

**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 I**

**A MASTER PLAN ON SOUTH SULAWESI
REGIONAL AGRICULTURAL DEVELOPMENT**

February - 1979

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

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国際協力事業団	
受入 月日 '84. 3. 27	108
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P R E F A C E

The activities of the Team, Japanese Experts and Indonesian Counterparts, as a technical cooperation on regional agricultural development planning between the Government of Japan and the Government of the Republic of Indonesia, have been started on arrival of Japanese Advisor and Experts at Jakarta on December 25, 1976, based on the "Record of Discussion" (R/D) which was concluded on May 04, 1976.

The objective of this Project, with a view of contributing to promotion of regional agricultural development, is intended to make an over-all review of the plans for the development of agriculture in South Sulawesi Province, to give advisory guidances thereon, to possibly improve methods and techniques of planning for the regional agricultural development and thereby to improve the planning abilities of the officials in charge.

According to the "Plan of Operation of the Project", during a period of 26 months for the first phase (in original plan, the first phase is a period of 18 months) the Team carried out data collection, several kinds of surveys in the fields, data processing, researches and analyses on the aspects of covering all agricultural activities in South Sulawesi Province, with a good cooperation and consultation with Japanese short-term Experts and Indonesian officials concerned. After those activities the Team has worked out this final report on the first phase, as the result of activities of the Team during the first phase.

This final report consists of the following five (5) volumes and one (1) volume of summary in Bahasa Indonesia:

- Volume I: A Master Plan on South Sulawesi Regional Agricultural Development,
- Volume II: The Present Situation and Problems of Agriculture in South Sulawesi Province,
- Volume III: Data of the Agriculture in South Sulawesi Province,
- Volume IV: A Guidance for the Planning on Regional Agricultural Development,
- Volume V: Basic Maps for Planning on Regional Agricultural Development in South Sulawesi Province, and
- (1 Volume): Laporan Final Tahap Pertama - Ringkasan dan Rekomendasi dari jilid I,II dan IV.

The contents of this report is the result of activities of the Team, which is submitted as material of the formulation of regional agricultural development plan in South Sulawesi, for the purpose of the transfer of techniques. As repeatedly described above, this master plan formulated by the Team is not an administratively practical plan such as the Repelita, but it is aiming at the transfer of techniques for upgrading of the Counterparts' ability.

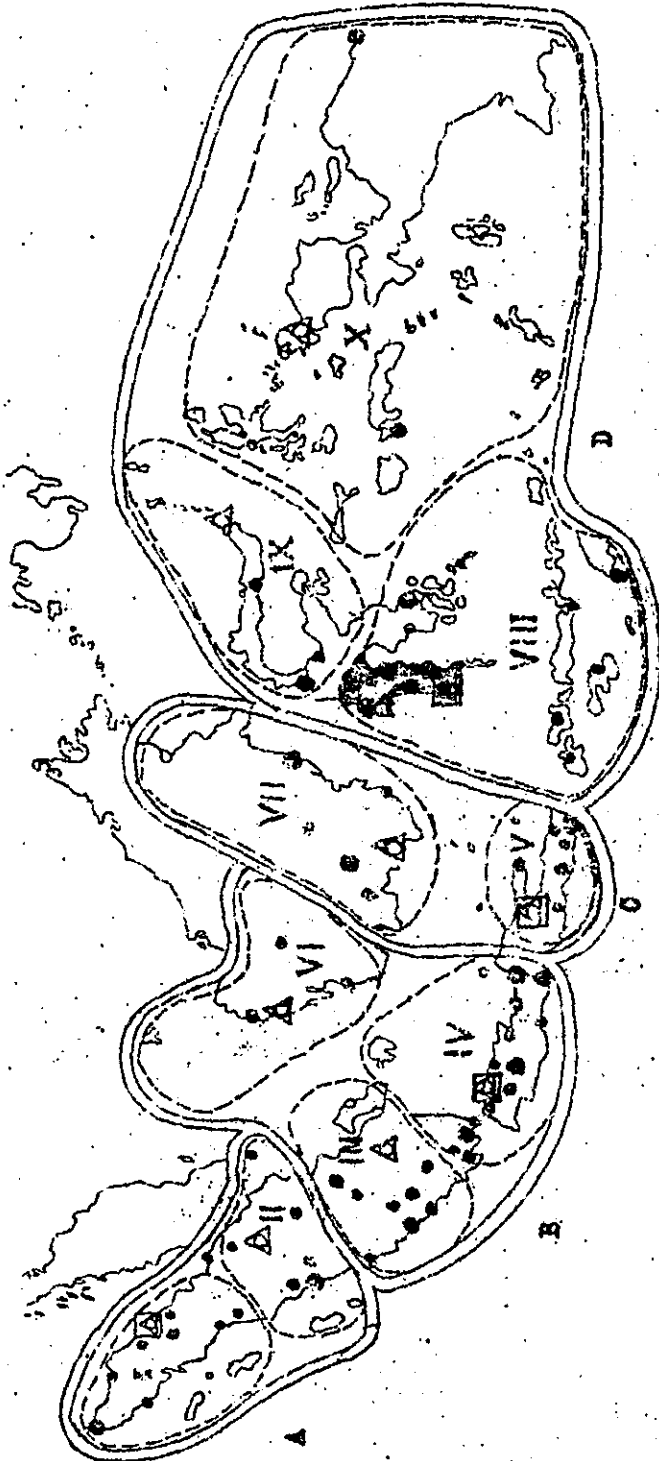
Consequently the Team requests to all concerned, don't miss the main stream of the way of approach and don't stick to the minor fringe matters. Otherwise one will lose the destination of the integration of various aspects in the planning on regional agricultural development. Each methodology such as dietetics, demography statistics and so forth should be developed accurately in each monograph by each department or faculty. How to integrate those specific items horizontally, based on the characteristics of the region and available data, is the main stream of the methodology of the regional agricultural development planning.

It is the Team's sincere hope that this final report will prove helpful not only to the development of agriculture in South Sulawesi Province, but also to the development of the technical cooperation by JICA in this Province in the future.

Finally, the Team wishes to take this opportunity to express the Team's gratitude to the officials of the Governments of Japan and the Republic of Indonesia for their whole-hearted cooperation and supports extended to the Team in the execution of the activities of the Team in the first phase.

Ujung Pandang; February 28, 1979.

Map 1: Four (4) ZONES & 10 Sub-Zones for Development in Indonesia

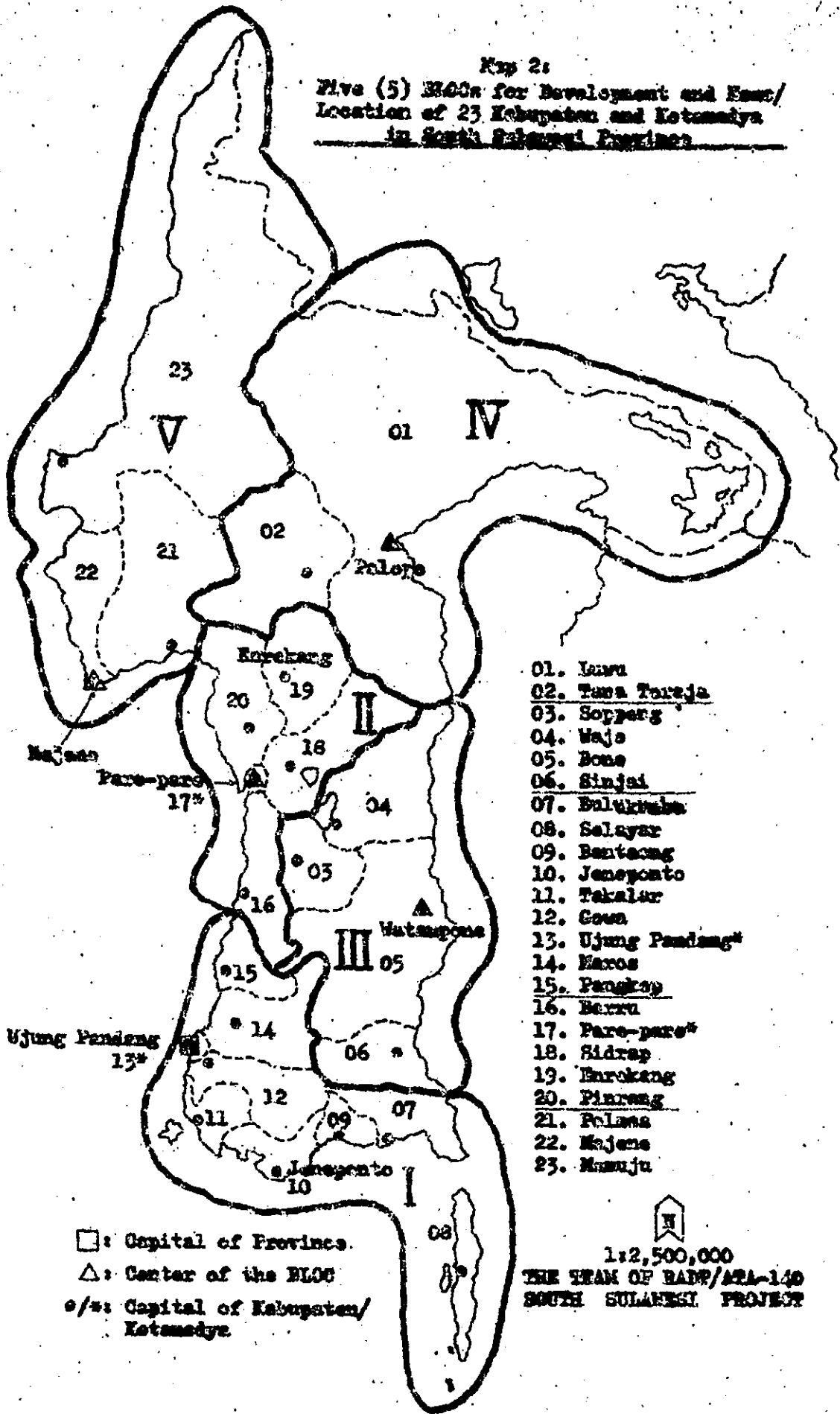


- WILAYAH PEMBANGUNAN UTAMA (A, B, C, D)
- WILAYAH PEMBANGUNAN (I - X)
- FUSAT UTAMA WILAYAH PEMBANGUNAN UTAMA
- ▲ FUSAT WILAYAH PEMBANGUNAN
- SUB FUSAT WILAYAH PEMBANGUNAN
- SUB-SUB FUSAT WILAYAH PEMBANGUNAN

(No Scale)
 THE TEAM OF RANP/ATA-140
 SOUTH SULAWESI PROJECT

A	I D.I. Aceh II North West Sumatera Riau Jambi South Sumatera III Bengkulu Lampung D.K.I. Jakarta	C	V East Jawa Bali VII Central Kalimantan South Kalimantan East Kalimantan
B	IV West Jawa Central Jawa D.K.I. Yogyakarta VI West Kalimantan	D	VIII West Nusa Tenggara East Nusa Tenggara South Sulawesi South East Sulawesi IX North Sulawesi Central Sulawesi Maluku X Irian Jaya

Kup 2:
 Five (5) BLOCs for Development and Econ/
 Location of 23 Kabupaten and Kotamadya
 in South Sulawesi Province



- 01. Luwa
- 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. Macos
- 15. Pangkajene
- 16. Barru
- 17. Pare-pare*
- 18. Sidrap
- 19. Barrakang
- 20. Pinrang
- 21. Polawa
- 22. Majene
- 23. Mamuju

□: Capital of Province.
 △: Center of the BLOC
 ○/•: Capital of Kabupaten/
 Kotamadya

1:2,500,000
 THE TEAM OF RAMP/ATA-140
 SOUTH SULAWESI PROJECT

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Note: Glossary or List of Abbreviations refer to the glossary
in Volume III.

