore -s_m^{(1)} X_m^{(1)} + 1Y_1^{(1)} + 1Y_2^{(1)} + \cdots + 1Y_n^{(n)} - 0 \quad \cdots\cdots\cdots\cdots (6)$$

where $Y_1^{(1)}$ is the transporting level of the 1-st transportation process in the 1-st region, $Y_2^{(1)}$ is that of the 2-nd process in the 1-st region. The transfer from prpduction to transportation processes is done independentely in each region. Accordingly, the technical coefficients of transportation (i.e. unity) are arranged diagonally between regions. On the other hand, because the transportation processes within a region are competitive with each other, all of these technical coefficients are arranged in a row. If there is a condition that the level of certain transportation process cannot exceed over a certain amount due the technical and/or economical reason(s), we can consider situation in our model. Similary, the condition of minimum requirement level of certain transportation process can be taken into account.

Next, let us explain about demand restriction at consuming market. This is illustrated by rectangle LMON in Figure. As mentioned earlier, the m-th farm product produced in three producing regions are supplied to three consuming markets. This means that the independency of production and of transfer between production and transportation within respective region changes now into competitiveness between regions. In each market, the amount of total demand must be equal with, less or greater than certain level due to technocal and/or economical reasons(s). We can consider these conditions into our model, by adding restrictive equation(s), upper and/or lower limitation(s) in accordance with circumstance.

Finally, let us explain about profit coefficient of each process. The coefficient can be derived by subtracting variable cost from gross revenue like in the case of ordiandry linear programming method. These coefficient are attached to all production processes except for m-th process in each region. The variable cost required for one unit of production is exclusively assigned to m-th producing process. As to transportation process, the profit derived by subtracting shipment cost from wholesale price and by multiplying it with unit amount of transportation (say, per ton) is used coefficient. This means that m-th producing process requires only variable cost at its production phase then realizes

its value at merketing phase. Accordingly, the sign of profit coefficient of it is negative at formar and positive at latter phases, respectivoly. In so doing, spatial equilibrium between multi-prodicing and consuming regions can be quantitatively analysed by the above model. The model is primarily based on inter-regional linear programming method.

VI. Procedure and basic data required for analysis

The principal procedure used in the spatial equilibrium analysis is as follows:

(1) Division of nation into several regions
(2) Selection of representative farm products in each region
(3) Collection of such data as technical and profit coefficient more specifically the amount of resource input for one unit of production of producing process, gross revenue (= price x amount of yirld), and variable cost
(4) Estimation of restrictive amount of resource input in each region
(5) Selection of transportation process(s)in each region
(6) Collection of such data as transportation cost, wholsale price at each consuming market.
(7) Building model
(8) Computation of the initial solution
(9) Parametric programming or simulation of model (sensitivity ahalysis)
(10) Obtain the optimum solution

VII Example of empirical study

In 197-, based on the model mentioned above, the Ministry of Agriculture andDorestry of Japan worked out an optimum plan for regional agricultural production to cope with surplus peoduction of rice case, the country was divided into 14 regions according to its geographic conditions. The summary result is illustrated in Figures 2 to 11.