P E R H A T I A N

RENCANA PEMBANGUNAN PERTANIAN TERPADU ini bukanlah rencana praktis untuk Pemerintah, melainkan MODEL RENCANA sebagai hasil kegiatan Team Proyek ini. Meskipun rencana ini merupakan rencana model, namun Team Proyek ini berharap dengan sungguh-sungguh kiranya Rencana Model ini dimanfaatkan sebaik-baiknya oleh para perencana untuk merumuskan suatu rencana. Tentu saja ada orang yang berbeda pendapat dengan Team ini, tetapi itulah yang penting bagi maksud Proyek ini. Apabila semua orang berpendapat sama, tidak adalah "PERKEMBANGAN" kehidupan dan penghidupan KITA semua. Perbedaan itulah yang merupakan unsur yang dapat mendorong perkembangan. Dan kegiatan "perencanaan" dapat dianggap sebagai suatu kegiatan "mental". Menurut hemat kami, perbedaan tersebut diatas dapat diatasi melalui diskusi atau perundingan, semua masalah barulah dapat menuju kearah perkembangannya. Pada kesempatan ini, Team Proyek ini ingin mempersembahkan dengan hormat satu pepatah kepada yang bersangkutan dengan Proyek ini yang bertanggung-jawab pada seluruh Rakyat Sulawesi Selatan khususnya:

DUNIA PENISI IALAH LAUTAN,
DUNIA PERENCANAAN IALAH PIKIRAN.¹⁾

Demikianlah dengan hormat Team Proyek ini maklumkan dan ucapkan Terima Kasih Banyak!

Hormat Kami

Team Proyek RADP/ATA-140
Sulawesi Selatan di U. Pundang

1) This means "Ship's field is the ocean, PLANNING's field is the THINKING".

A MASTER PLAN ON SOUTH SULAWESI
REGIONAL AGRICULTURAL DEVELOPMENT

I

I N T R O D U C T I O N

1.1. Background of the Project

1001. The request of the Government of the Republic of Indonesia for a technical cooperation on the Regional Agricultural Development Planning Project in South Sulawesi Province was formally proposed to the Government of Japan in April 1975.

1002. In advance of this request, there had been several opportunities of discussion and negotiation between both Governments since 1973, when the technical guidance mission was dispatched by JICA for the Tani Makmur Project in West Java, which had been implemented by that time.

1003. In response to the aforementioned request, a preliminary survey team headed by Mr. Heijiro YOSHIHARA, Director General of JICA, was dispatched in November 1975 to clarify the terms of reference (T/R) of the Project with a short period of field survey in South Sulawesi Province.

1004. Again a team headed by Mr. Heijiro Yoshihara was dispatched in late April 1976, and finally the "Record of Discussion" (R/D) was signed between Dr. A.T. BIROWO, Director of the Bureau of Planning, Ministry of Agriculture, and Mr. Heijiro Yoshihara, on May 04, 1976.

1005. Based on the master plan attached to the R/D mentioned above, the preparation for project implementation proceeded in both the Government. After the agreement was reached concerning the personnel aspects by the Government of the Republic of Indonesia, the Team of Japanese Experts was dispatched on December 25, 1976 to Jakarta, and cooperation activities were commenced after the arrival of the Experts' Team at Ujung Pandang on January 03, 1977.

1.2. Purpose of the Project

1006. The objective of the Project is determined by the R/D as follows: This Project, with a view of contributing to the promotion of regional agriculture, is intended to make an over-all view of the plans for the development of agriculture in South Sulawesi Province, to give advisory guidance thereon, to possibly improve methods and techniques of planning for the development of regional agriculture and thereby to improve the planning ability of the Indonesian officials in charge.

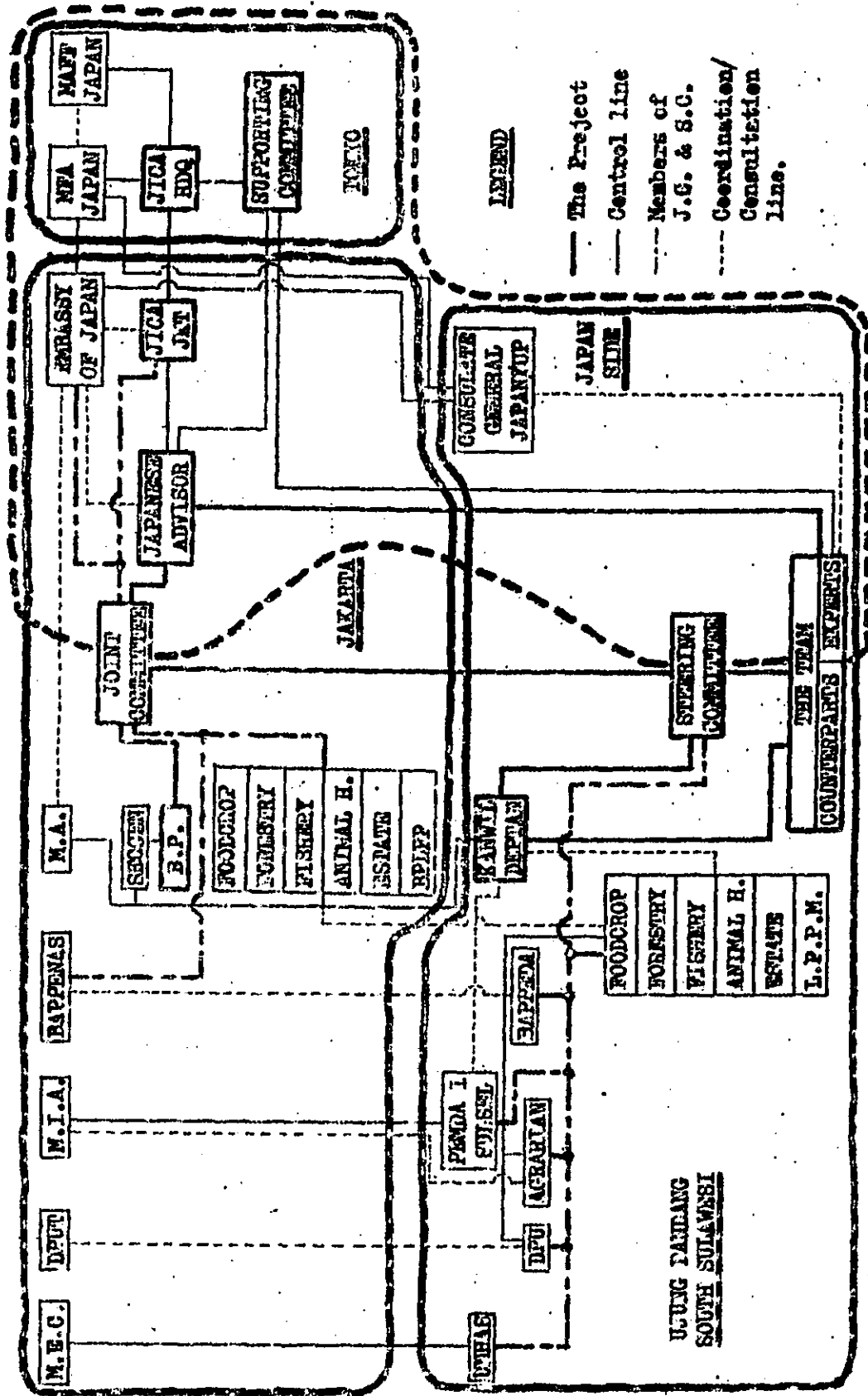
1007. It is quite clear that the four points of operation as described in the R/D have to be succeeded within the period of 30 months of the Project's operation, mainly on the objectives of:

- (1) Survey and analysis concerning agriculture in South Sulawesi Province;
- (2) Review of the Repelita II formulated by the BAPPEDA and other existing projects and recommendations thereon;
- (3) Drawing up of sector plans in conformity with the plan mentioned in (2);
- (4) Drawing up of the implementation plans including project preparations and feasibility study for agricultural development projects in certain agencies in conformity with the mentioned plans.

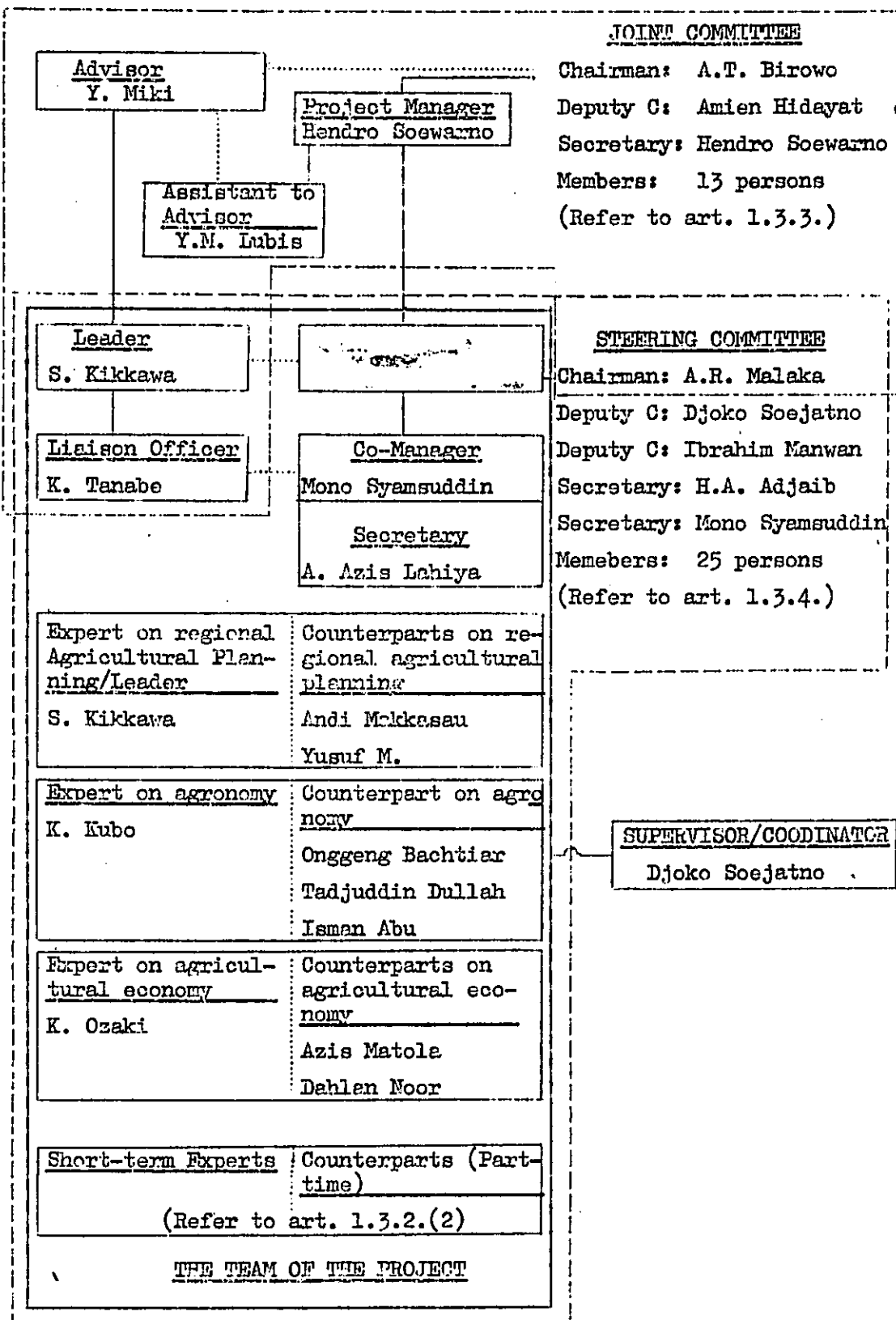
1008. Another main objective of the Project is the transfer of techniques on planning to the Indonesian officials concerned by trainings, consisting of:

- (1) On-the-job training (in the office/field);
- (2) Classroom training (by long and short-term Experts);
- (3) Study/observation trips in Japan.

1.3. Organization of the Project



1.3.1. The Project Team's Structure of Organization



1.3.2. Member of the Team for the Project

(1) Member of the Team

A. Azis Iahiya	Secretary of the Project.
Azis Mattola	Economist.
Isnan Abu	Agronomist.
Setsuzo Kikkawa	Leader of Experts' Team/Regional agricultural planner.
Kiyoaki Kubo	Agronomist.
Mono Syamsuddin	Co-Manager of the Project.
Andi Makkasau	Regional planner.
Nazaruddin L.	Agricultural economist (until August 1972).
Dahlan Noor	Economist.
Onggeng Bachtier	Agronomist.
Kunihiro Ozaki	Agricultural economist.
Tadjuddin Dullah	Aquaculturist.
Koji Tanabe	Liaison Officer of Experts' Team.
Yusuf Maruzuku	Agronomist.
Luky Yasin Ralchman	Translator.
Muh. Said	Assistant.
Syehrullah N.	-ditto-
Fien Latuihamallo	Typist.
Seniwati	Typist.
Siti Aisyah	Typist.
Amiruddin	Driver of the Project.
Ahmad	-ditto-
Daude	-ditto-
Johnny Lawalata	-ditto-
Jukkas	-ditto-
Dg. Rala	-ditto-
Sangkala	-ditto-
Sangkala M.	-ditto-
Rahim	Office boy.
Hafid	-ditto-

(2) Short-term Experts & Counterparts for Phase I

A. Short-term Experts & Counterparts

(Name)	(Field)	(Duration)
1) Iwao Nishiyama	Marketing/Processing	1977.10-12/2.0
2) Ryuichi Tatsumi	Water resources	1977.10.12/2.0
3) Zainuddin Dahlan	-ditto-	
4) Yoshihiko Ogawa	Regional agricultural planning	1977.12/1.0
5) Takeichiro Kafuku	Fishery resources	1977.12-1978.01/2.0
6) Masaaki Funada	Soil & Vegetation	1977.12-1978.01/1.5
7) Hiroyuki Nishimura	Socio-economic condition & Farmers' needs	1977.12-1978.02/2.0
8) Siregar	Agrarian/Mapping	
9) Hiroshi Murai	Forestation	1978.01-02/1.0
10) Keharuddin Salihi	-ditto-	
11) Kanae Morinishi	Organization for Agricultural development	1978.02-03/1.0
12) Mughtar Palental	-ditto-	
13) Nobuharu Sasano	Regional agricultural planning	1978.10-11/0.5
14) Tetsuro Miyazato	Water resources	1978.05-1979.03/11.0
15) Hiroshi Matsuo	Regional agricultural planning	1978.11/0.7
16) J. Sampe	Animal husbandry	
17) Fouziah	-ditto-	
18) Titien Mangga Barn	Forestation/Mapping	

B. Short-term Consultants

1) Terushi Egashira	Lecturer at Seminar I	1977.08/0.5
2) Shingo Itoh	Leader of Consultation Team from JICA	1977.06-07/0.5
3) Shozo Ogasawara	Member of the Team	1977.06-07/0.5
4) Mitsuhiko Ohta	-ditto-	1977.06-07/0.5
5) Koichi Baba	Leader of Technical Guidance Team/JICA	1978.02-03/0.5
6) Hiroyoshi Tanabe	Member of the Team	1978.02-03/0.5
7) Mitsuhiko Ohta	member of the Team	1978.02-03/0.5
8) Kazuo Muto	Lecturer at Seminar II	1978.04/0.4
9) Isao Suzuki	Leader of Technical Guidance Team/JICA	1978.07-08/0.4
10) Shigeoyoshi Nishiwaki	Member of the Team	1978.07-08/0.4
11) Katsuhiko Akiyama	-ditto-	1978.07-08/0.4

1.3.3. Composition of the Joint Committee

Chairman: 1. Director of the Bureau of Planning, Ministry of Agriculture (M.A.)/Dr. Ir. A.T. Birowo.

Deputy chairman:

2. Chief of the Project Evaluation and Analysis Division, M.A./Ir. Amien Hidayat.

Secretary: 3. Staff of the Bureau of Planning, M.A./Drs. Hendro Soewarno.

Members (1) Indonesian Members:

4. Director of Programming of Directorate General of Food Crops, M.A.

5. Director of Programming of Directorate General of Animal Husbandry, M.A.

6. Director of Programming of Directorate General of Forestry, M.A.

7. Director of Programming of Directorate General of Fishery, M.A.

8. Director of Programming of Directorate General of Estate Crops, M.A.

9. Chief of the Bureau of Agriculture and Irrigation of BAPPENAS.

10. Chief of the Bureau of Regional II of BAPPENAS.

11. Staff of the Bureau of Agricultural Education, Training and Counselling, M.A.

12. Chief of the BAPPENAS of South Sulawesi Province.

Members (2) Japanese Members:

13. Advisor.

14. Team Leader.

15. Liaison Officer.

16. Head of JICA Office in Jakarta.

(17) Experts designated by the Team Leader.

Note: The Embassy's staff and the persons nominated by the Embassy of Japan may attend the meeting of the Committee as observers.

Remark: This list is based on the Record of Discussions for the Project on RADP/ATA-140 of South Sulawesi.

1.3.4. Composition of the Steering Committee

(1) Original Composition (Jan. 7, 1977 - Aug. 02, 1978)

Chairman: 1. Chief of the BAPPEDA of South Sulawesi.
Deputy Chairman: 2. Chief of the South Sulawesi Regional Office
of Ministry of Agriculture(M.A.).
Secretary: 3. Staff of the South Sulawesi Regional Office of
M.A.

Members (1) Indonesian Members (Senior Counterparts).

4. Second Asistant of the Secretary of South Sulawesi Governor.
5. Chief of the Economy and Financial Devision, BAPPEDA of South Sulawesi.
6. Chief of the Agricultural Extension Service of South Sulawesi.
7. Chief of the Forestry Service of South Sulawesi.
8. Chief of the Estate Crops Service of South Sulawesi.
9. Chief of the Animal Husbandry Service of South Sulawesi.
10. Chief of the Fishery Service of South Sulawesi.
11. Chief of the Maros Agricultural Experiment Station.
12. Staff of the Agricultural Faculty of UNHAS.
13. Chief of the Irrigation Division, Public Works Service (DPU) of South Sulawesi.

Members (2) Indonesian members (Junior Counterparts)

- 14/15. Two Counterparts on Agricultural economy.
16. A Counterparts on Agronomy.
- 17/18. Two Counterparts on Regional agricultural planning.

Members (3) Japanese Members (Experts)

19. Team Leader/Expert on regional agricultural planning.
20. Expert on agronomy.
21. Expert on Agricultural economy.
22. Liaison officer.

Remark: This list is based on the Decision Paper of South Sulawesi Governor, No. 22a/I/1977, dated January 7, 1977.

(2) Present Composition (August 3, 1978 -).

- Chairman: 1. Chief of the BAPPEDA of South Sulawesi (S.S.)/
A.R. Malaka S.H.
- Deputy Chairman I: 2. Chief of the South Sulawesi Regional Office of
Ministry of Agriculture (M.A.)/Drs. Djoko Soejatno.
- Deputy Chairman II: 3. Chief of the Maros Agricultural Experiment
Station/Dr. Ibrahim Manwan M.Sc.
- Secretary I: 4. Secretary of the BAPPEDA OF S.S./H.A. Adjaib.
- Secretary II: 5. Chief of the Regional Data Section, South
Sulawesi Regional Office of M.A./
Mono Syamsuddin.

Members:

Representative of Agencies:

6. Asistant I of the Secretary of South Sulawesi
Governor/Drs. H. Umar Laknu.
7. Chief of the Bureau of Development, South
Sulawesi Governor's Office/Drs. A. Bakri Tandara-
mang.
8. Chief of the Economy and Financial Division,
BAPPEDA of S.S./Drs. Dahlan Maulana.
9. Chief of the Agricultural Extension Service of
S.S./Ir. Sjamsuddin Abbas.
10. Chief of the Forestry Service of S.S./
Ir. Hadimartono.
11. Chief of the Animal Husbandry Service of S.S./
Drh. J. Kadang.
12. Chief of the Estate Crops Service of S.S./
Ir. Syamsuar N.D.
13. Chief of the Fishery Service of S.S./
Ir. Mochtar Abdullah.
14. A staff of the Agricultural Faculty of UNHAS/
Dr. Ir. Muslimin Mustafa.
15. A staff of the Faculty of Social Science of
UNHAS/Drs. Ambar Tadang.
16. Chief of the Irrigation Division, Public
Works Service (DPU) of S.S./R. Suratman B.I.E.
17. Chief of the Directorate of Agraria/H.A. Sukur.

Team of Counterparts:

- 18/20. Three (3) Counterparts on Regional Agricultural
Planning/Ir. Nazaruddin L., A. Makkasau B.Sc.,
Ir. Jusuf Marzuku.
- 21/23. Three (3) Counterparts on Agronomy/Drs. Onggeng
Bachtiar, Tadjuddin Dullah, Ir. Isman Abu.
- 24/25. Two (2) Counterparts on Agricultural Economy/
Drs. Azis Mattola, Drs. Dahlan Noor.
26. Secretary of the Project/A. Azis Lahiya.

Team of Experts:

27. Team Leader/Expert on Regional Agricultural Planning/ Setsuzo Kikkawa.
28. Expert on Agronomy/Kiyosaki Kubo.
29. Expert on Agricultural Economy/Kunihiro Ozaki.
30. Liaison Officer/Koji Tanabe.

Remark: This composition has been recomposed on August 3, 1978, based on the Decision Paper of South Sulawesi Governor, No. 472/VIII/1978, dated August 03, 1978.

1.4. Implemented Working Schedule of the Team for Phase I

1009. The period of 30 months of the Project has been divided into two phases, based on the Plan of Operation¹⁾ which was authorized by the Joint Committee:

Phase I: Period of 18 months, from January 1977 to June 1978.

This phase is for the transfer of techniques on planning of the regional agricultural development of South Sulawesi Province; and

Phase II: Period of 12 months, from July 1978 to June 1979.

This phase is for the transfer of techniques on preparation of the implementable projects by pre-feasibility studies (pre-F/S) and feasibility studies (F/S) in the specific two Kabupaten-s, Parekang and Jenaponto, as the planning of the regional agricultural development of the two Kabupaten-s.