FIGURE 2 GENERAL FEATURES OF AGRICULTURAL PRODUCTION IN EACH REGION

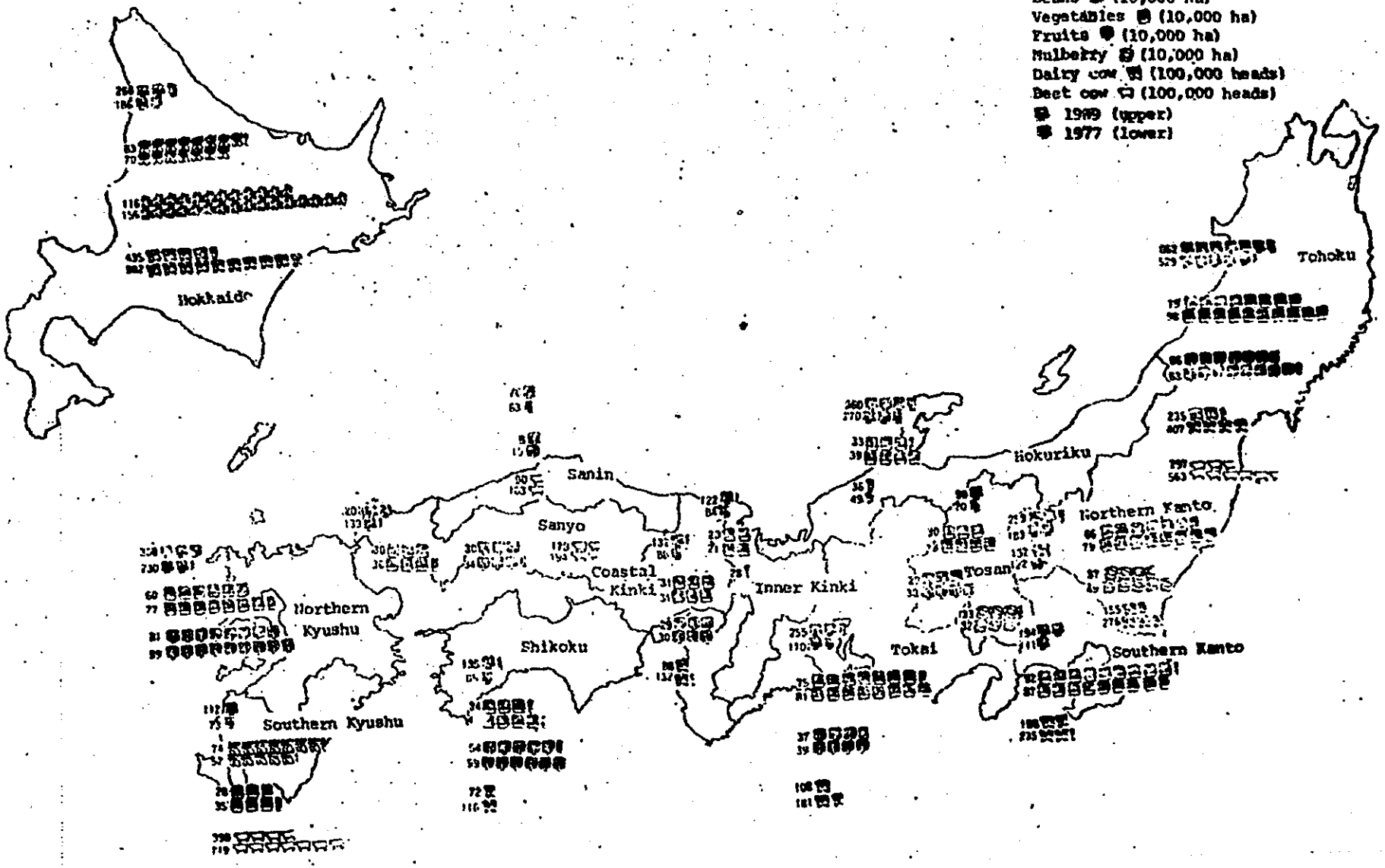


FIGURE 3 RICE

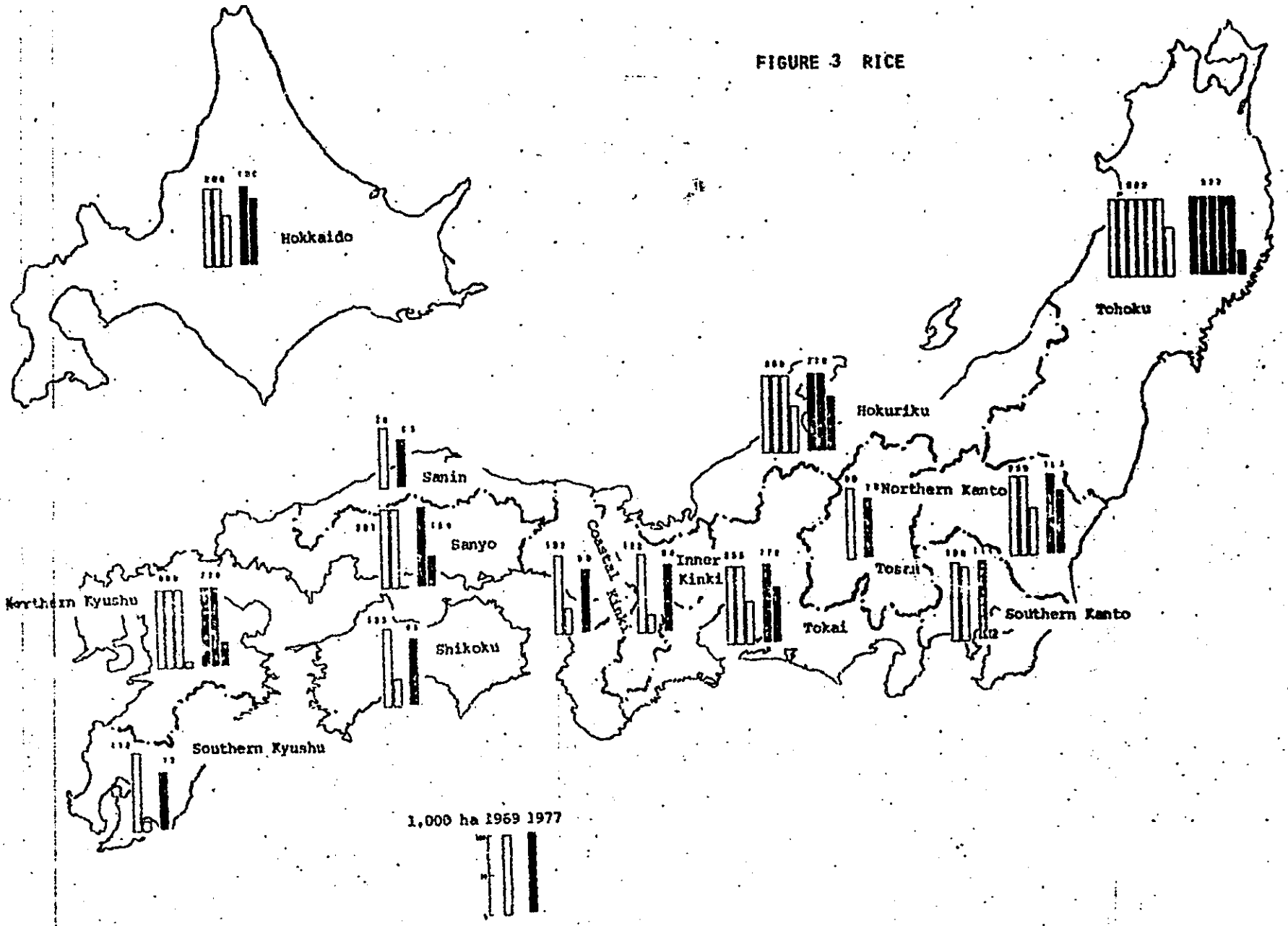


FIGURE 4 WHEAT & BARLEY