1010. The Team's activities were started on the arrival of the Experts' Team at Jakarta on December 25, 1976 and at Ujung Pongang on January 3, 1977, and carried out data collection, several kinds of surveys in the field, data processing, researches and analyses on the aspects of covering all agricultural activities in South Sulawesi Province with transfer of techniques for the planning, according to the plan of operation.

1011. At the end of June 1978, i.e. the end of the first phase in the original plan, in consideration of the results of the activities during 18 months for the first phase, the working schedule has been rearranged to emphasize and to make certain of the transfer of techniques on planning. As a result of the rearrangement of the schedule, the period of the first phase was prolonged by 8 months to a period of 26 months, and the first phase is expected to be completed by the end of February 1979.

1012. At the same time, the second phase has been commenced in parallel as scheduled on the original plan by the Team from the 19th month of the period in order to finish the whole schedule in time of 30 months (12 months from July 1978 to June 1979).

1.) JICA & The Experts' Team: Technical Cooperation Plan for the Project on North Sulawesi Regional Agricultural Development Planning (RAB-1A0); Agricultural Development Cooperation Department of JICA; Tokyo, Japan; December 1976.

Fig.1.1. Implemented Working Schedule of the Team for Phase I:

Note: 1) : Original Schedule, 2) ——— : Implemented Schedule.

Classification	x												
	'76						1977						
	12	1	2	3	4	5	6	7	8	9	10	11	12
<u>1. Data collection & surveys/data processing</u>													
1.1. Collection of existing data													
1.2. Field reconnaissance & observation													
1.3. Basic survey													
1.4. Sampling survey & supplementary survey													
1.5. Data processing													
<u>2. Research & analysis</u>													
2.1. Review of the existing projects													
2.2. Classification of problems & recommendations													
<u>3. Formulation of a regional agricultural development plan</u>													
3.1. Establishment of economic indices consistent with provincial plan													
3.2. Establishment of economic indices consistent with national plan													
3.3. Formulation of a regional agricultural development plan of South Sulawesi													
3.4. Making a manual													
4. <u>Joint Committee</u> (at JKT)	x							x					
5. <u>Steering Committee</u> (at UP)		xx	x					x		x			x
6. <u>Seminar</u> (at UP)										x(I)			
7. <u>Dispatch of short-term Experts</u>													

(to be continued)

1013. After those activities mentioned above, the Team has worked out this final report on the first phase, as the result of the transfer of techniques on the planning at the end of February 1979. The implemented working schedule of the Team is shown in Fig. 1.1. in detail.

1.5. Activities of the Team

1.5.1. General Activities

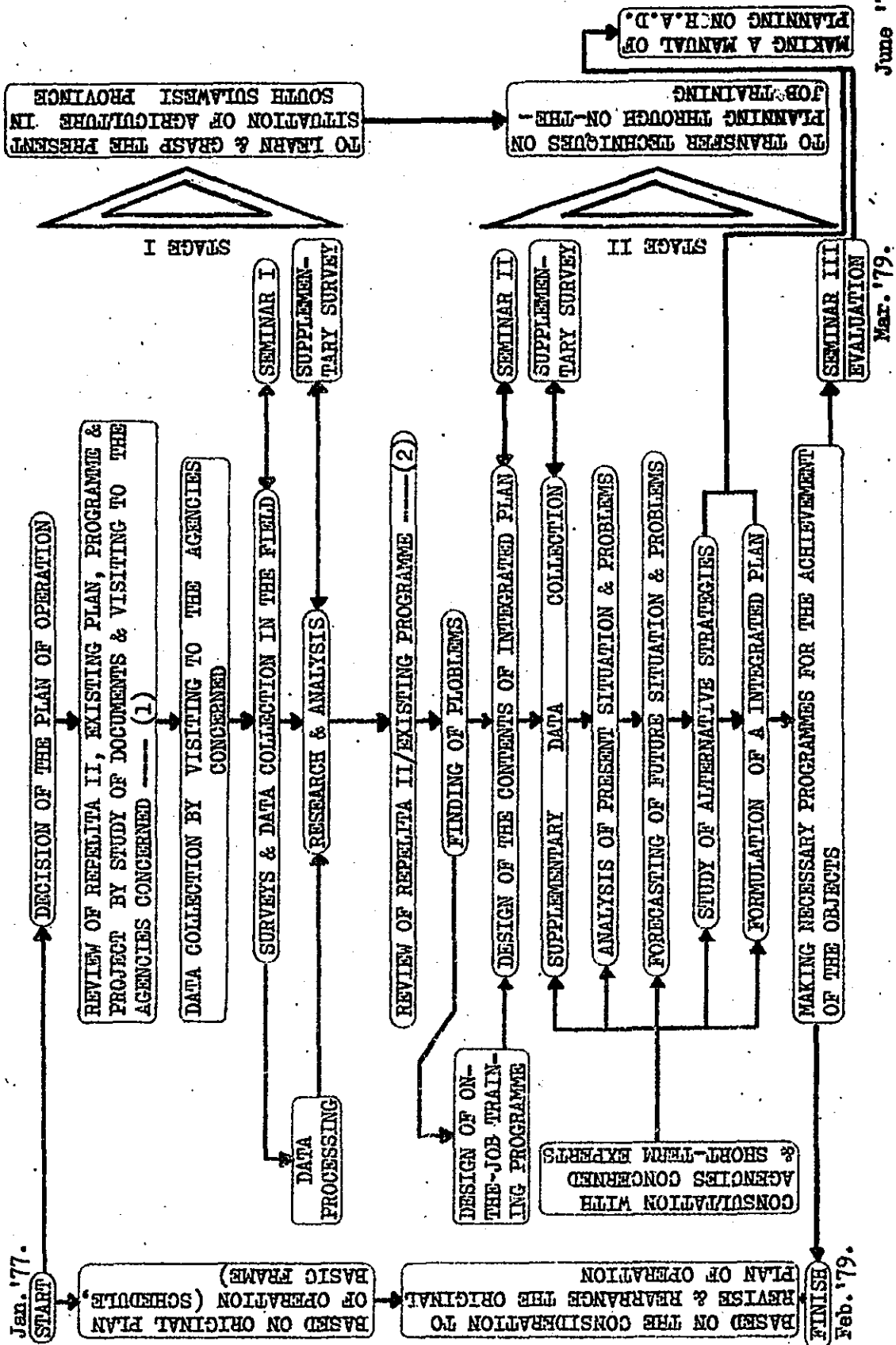
1014. At the beginning of the Project, the Experts' Team explained a draft of the Plan of Operation made by JICA and the Experts' Team to the First Joint Committee held in Jakarta on December 31, 1976, and after the achievement of understanding on the main stream of the draft by the members of the Joint Committee, the Expert' Team began to explain it, item by item, to the Counterparts in Ujung Pandang.

1015. According to the original plan of operation, i.e. the basic frame of operation, procedures of training and planning, reconnaissance studies, surveys, data collection, researches and analyses were commenced; in the course of time, however, the original plan of operation was revised for several reasons, especially emphasizing and making certain of the transfer of techniques on planning. The revised one is aimed at the design of effective programmes for on-the-job training based on the finding of problems in planning through the review of Repelita II of South Sulawesi Province.

1016. At the end of the first phase, it can be said that activities of the Team based on the original basic frame and procedure were the stage to learn and grasp the present situation of agriculture in South Sulawesi Province for both sides, Experts and Counterparts, and the activities based on the revised one were the stage to transfer of techniques on the planning through on-the-job training. Therefore the revised one, finalizing as "implemented basic frame of operation and procedure of training for the first phase" and "flow chart of implemented planning of integrated regional agricultural development" are shown in Fig. 1.2. and 1.3.

1017. During the first phase, Joint Committee and Steering Committee meetings were held twice in Jakarta and eight times in Ujung Pandang respectively for discussions/consultation of the

Fig. 1.2. Implemented Basic Frame of Operation & Procedure of Training for Phase I

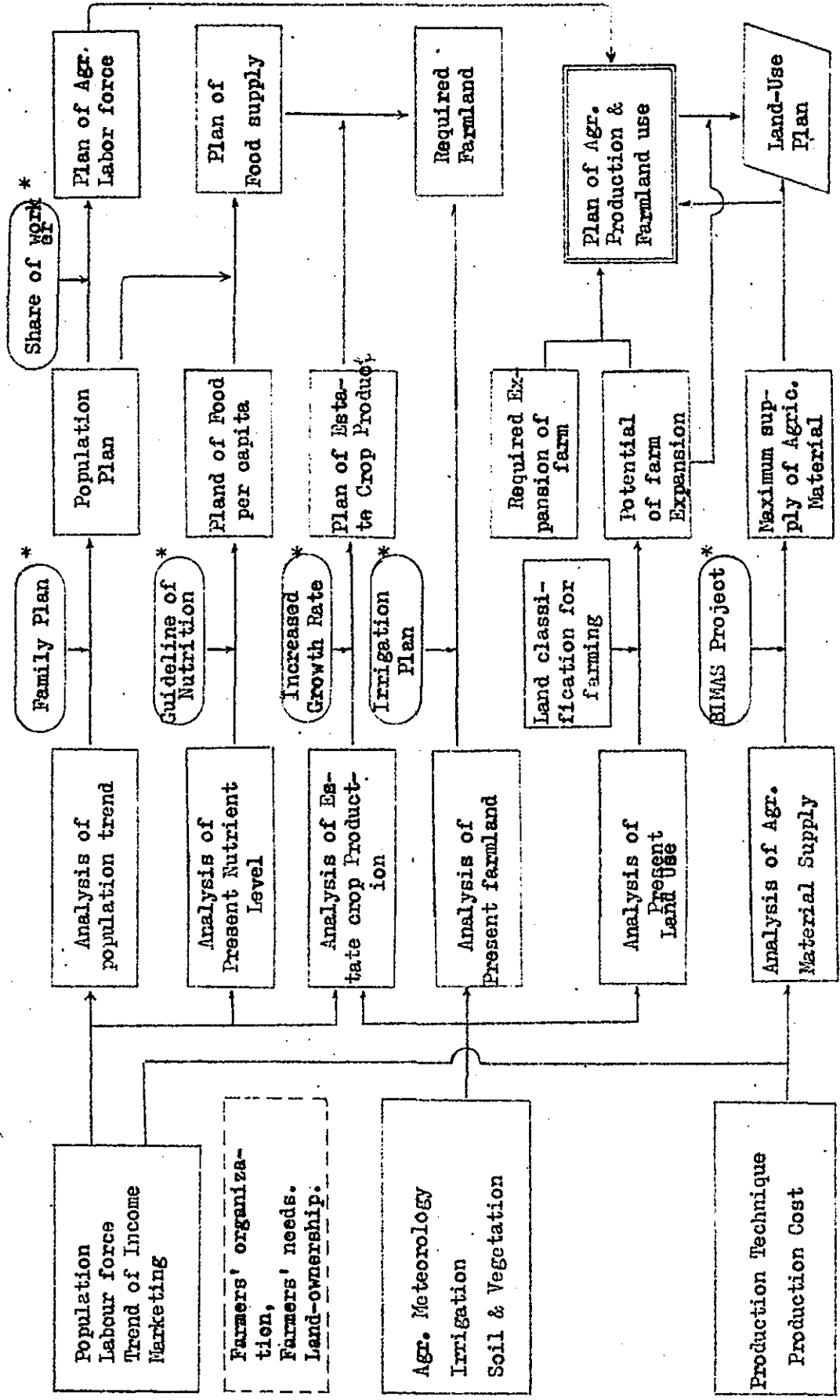


June '79.

Mar. '79.

Feb. '79.

Fig. 1.3. Implemented flow chart for the formulation of Regional Agricultural Integrated Planning



Note : * : Request from national plan

Project's operation. Two Seminars were held in Ujung Pandang, for the purpose of informing widely and evaluating the activities of the Team, inviting lecturers from Japan.

1.5.2. Surveys

1018. During the first phase, an amount of 62 times, 184 days and 490 participants have been expended for the surveys. The surveys mentioned here which were implemented for the preparation of the research on agricultural condition and analysis of data, besides the collection of data, consisted of:

1019. (1) The basic survey, which was conducted mainly by the Team, has the objective to grasp the existing general conditions of agriculture and farming by ways of survey in the field, collecting data and information, discussion/interview with officials concerned or farmers and consultation with officials. The main items of surveys are: flow of goods, unit price by commodity, systems of farm labour employment and marketing.

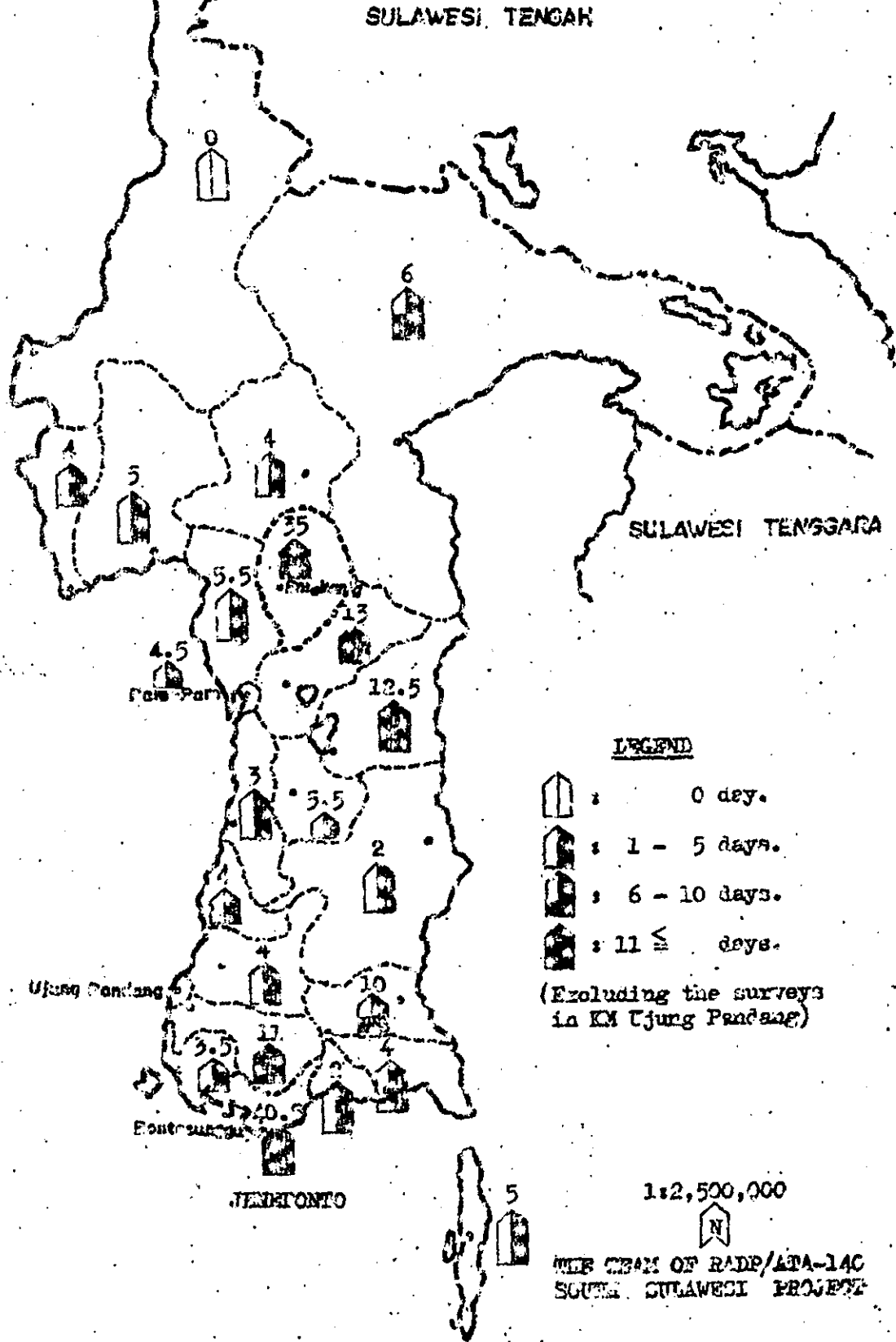
1020. (2) The sampling survey in depth, which has been conducted mainly by the Counterparts' Team and by short-term Experts with Counterparts, has the objective to deepen the understanding of the condition of agriculture in selected Kabupaten-s generally; and to survey in depth on certain matters or the specific sub-sectors especially, by way of field survey, collecting sepecific data, discussion/interview etc., and to recognize and supplement the results of the basic survey. The main items are: production cost and farming practice.

1021. (3) The supplementary survey which was done by short-term Experts with Counterparts has a purpose of supplementing the results of basic surveys.





1022. (4) The field reconnaissance and observation, mainly conducted by short-term consultants, i.e. members of missions from Japan, lecturers for the Seminars and visitors concerning the Project, have the objectives of observing the facts and conditions of agriculture and other sectors in the Province, including formal consultation with officials concerned such as Bupati-s, and collecting data and informations.

1023. In twenty two (22) kotamadya-s and Kabupaten-s of South Sulawesi Province, the surveys have been done. But the Team had no opportunity to make surveys in the remaining one, Kabupaten

Fig. 1.4.
Total Number of Required Days for the
 Surveys by Kabupaten in Phase I



LEGEND

-  : 0 day.
-  : 1 - 5 days.
-  : 6 - 10 days.
-  : 11 ≤ days.

(Excluding the surveys
 in KM Ujung Pandang)

Kabupaten Mamuju. Although the Team could get the data/information for the Kabupaten Mamuju by the good cooperation with the Team of Sulawesi Regional Development Study (SRDS).

1.5.3. Data Collection

1024. There are two ways which have been taken and practice in the activities on collecting data/information, one is indicated by the term of secondary data collection by way of visit to the agencies, surveys and straight discussions with responsible officials and rural leaders of regions, among the Provincial, Kabupaten-s, Kecamatan-s and Desa-s, and the other is indicated by the collection of primary data, also secondary data, with surveys in South Sulawesi Province.

1025. Those activities have just begun in the middle of February 1977. And from the visits to twenty eight (28) agencies in Ujung Pandang and the surveys mentioned in art. 1.5.2., various data and information have been collected and obtained as number of books and papers valuable for the materials of planning (refer to Volume III of this final report).

1026. These activities have been done by all members of the Team, but mainly by the Counterparts. Concerning the collected basic data, the classification, the purpose of analysis and persons on duty (Counterparts) of the collecting basic data are shown in following table 1.1.

1027. These activities of data collection have been evaluated as good as to get a conclusion in the Second Seminar in August 1978: It was suggested that the data collected would be published as they constitute important material, not only for the Team, but also for other agencies requiring them.

1028. Nevertheless in those data, some data were not utilized to formulate the master plan, even though it was scheduled to be used. At the same time, some insufficient data were used as they were, because of the scarcity of data concerned. Especially, some criticism was made in the case of maps for land-use planning, which were enlarged from a scale of 1:1,000,000- to that of 1:500,000-. This is the problem of the minuteness of planning, based on the scarcity of the basic data. The Team inevitably adopted this way of approach for the transfer of techniques because of the

Table 1.1. Collected Basic Data : Purpose of Analysis & Persons on Duty

Classification	Purpose of Analysis	Person on Duty
1) Survey on natural condition :	For :	
a) Agricultural meteorology	Irrigation plan	
- Data of precipitation	Cropping	Orggeng Rachtiar
(No data of temperature & humidity)		
b) Irrigation condition	Irrigation plan	Zainuddin Dachlan
- Implemented irrigation project		
c) Soil & vegetation	Cropping	Ardi Makkasan,
- 20 Maps (surveyed in 1968)	Land-use plan	Ismail Abu, Yusuf M,
d) Land-use condition	Land-use plan	& Tjien
- Annual Reports by Agencies		
2) Survey on agricultural condition :		
a) Production techniques	Labour-use plan	All Counterparts
- Reports on field survey		R. Ibrahim,
- Reports on estate crops		Kaharuddin
b) Production cost	Income distribution plan	All Counterparts
- Field survey		
- Data of unit price by commodity		

(to be continued)

(Continued : Table 1.1. Collected Basic Data)

Classification	Purpose of Analysis	Persons on Duty
3) Survey on socio-economic condition :	For :	
a) Land-ownership	Population plan	Tadjuddih Dullah
- Agricultural Census		
b) Population:	Population plan	Andi Makkasau Nazaruddin I.
- Census		
- Annual Reports of Statistics Office		
c) Labour force & Labour for agricultural	Labour-use plan	Azis Mattola. Nazaruddin I.
- Census		
- Annual Reports of the Statistics Office		
d) Income		Azis Mattola
- Data of BAPPEDA's Reports		
e) Marketing		Dahlan Noor
- Field survey		
- Data on Export & Import		
f) Farmers' organization		A. Muchtar P.
- Field survey		
g) Farmers' needs and preference		All Counterparts
- Field survey		
h) Administration for the Agricultural Sector.		Mono Syamsuddin

the restricted capacity of the Team. Consequently, the minuteness shall be improved by the Counterparts themselves in the course of time, based on the accumulation of basic data and maps in Indonesia.

1.5.4. Training Activities

1029. The main objective of the Project is determined by the R/D as follows:

This Project, with a view of contributing to the promotion of regional agriculture, is intended to make an over-all view of the plans for the development of agriculture in South Sulawesi Province, to give advisory guidance thereon, to possibly improve methods and techniques of planning for the development of regional agriculture and thereby to improve the planning ability of the Indonesian officials in charge.

(1) On-the-job Training¹⁾

1030. Based on the main objective of the Project, it took the well-known method to mention "learning by doing" which means "on-the-job training" for the Counterparts. As regards the Experts, this means "transferring by doing". Almost in all activities throughout the first and second stages of the first phase, this method has been practiced and not any opportunity has been neglected. But in this article, only the activities of training in the second stage of the first phase will be explained (concerning the one in the first stage, refer to the Annual Report I/1977 of the Project).

1031. After the finish of the first stage of the first phase, the Team practiced again a review of the Repelita II, other existing plans and programmes. Through the review of Repelita II, Experts' Team has found the following main problems to be solved:

1032. Experts' Team found a difficulty in finding the techniques and procedure of planning through which the plan was formed. What Experts' Team could find was a list of programmes and projects which should be considered as a result of planning activities. Therefore Experts' Team felt it might be useful to transfer some practical technique necessary to formulate a comprehensive plan, and a systematical way of thinking. It is because these abilities

1) Refer to art. 1.5.1. and Fig. 1.2.

are indispensable for the formulation of a comprehensive plan such as Repelita II. On the other hand, Experts' Team also found that maps were not utilized effectively in the formulation of Repelita II. 1033. According to the result of the review mentioned above, three main points to be transferred techniques on planning have been concluded:

- a) Systematical technique of planning;
- b) Detailed technique of planning in each specialized field;
- c) Technique of map making and map utilization.