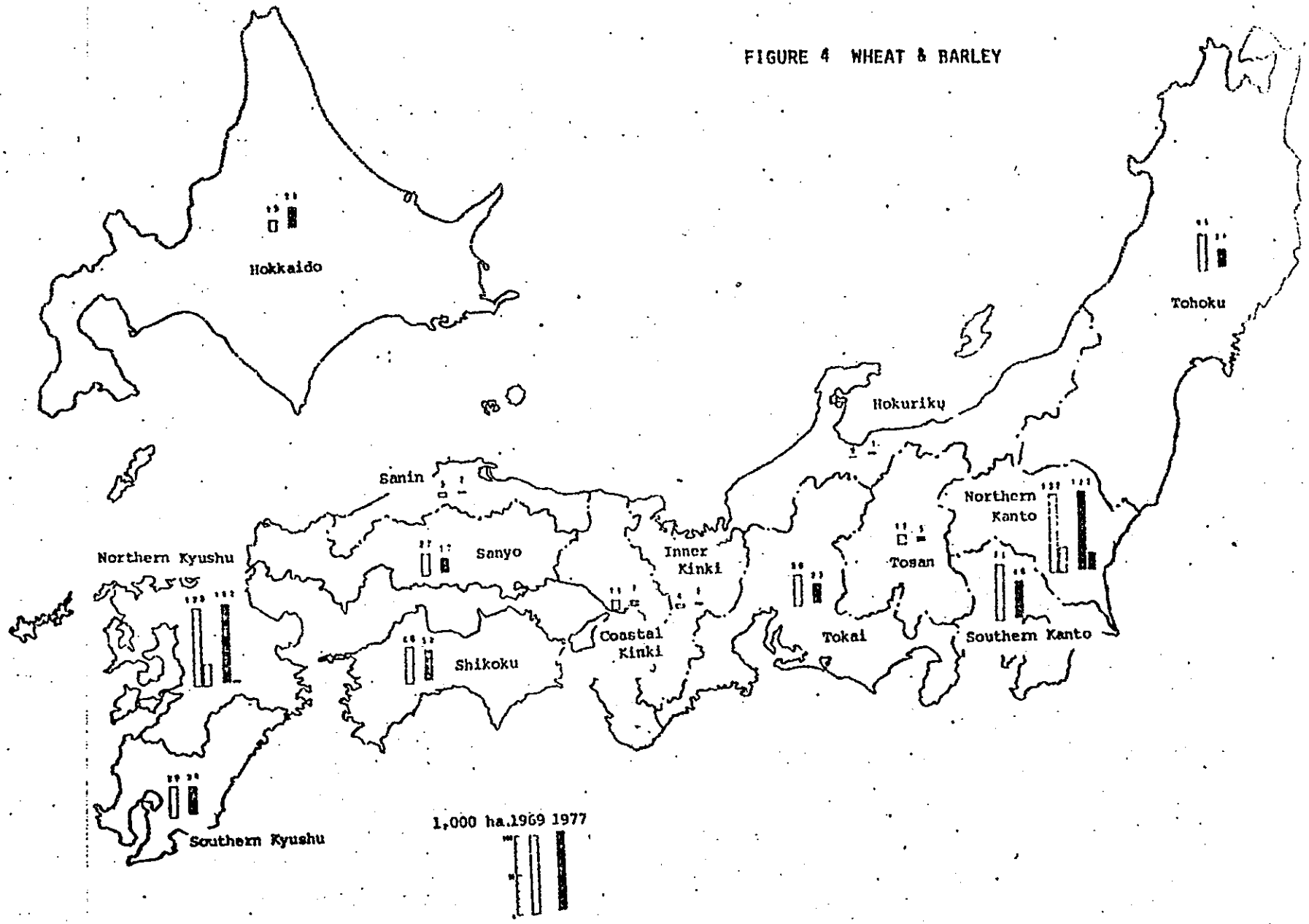


FIGURE 5 POTATOES

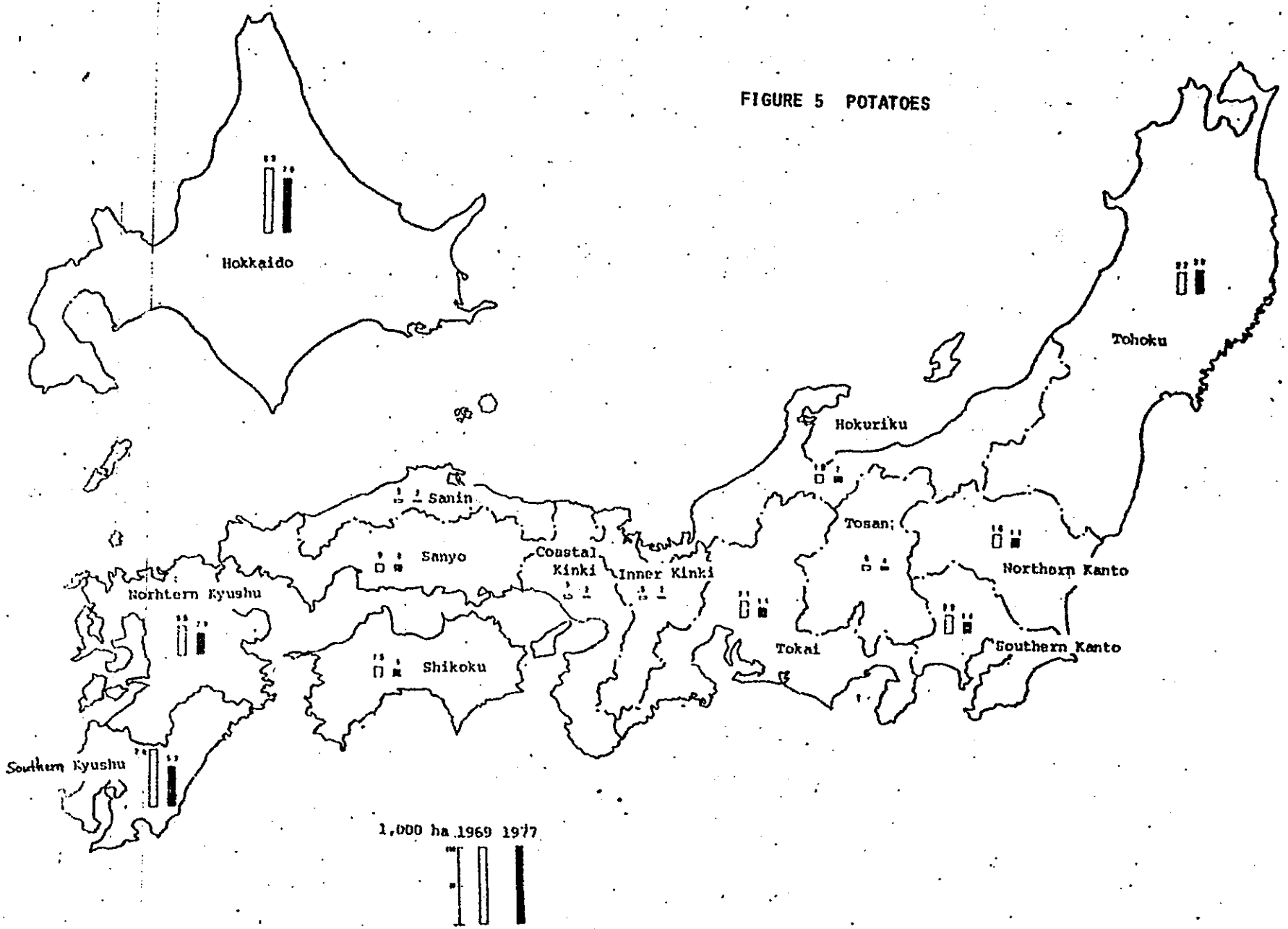


FIGURE 6 BEANS

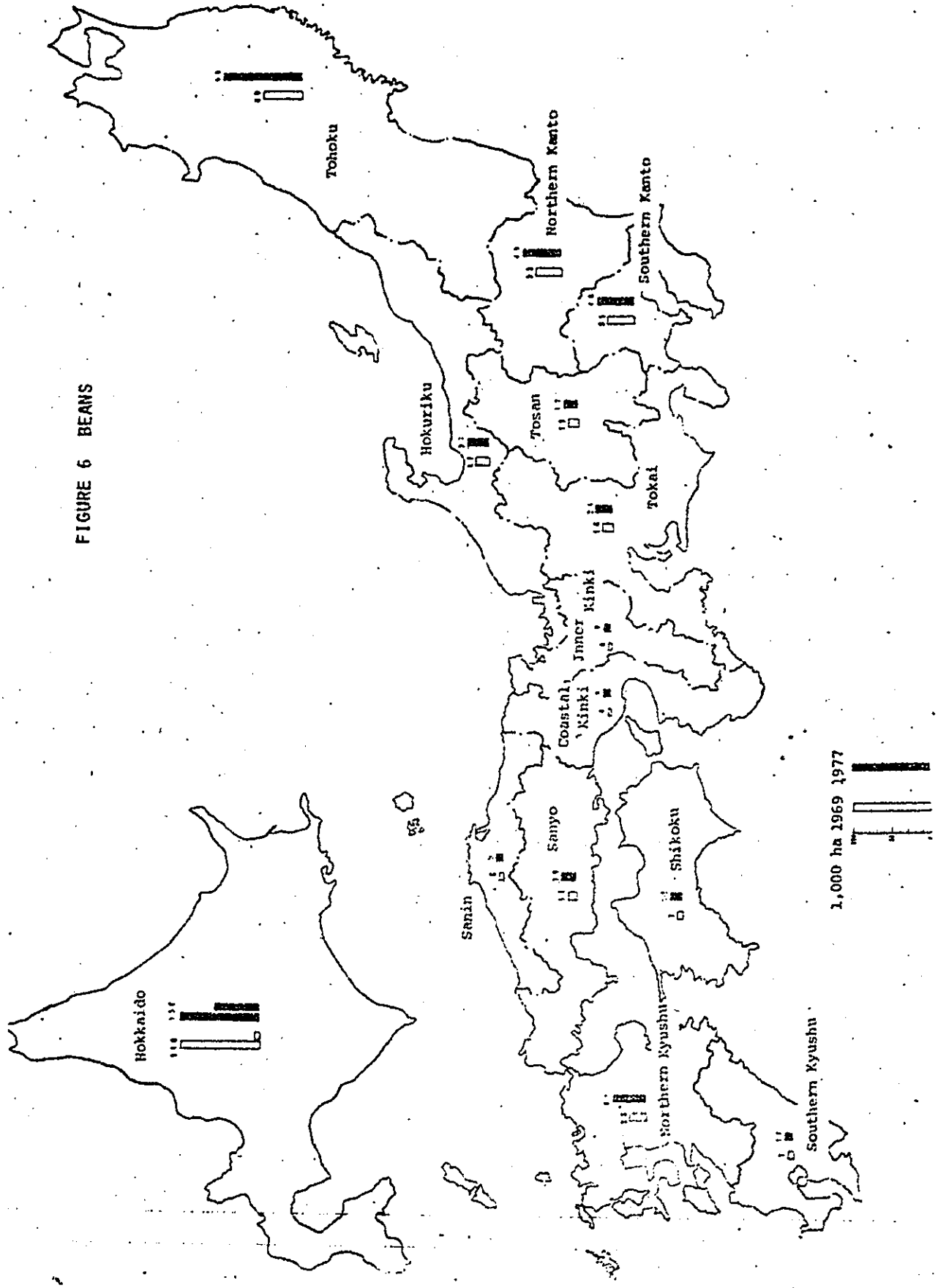


FIGURE 7 VEGETABLES