1034. Concerning the conclusion, the programme of training for the first phase was considered as shown in Fig. 1.2. At the same time, contents of an integrated plan as a model were decided, not aiming at the transfer of a huge completed system of planning methodology to the Counterparts, but aiming at the transfer of the way of the utilization of the experienced methods in the Project or adaptable methods for the present conditions in South Sulawesi Province, and furthermore to upgrade the operational ability for methodology in the future.

1035. Based on the afore-mentioned aim, Experts' Team has intended to reduce the component factors of the integrated plan and has formulated the simple model by which the Counterparts will have a deeper understanding and be easily accustomed to the operation of the model.

1036. The implemented procedure of training activities are as follows:

- i) Analysis of the present situation of agriculture.
 - a) Analysis of the present situation and finding of problems,
 - b) Forecasting of the future situation and finding of problems.
- ii) Study on the alternative strategies for regional agricultural development.
- iii) Formulation of an integrated plan of "food demand and supply" as the model of a master plan.

This item is the most important part of the activities in the first phase. Activities of technical transfer were conducted including the preparation of several alternative plans. The three points to be transferred techniques mentioned above were practiced for the on-the-job training in the

the compilation of an integrated plan. A Master Plan shown in this report should not be considered as the plan to be adopted by the officials of the Provincial Government. Three alternative development plans shown in this report are presented as graduation thesis on the transfer of techniques.

- iv) Making the programme necessary to achieve the objective in integrated plans.

1037. Although the model is simple, it is composed to give an output of interesting planning strategies, which depend upon the different inputs and operations. Thus the Experts' Team hopes that the Counterparts will be able to reach a higher level in which they will be accustomed to use and compose freely at their will such models as practiced in the Project. More advanced methodology should be introduced to solve the remaining problems which were not clarified yet by the simple model used on the activities.

1038. As mentioned above, the model for food demand and supply does not include the important factors such as income discrepancy among industries and regions, and the components of the employment by industries. Therefore, Experts' Team has requested to JICA Headquarter in Tokyo that a manual on planning of regional agricultural development will be prepared by JICA, based on the same data available here in Ujung Pandang, aiming at a more advanced level than the simple model.

(2) Training in Japan

1039. According to the R/D, the training in Japan also has been conducted. The participants of the training or observation study/trip in Japan are as shown in table 1.2. These trainings/observations in Japan have given the Indonesian Team a clear illustration that, on one hand, the Japanese Government has succeeded very well in the field of human investment, which steps up the Japanese Community's awareness and understanding on the significance of:

- a) the effective and efficient use of time,
- b) the utilization of the existing opportunity, and
- c) the economic and productive utilization of natural resources and the maintenance of their durability.

(3) Comparative Study

1040. The comparative studies, aiming at the comparison with the sub-Projects of ATA-140 Project in other regions by discussions and consultations with Experts or Counterparts in charge, were conducted twice, once to the Integrated Agricultural Development Project in East Java by cooperation with the Taiwan's Team in November 1977, and the second time to the Agricultural Development Project in West Sumatra by cooperation with the Team of West German in November 1978.

Table 1. 2. Participants to the Training/Observation in Japan

Name	Duration	Field of Training
A.R. Malaka	2 weeks/October 1977	Observation
Hendro Soewarno	-ditto-	
Onggeng Bachtiar	1 month/May-June 1978	Observation Study
Y.M. Lubis	-ditto-	
Nazaruddin L.	-ditto-	
Tadjuddin Dullah	-ditto-	
Amiruddin Madjid	-ditto-	
Dahlan Noor	3 months/Aug.-Nov. 1978	Agricultural Statistical Course.
Azis Mattola	6 Months/Sep. '78-Mar:79	Economic development Course.
Amien Hidayat	3 weeks/Nov. 1978	Observation
Djoko Soejatno	-ditto-	
Mono Syamsuddin	-ditto-	
Totals	17 man/month	

1.5.5. Reporting

1041. In the first stage of the first phase, before publishing the Annual Report I/1977, three Quarterly Reports have been published at each end of quarter in 1977. The First and Second Quarterly Reports were published at the end of March and June 1977. Most activities in publishing the two quarterly reports relied on the Experts' Team. This fact was based on the comprehension/appreciation of the Experts' Team as follows:

- (1) The planning is practiced on the base of certain objective/target and time-limit, so that a planner has to recognize the "punctuality" according to the original schedule;
- (2) There are many ways for training. Doing by oneself is also a kind of way for training as making a model which will be able to influence the others, because the purpose of the training is to arouse the interest of object persons into doing something themselves; and
- (3) There was a communication-gap¹⁾ among the Team, though the gap has almost been overcome at present. So at the first stage, the Experts' Team has been obliged to do those activities.

1042. On the contrary, most activities for reporting of the Third Quarterly Report have been done by the Counterparts' Team. It is owing to the consideration of the Experts' Team that the Counterparts doing themselves, to show the fruits of their activities on surveys and data processing, yet that consideration has brought a confusion among the members of Steering Committee against the activities of the Team.

1043. Then in the activities to compile the Annual Report I/1977, the Team, including short-term Experts and Counterparts (part-time), has done the reporting through such a good cooperation works, as the Joint Committee has esteemed in the Second Seminar in April 1978 that there has already been a good communication between the Experts and the Counterparts; it is proved by the well-done composition of the Annual Report I/1977.

1044. After getting the good evaluation, the Team has worked out the planning activities for the first phase, and in the course of the planning the Team has published several kinds of documents

1) This communication-gap was pointed out as a conclusion of the First Seminar in August 1977 in Ujung Pandang.

as the fruits/records of the activities of the Team and short-term Experts with Counterparts, text books for training and materials for the planning. Those published documents are shown in the following table 1.3.

Table 1.3. List of Published Documents by the Team in Phase I

01. The Team: The First Quarterly Report/1977; Mar. 31, 1977.
02. The Team: The Second Quarterly Report/1977; June 30, 1977.
03. The Team: The Cohort Share-Trend Method -- A Method of Estimation on Population and Labour Force for Regional Agricultural Development Planning --; Working Paper for the First Seminar; Aug. 1977.
04. The Team: Hasil Seminar I, Perencanaan Pembangunan Pertanian Regional Sulawesi Selatan Proyek ATA-140; Aug. 1977.
05. The Team: Results of the Seminar I; Aug. 1977.
06. The Team: The Third Quarterly Report/1977; Sep. 30, 1977.
07. Ryuichi TATSUMI: A Summary Report on Water Resources Development in South Sulawesi Province; Dec. 14, 1977.
08. Iwao NISHIYAMA: A Summary Report on Marketing and Processing; Dec. 14, 1977.
09. Yoshihiko OGAWA: A Summary Report on Regional Agricultural Planning; Dec. 26, 1977.
10. Takeichiro KAFUKU: Fishery Resources Development in South Sulawesi Province; January 1978.
11. Masaaki FUNADA: Summary Report on Soil and Vegetation (Appendix: Land/Soil Utilization Standard); Jan. 1978.
12. Hiroyuki NISHIMURA: Memorandum to "Socio-economic Survey for Agricultural Development"; Feb. 1978.
13. Hiroyuki NISHIMURA: Survey concerning Socio-economic Factors and Farmers' Needs in Agricultural Development Planning; Feb. 1978.
14. Hiroyuki NISHIMURA: Summary Report on Socio-economic Surveys concerning Farmers' Needs; Feb. 1978.
15. Hiroshi MURAI: Summary Report on the Forest Lands Management for Soil and Water Conservation; Feb. 1978.
16. Kanae MORINISHI: Summary Report on the Organization of Farmers; March 1978.

17. The Team: Annual Report I/1977 (Volume I): Result of the Studies on the Regional Agricultural Developments in South Sulawesi Province; March. 1978.
18. The Team: Annual Report I/1977 (Volume II): Appendix -- Data and Informations of the Agriculture in South Sulawesi Province; March 1978.
19. The Team: The First Quarterly Report/1978; Basic Figures Toward A Plan; March 1978.
20. Kazuo MUTO: Establishment of the Optimum Plan of Regional Agricultural Production; April 1978.
21. The Team: Strategies of the Regional Agricultural Development Plan in South Sulawesi Province (First Draft); Apr. 1978.
22. The Team: Method of Plan Making; Apr. 1978.
23. The Team: The Second Quarterly Report/1978; The Draft of A Regional Agricultural Development Plan in South Sulawesi Province with Recommendations for Planning Methodology; June 30, 1978.
24. The Team: Report/Comments on the Consultation with Agencies concerned for Contents of A Master Plan (Draft); July '78.
25. The Team: Explanation for the Comments of the Agencies concerned of A Master Plan (Draft); July 1978.
26. FAO/IBRD Cooperative Programmes (Multiplied by the Team): Guideline for the Preparation of Feasibility Studies for Irrigation and Drainage Projects; (Rome, 1970); July 1978.
27. Hendra Esmera (Multiplied by the Team): Regional Planning Studies in Indonesia (Excerpted from a magazine "Ekonomi dan Keuangan Indonesia" Vol. XXIV, No. 4, 1976); July '78.
28. The Team: The Third Quarterly Report/1978; Record of the Activities of the Team of the Project with Addenda for the First and Second Quarterly Report of 1978 (January-June); November 1978.
29. The Team: Interim Report on the Activities of the Team of the Project in the Fourth Quarter of 1978 (01 Oct.- 15 Nov.); Nov. 15, 1978.
30. The Team: Final Report on Phase I (Volume One); A Master Plan on South Sulawesi Regional Agricultural Development; (Second Draft); Jan. 1979.

1.6. Acknowledgement

1045. First of all the Team would wish to express a deep gratitude to the Central Government of Indonesia, all the agencies in the South Sulawesi Province, and also colleagues in the Regional Office of the Ministry of Agriculture, in which the Team has worked for the Project. During the period of the First Phase, at the meetings of Joint Committee and Steering committee, recommendations for the Team have been given by the Chairman and all the members of the Committees, thus the many difficulties were conquered and the objectives of the Project were gradually attained.

1046. On the other hand, the Team would like to acknowledge to JICA and Supporting Committee in Tokyo, which sent the technical guidance missions for the Team several times and which also sent short-term Experts based on the Joint Committee's approval of the request by the Steering Committee. It is also a great pleasure to the Project that necessary equipments were contributed and overseas trainings/studies were provided by JICA.

1047. This Project is not an academic but an empirical Project, aiming at the upgrading of the ability for planning of the officials in charge. Even though the Team has made a great endeavour to attain the objectives mentioned above during the first phase, there would be some shortcomings. In response to the result of the activities of the Team, which inevitably have some weak points, the Supporting Committee in Tokyo will help the Team with a manual on planning of regional agricultural development by a consulting firm appointed by JICA. This report is intended to be accomplished by the end of the 30 month, based on this report and accumulated data by the Team. This will contribute a great deal to the continuous development of the regional agricultural development in Indonesia in the future.

1048. At the same time, the Team appreciates the Bureau of Planning of the Ministry of Agriculture, which allows the Team to have the opportunities to conduct comparative studies respectively on the projects implemented by the Taiwan Team in East Java, the West German Team in West Sumatra and the Canadian Team in Sulawesi Island. This will be a great contribution to the development of planning ability of all members of the Team in the future, by

by comparing the different ways of approach to the targets.

1049. The Team also expresses appreciation to the Governor of South Sulawesi Province who has supplied a local budget as Rupiah counterpart from the Provincial Budget, which constitutes a participation in strengthening the Rupiah Counterpart from the Indonesian Government; in this way the requirement for quite a number of Counterparts to assist the short-term Experts and the quite high frequency of various activities of field surveys and data collection, as well as other requirements, have all been met well.

1050. In this occasion, finalising the report on the first phase, the Team would once again express a heartfelt gratitude to all the personnel concerned, both on the Indonesian and the Japanese parts, especially the short-term Experts and Counterparts, Bupati-s of Kabupaten Jeneponto and Kabupaten Enrekang, Secretaries of Embassy of Japan in Jakarta and Chief/staff of Jakarta Office of JICA.

1051. Closing this passage the Team wish to extend the Team's gratitude to Ir. Syamsuddin Abbas who had acted as Supervisor to the practice of the Project during the time of his position as Acting Chief of the South Sulawesi Regional Office of the Ministry of Agriculture.

A MASTER PLAN ON SOUTH SULAWESI
REGIONAL AGRICULTURAL DEVELOPMENT

II

S U M M A R Y

2001. The report of the Master Plan on Regional Agricultural Development Planning in the South Sulawesi Province consists of Five Volumes and one Volume of Summary in Bahasa Indonesia, such as the following :

Volume I : A Master Plan on South Sulawesi Regional Agricultural Development;

Volume II : The Present Situation and Problems of Agriculture in the South Sulawesi Province;

Volume III : Data of Agriculture in the South Sulawesi Province;

Volume IV : A Guidance for the Planning on Regional Agricultural Development;

Volume V : Basic Maps for Planning on Regional Agricultural Development in the South Sulawesi Province, and

(1 Volume) : Laporan Final Tahap Pertama - Ringkasan dan Rekomendasi dari Jilid I, II dan IV.

2002. The Project on Regional Agricultural Development Planning/ATA-140 South Sulawesi is quite unique among international cooperation projects under JIGA. At the same time, it is also quite unique in Indonesia. Both the Governments have agreed upon the R/D that the objective of the ATA-140 Project is to improve the planning ability of the officials in charge through on-the-job training, as already described in detail under the heading: "Purpose of the Project in this Volume (Refer to art. 1.2).

2003. In order to achieve the objectives of the Project, a planning procedure for on-the-job training was fixed and the plan was formulated according to the flow chart for the formulation of a regional agricultural development planning. Therefore, a plan formulated by the Team, on the basis of the aforementioned procedure, is not an administratively practical plan but one for training. However, all the parties concerned (Indonesian Counterparts and Japanese Experts) believe that the results of data analysis and the method of the necessary programmes mentioned below are useful for planning on regional agricultural development such as Repelita III and IV.

2004. The Master Plan shall be summed up as follows :

Major socio-economic problems in the South Sulawesi Province are: (1) Insufficient employment opportunities, increasing unemployment and continuing population outflow; (2) declining labour force participation rate and growing dependency ratio; (3) lagging industrialization; (4) limited market size, and (5) insufficiently developed infrastructure. The best strategy for agricultural development in the Province is to establish first of all the agricultural base in a relatively favourable area for agricultural development by providing financial incentives.

2005. The rate of population growth in the province was 1.6% during the past five years until 1976, but according to a calculation by the Cohort Trend Method it is forecast to be 1.9% for the next fifteen years, and there will be an increase of 7.5 million persons in the Province after 15 years. However, in the population plan the Team subtracted 0.1% from 1.9% of the population growth rate, such as the following :

Table 2.1. Estimation of population increase

Unit : 000 persons					
I t e m	1971	1976	1981	1991	Difference
Forecast data					
following tendency	3,180	5,650	6,210	7,500	
	← 1.6% →		← 1.9% →		> 200
Family Plan					
considered	5,180	5,650	6,150	7,300	
	← 1.8% →				

2006. Present production volume of staple food such as rice, corn and cassava is 1,231,000 tons (equivalent volume to rice and average volume during 3 years from 1974 through 1976); but the tendency of productive development is an annual growth rate of merely 0.5%. Productivity per capita in 1991 will only be 178 kg., compared with 217 kg. in 1976; therefore the surplus will decline to 88,000 tons in 1991, from 294,000 tons in 1976.

Table 2.2. Estimation of food shipment volume and production per capita

	U n i t	74-76	1981	1986	1991
Equivalent Vol. to rice	000 ton(a)	1,231	1,268	1,300	1,333
Required vol. in S.S.	000 ton(b)	932	1,031	1,132	1,245
Shipment to other prov.	000 ton(c)	294	237	168	88
Production per capita	kg.	217	204	191	178
% of shipment volume	(a) : (c) %	31	23	15	7

2007. From the viewpoint of data analysis in Chapter IV, the following strategies are important for agricultural development in South Sulawesi :

(1) Formulation of a demand and supply plan for food stuff as well as for population growth; the demand and supply should be shifted by the effect of population control by family planning.

(2) Increase of work opportunity in rural areas and prevention of labour outflow; particularly, work opportunity in agricultural processing, marketing and transportation should be expanded in South Sulawesi.

(3) Increase of agricultural income in order to settle farm labour in the rural area based on intensive agriculture.

(4) Increase of people's income in order to save them from poverty, through improvement of income distribution.

2008. According to priority, the most urgent strategy is to increase rural people's income; this aspect is, however, beyond the scope of a Project merely concerned with regional agricultural development, because the law and regulation should also be established to enforce the development of this aspect. In order to study this aspect, industrial gap and regional disparity have to be reduced, but it is hitherto difficult to study the method of reduction. Consequently the Team studied 3 categories leaving out point (4); but some recommendations toward this strategy will be presented in Chapter VIII.

2009. In addition, since all the aspects of regional agricultural development planning is rather difficult in the restricted period of 18 months due to the insufficiently available data from each Agency (sub-sub-sector) for the whole planning, the Team inevitably focused on the item of demand and supply of food for the anticipated population in 1990. Other aspects of the planning will be attained by the same way of approach already transferred in the analysis and planning methodology for

the equivalent demand and supply of food based on the statistic development in the future by the respective agencies concerned. The Team hopes that the increased development in planning ability by this way of self training in the Kantor Wilayah of the Ministry of Agriculture during the Repelita III would be able to contribute greatly to the planning of Repelita IV.

2010. The Team would like to repeat the most emphasized points for the formulation of this plan, in order to help more understanding about the contents of the Master Plan in the R/D of the Project. According to the R/D, the Team reviewed the Repelita II, and found several points which were already pointed out in general by Drs. Hendra Esmara. ¹⁾

"Almost all of regional plans at the provincial level are duplications of the National Second Five-Year Development Plan, either in scope or in table of contents. The basic strategy, however, nearly reproduced, word by word, what is contained in the National Plan. Not all regions could identify the problems and strategy to be used in the second Five-year Plan. The basic minimum needs (BMN) criteria were never used either at the national or regional plans in Indonesia. Research on this line is quite scarce although the needs to use this concept becomes evident in the last few years, particularly in the calory and protein requirement of the population. Further the use of maps as the tools of regional plans has been neglected in nearly all provinces with exception of West Java".

2011. In recognition of the fact mentioned above, the Team has challenged the unique way of approach to the target, i.e. clarifying the strategy of the development. The basic minimum needs (BMN) criteria were analyzed, based on the future population by age group and by sex, estimated by the Cohort Trend method, and the demand and supply of food are calculated by commodity, allocating necessary calories and protein.

2012. Based on the premise mentioned above, the scope of work is focused on the aspects of food demand and supply, aiming at the effective transfer of the planning know-how. It is needless to say that the repetition of the way of approach in the Project will enable the counterparts to plan the other aspects besides food demand and supply

1) Drs. Hendra Esmara: Regional Planning Studies in Indonesia; pp. 355 - 370, Ekonomi dan Keuangan Indonesia; Vol. XXIV No. 4; Jakarta; December 1976.

in the province. Thus a prototype plan was formulated with three alternatives, under the following conditions, and the results of calculation are explained in Chapter VI of the Volume I, and Table 2.3 shows the comparison of the prototype and the alternative plans, based on the following specifications :

- (1) The Prototype is in the case of supplying the required demand including the required shipment volume for D-zone.
- (2) Alternative Plan 1 is the case of using the surplus farmland by expansion of upland rice production, comparison with the Prototype.
- (3) Alternative plan 2 is in the case where the surplus labour and reclamation land are used, against alternative plan 1 by expansion of lowland rice.
- (4) Alternative plan 3 is in the case where every resource is used.

Table 2.3 was made on the basis of the Flow Chart on Food Demand and Supply Plan shown in Fig. 6.1.

The volumes of local consumption and shipment to other regions are shown in Columns 4 and 5.

After the calculation of those volumes, we estimate the required farmland, labour force and reclamation area by the Prototype and Alternative plans. The results of calculation of farmland, labour force and reclamation area are shown in Column 1.

However, in the Prototype and in Alternative Plan 1 there will be surplus farmland and labour force in 1990 (Column 2).

(Refer to Chapter 6, article 6.4, for more detail).

Table 2.3. Comparison of the prototype plan and alternative plans

Item	Plans	'Prototype plan	Alternative plan		
			1	2	3
(1)	Farmland use 2,872 ^{*A} Available 000 ha. (2,074)	2,807	2,872	2,872	2,872
	Labour force 1,410 resources 000 manpower	1,023	1,122	1,410	1,410
	Reclamation 770 ^{*B} 000 ha. (550)	no need	no need	474 (664)	770 (550)
(2)	Farm land 000 ha.	65 ²⁾ → 0		-	-
Surplus	Labour force 000 man- power	387	354 ³⁾ → 0		0
	Reclamation 000 ha.	550	550	76 ⁴⁾ → 0	
(3)	Annual rate of income increase	64 %	6.5	7.7	7.7
	Local net income of agriculture ^{*C}	362.6	365.8	440.5	441.0
Production Volume (000 ton)					
	R i c e	1,309.6 P	P=47.3	P+1141.3	P+1061.9
(4)	C o r n	251.9 Q	= Q	= Q	Q+ 139.1
	Other food	1,733.7 R	= R	= R	= R
	M e a t	64.6 S			
	F i s h	296.8 T	same	same	same
	Industrial crops	238.3 U			
Export Volume (000 ton)					
	R i c e	302.2 V	349.5	1,443.5	1,364.1
(5)	C o r n	60.5 W	= W	= W	199.6
	Others	233.2 X	= X	= X	= X
	Industrial crops	85.9 Y	= Y	= Y	= Y

Note :

*A 2,872,000 ha. = $\frac{1}{2}$ (507,000 paddy field x 1.75) + $\frac{1}{2}$ (462,000 upland field x 1.75) + $\frac{1}{2}$ (440,000 orchard x 1.16) + $\frac{1}{2}$ (655,000 grassland)

*B 770,000 ha. = 550,000 x 1.40 (because 2,872 + 2,074 = 1.40).

*C Unit: Billion.

2013. According to the results of the study on the possibility of required lands, land resources for demand and supply plan of food stuff in the province are sufficient, if cultivation of 135% will be conducted in the future. Therefore it is possible to supply enough food stuff without imported commodities.

2014. In the future, in case of a similar percentage to the present composition rate of labour force by industry, agricultural labour force is forecast to be 1,410,000 manpower. On the other hand, the required employment for agriculture is 1,023,000 manpower and about 387,000 manpower will be in surplus in 1990 according to the prototype. Thus in the alternative plans it is studied on how increase the employment of an over-supply of labour force in agriculture.