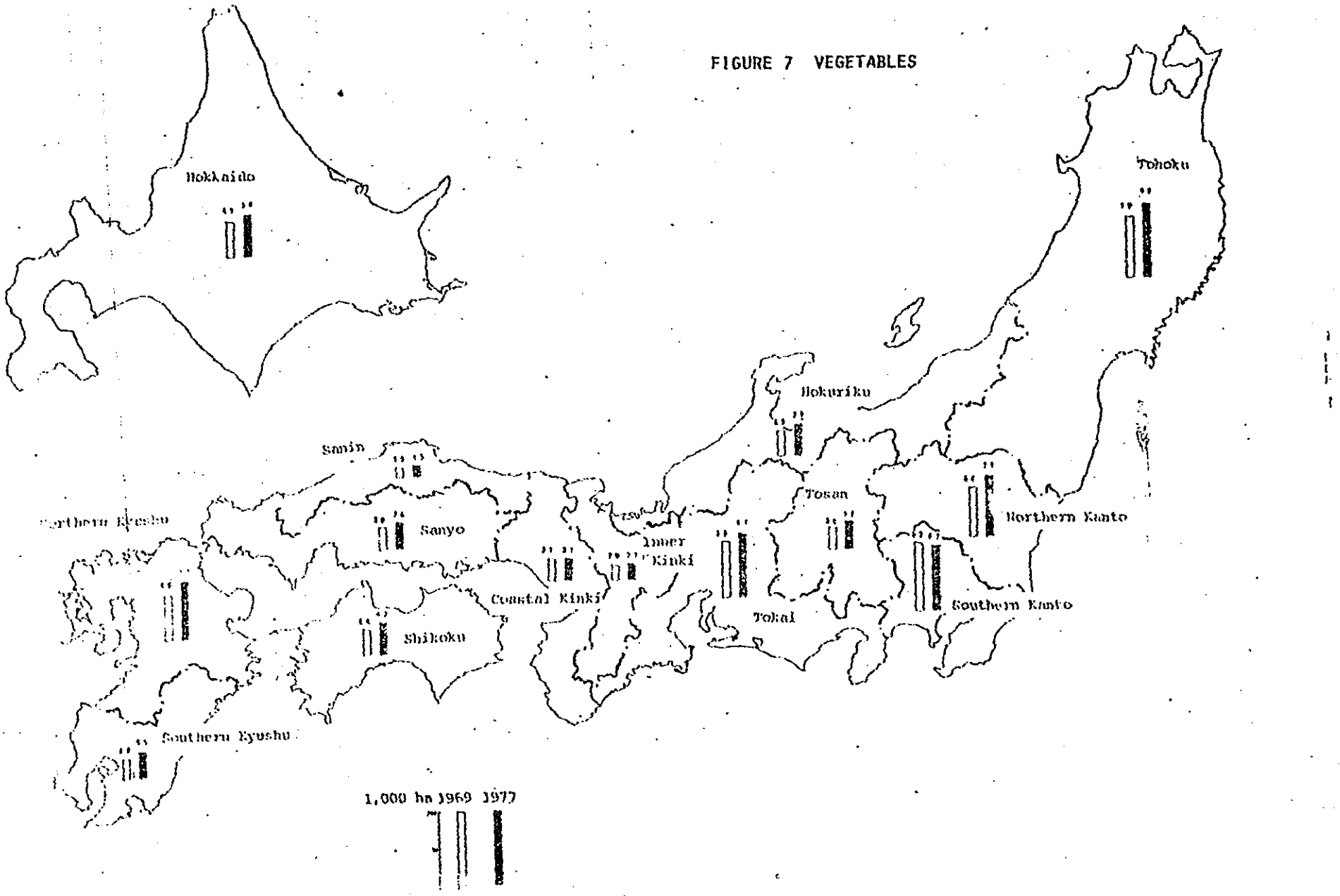


FIGURE 8 FRUITS

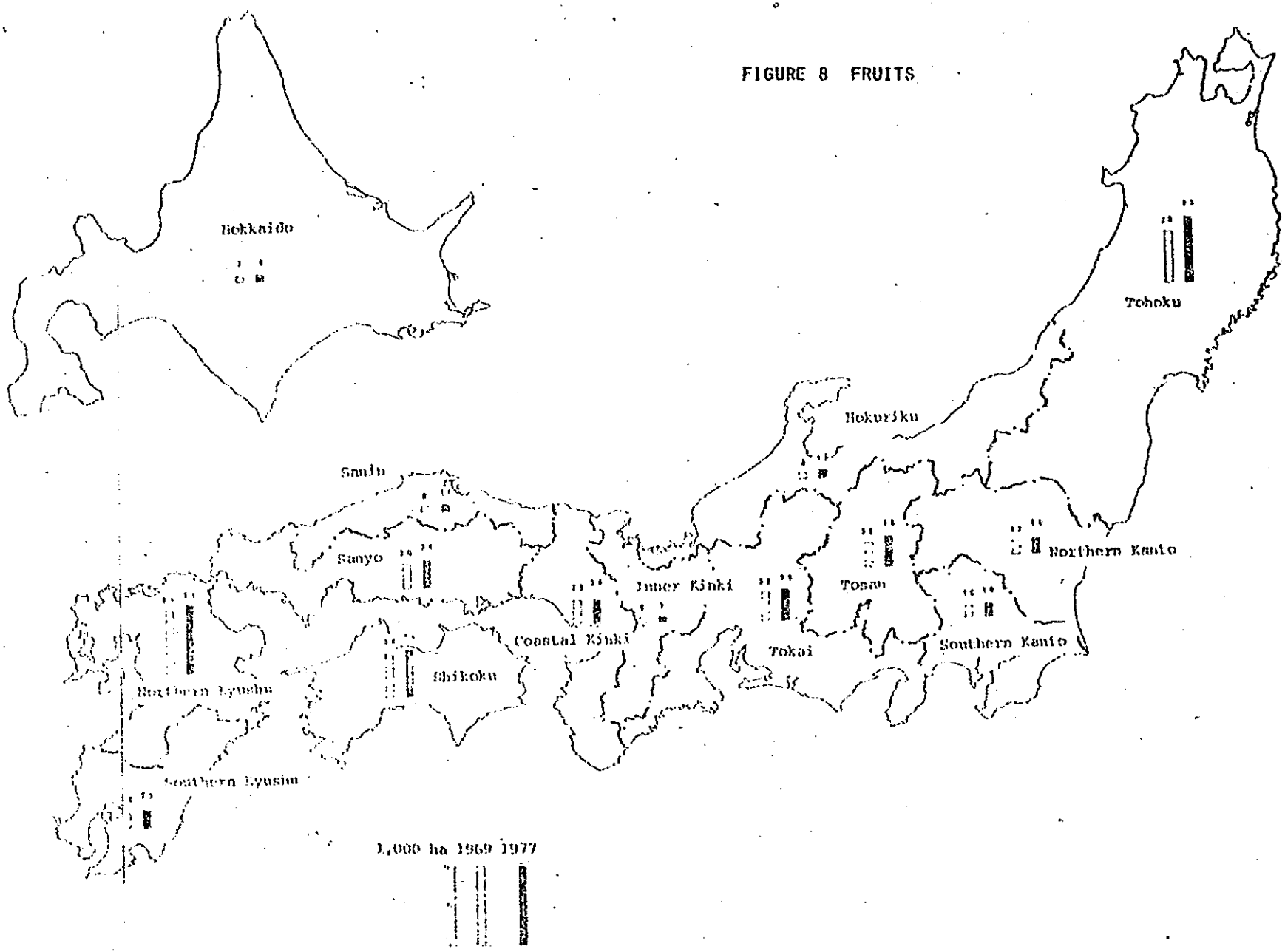


FIGURE 9 MULBERRY

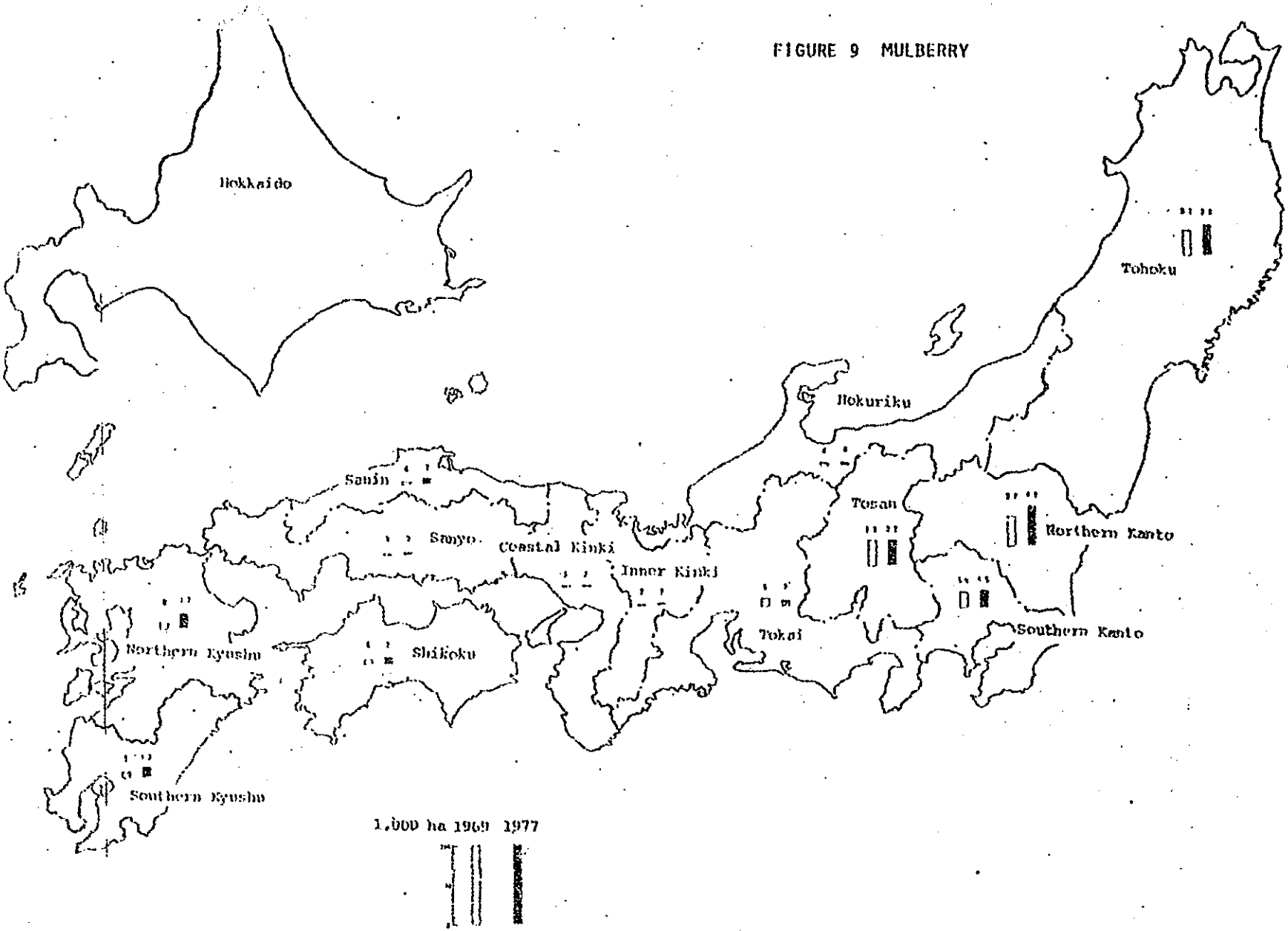


FIGURE 10 DAIRY COW

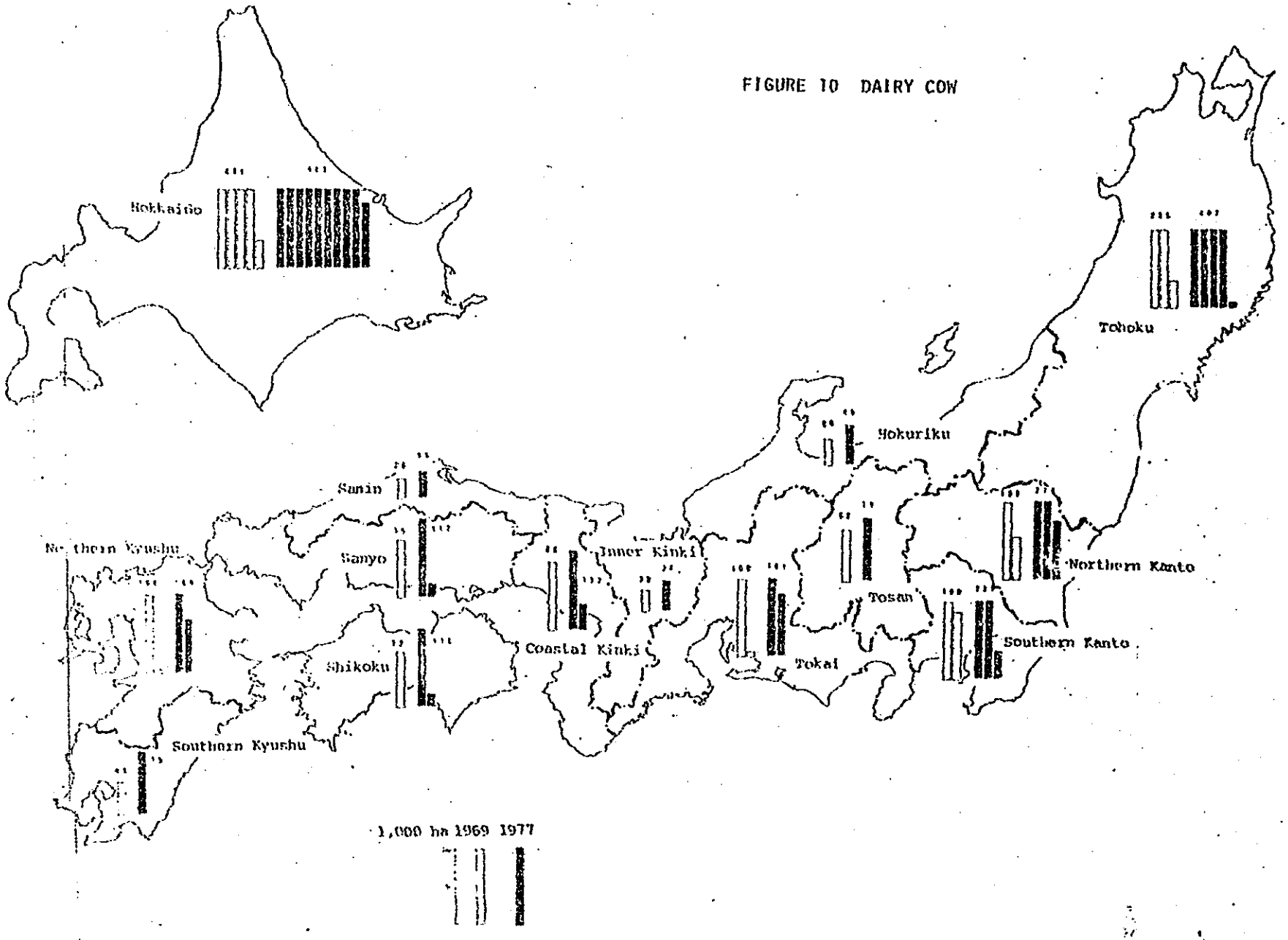
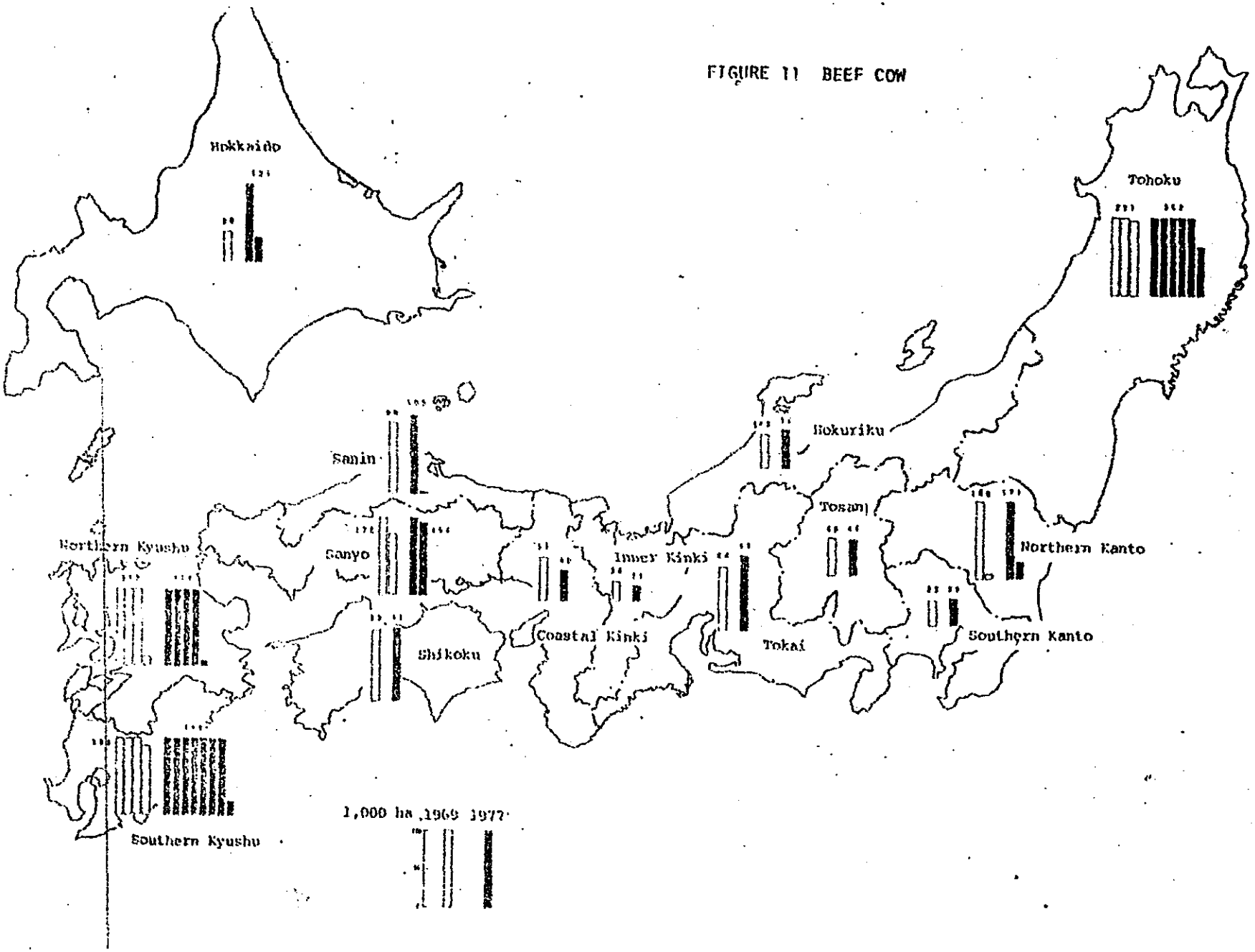


FIGURE 11 BEEF COW



VOLUME IV

The Final Report on Phase I,

The Project on RADP/ATA-140.

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Publishing: The Team of the Project.

February 1979; Ujung Pandang.

E R R A T A (Volume IV)

Page	Line*	Error	Correction
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57	W.S. 21-4.	divestock	livestock
64	W.S. 23-6.	relation ship	relationship
66	W.S. 24-1.	conciousness	consciousness
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67	W.S. 24-4.	conciousness	consciousness
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Note: *) + = from the top and - = from the bottom.

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