Table 2.4. Demand and supply plan for agricultural production in 1990 (in the Prototype plan).

Commodity	Demand		Supply	
	Local consumption 000 ton	Export/in- terinsular 000 ton	Local production 000 ton	Import/in- terinsular 000 ton
Food stuff	1,007.4	302.2	1,309.6	-
Rice	1,007.4	302.2	1,309.6	-
Secondary crops	938.1	247.7	1,185.8	-
Vegetables	251.3	5.5	256.8	-
Fruit	547.5	5.9	553.0	-
Meat	63.2	1.4	64.6	-
Fish	263.6	34.2	296.8	-
Estate crops	152.4	85.9	292.5	12.4
Total	3,222.5	682.4	3,892.5	12.4

Source : Data From Table 6.11.

Table 2.5. Required employment in Agricultural sector

Commodity	Prototype	Unit: 000 manpower			
		Alternative plans			
		1	2	3	4
P a d d y	348 (A)	(A) + 33	(A) + 387	311	
C o r n	49 (B)	same as B	same as B	26	
Other food crops	138 (D)	" " C	" " C	same as C	
Livestock	46 (D)				
Pond fish culture	23 (E)	same	same	same	
Estate crops	189 (F)				
O t h e r s	204 (G)				
T o t a l	1,023	1,056	1,410	1,410	

Source : From data in Tables 7.4, 7.5, 7.6, 7.7, 7.8, 7.16 and 7.17.

Programmes necessary to achieve the objectives

2015. Generally, the following measures are studied in order to increase food stuff, and effective policies well-adapted to each region will be employed by raising the basis of extension and research services and other institutional services.

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

(2) Breeding, i.e. best quality, high yielder, disease/pest resistance, adaptability to heavy manuring, drought resistance;

(3) Intensive farming, i.e. multiple cropping, inter-cropping and mixed cropping, upland paddy rotation, crop rotation;

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

(5) Farmland expansion, i.e. land reclamation, reclamation in water land; and

(6) Soil and water conservation.

2016. The following measures are generally studied in order to increase labour employment in agriculture, and proper measures are

taken in the region:

(1) Crop conversion, i.e. shifting from traditional extensive farming to labour intensive farming and change of cropping pattern, i.e. converting "less labour cropping" into "more labour cropping".

(2) Diversification of crops, i.e. introducing diverse crops a year and paddy upland rotation through lease or contract farming;

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

(4) Specialization, i.e. making a speciality of each agromanagement, e.g. division of livestock, fishery, special occupations of marketing and transportation;

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

2017. The following measures are generally studied in order to increase agricultural income, and the proper measures in this region are taken.

(1) Intensification of land productivity such as "diverse crops a year" and "paddy-upland rotation" etc. through good extension workers;

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

(3) Farmland expansion by land reclamation;

(4) Specialization such as division of each agricultural sector and special occupations in marketing and transportation;

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

(6) Home industry.

III

REVIEW OF REPELITA II

3.1. A result of review on Repelita II

3001. (a) the target of planning and (b) the measures for the achievement of the target, are adequately arranged in each project programming; however, (c) the prerequisite for the planning area are not clear in quality and quantity of the natural and economic resources and in the distribution of those resources in the province.

3002. The targets of planning in the Agricultural sub-sector (Agriculture, Fishery and Forestry) are divided into 4 aspects as the following :

- a) increase of food production,
- b) increase of total production,
- c) Increase of farmer's income, and
- d) Increase of employment opportunity.

In other words, (a) and (b) mentioned above are targets for the national economy as a whole, while (c) and (d) are targets for the peoples' community.

3003. The measures for the achievement of the target are divided into 3 categories :

- a) increase of production by arrangement of physical infrastructures. For instance, rice production increase by the development of infrastructures such as irrigation facilities ;
- b) attainment of the target by the development of production system; for example, rice production increase by the improvement of the management and operation based on BIMAS/INMAS;
- c) guiding the farmers by education and organization; for example, farm technique upgrading through extension service and organization services such as BUUD/KUD.

Most of the countermeasures have tendencies toward rice production with much investment of infrastructure in Repelita II.

3004. As the alternative plan, if the other target is selected as first priority, the measures for the achievement of target should be changed. Such study must be done but there is no discussion about the priorities. 1)

3005. On the other hand, the production mechanism in Forestry and Fishery are not clarified, and consequently the measures against the constraints on production development due to mechanical problems have not been determined. Therefore, there is necessity to examine what kind of projects are really effective for the sub-region in which the present production mechanism is the major problem for production development.

3006. At this stage, more precise field surveys are necessary to find out the production mechanism of the agricultural sub-sector, the field surveys concerning the many topics mentioned in Vol. II are decided and the form of surveys are prepared, based on discussion with the counterparts.

3.2. The result of subsectorwise examination in Repelita II

(1) Food crop farming.

3007. Throughout South Sulawesi, the agricultural productions are under quite a good natural condition in general. In the west season, transportation between the market and village is paralyzed and production activities are stagnant. Besides, a lot of constraints occur such as imperfect pest control and absence of harvest and so forth for the food crop production in the west season. However, the analysis on the cause of constraints for the food crop production is not always clear. Therefore, it calls for an examination of the countermeasures based on the analysis on the constraints mentioned above.

1) E.g. when rice production increase is requested from the viewpoint of the total production increase by the state, the development of infra-structures to the farmland will be effective for the total production increase under the utilization of big machinery. However, there will be less requirement for labour force, and many labourers will lose their employment opportunity in this case. On the other hand, to absorb the utmost labour force in rural areas based on the farm labourers' welfare, increase of land productivity by production growth per ha. and multicropping will be taken as countermeasures, and activities of the extension service and enlightenment for farmers will be quite effective in this case.

(2) Industrial crop farming (estate farming)

3008. Most of the industrial crop production mainly relies on small-scale farmers. Consequently, those crops are called industrial crops in the report, in stead of estate agriculture in Repelita II.

The role of estate crop production in Repelita II is clarified from the viewpoints of both national economy and regional economy as a) diversification of farmers' income resource, b) expansion of employment opportunity, c) utilization of natural resources and d) increase of foreign currency. However, it seems that the rehabilitation and protection of perennial crops are very difficult and problematical. Even though those facts are important, more planning and countermeasures for those aspects have to be implemented. Therefore, careful considerations from the viewpoint of long-range observation are necessary.

(3) Livestock

3009. The significance of livestock industry in South Sulawesi in both national and regional economy has not been clarified yet in Repelita II. In spite of the clear tendency of decrease the statistics before the planning, those are neglected and several times of expansion are taken in the plan. In general, plannings are different from the statistic trends when socio-economic needs arise, and political necessity is urgent if the countermeasures are available. There is scarce examination about the political purposes and countermeasures to attain the target of planning in Repelita II.

However, the present structure of livestock production of farmers in the region does not aim at marketing but merely at self-sufficiency; it is particularly at a stage of side-job pattern for small farmers. Thus, it was very difficult to examine production planning in Repelita II

Accordingly, in the Project the availability for the improvement of production system will be examined first rather than the production planning itself.

(4) Forestry

3010. Most of the forestry production is conducted by the national agency. -The plan for forestry production is as follows:

- a) Diversification of the regional income and expansion of employment opportunity ;

- b) Utilization of natural resources and increase of foreign currency;
- c) Protection of forestry on national land by planting and forest conservation.

Consequently the following plan has been considered in attaining the target in Repelita II.

- a) To keep the regional forest territory and reserved areas;
- b) To conduct reforestation and reproduction of woods;
- c) To increase production from natural forestry in Luwu and Mamuju.

The present condition of forestry production is not clear, and the marketing system of forestry production was not explained in Repelita II. A forestry plan should also be made with the viewpoint of long-range observation.

(5) Fishery

3011. South Sulawesi is in the position as one of centres of fishery development in Eastern Indonesia, with the following aims:

- a) to satisfy local needs;
- b) to supply for interinsular trade, especially to Java, and
- c) to supply for export.

The main role of fishery production in REPELITA II is also defined as follows:

- a) increasing the national and domestic income, and
- b) raising the welfare for fishery villages.

The development of fishery production has been increased before Repelita II, but it was not mentioned in Repelita II concerning fishery resources in the province, the device for product processing and marketing.

IV

ANALYSIS ON THE PRESENT CONDITION

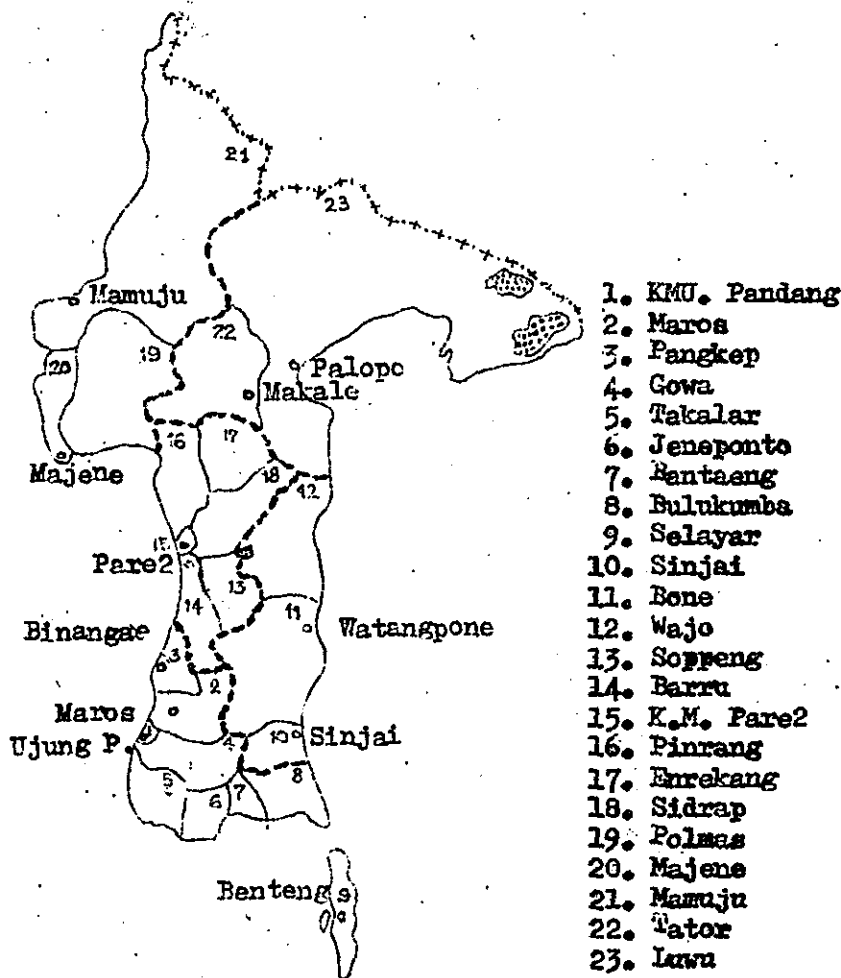
4.1. Present situation and problem

4.1.1. Location, area and nature

4001. According to the 1971 Census the South Sulawesi Province has an area of 82.8 thousand km² (62.9 km² according to the Agrarian Office) and accounts for 36% of the entire Sulawesi Island area.

The temperature is high throughout the year, at an average of 26.4°C, 31.8°C at its highest (August through October) and 21.7°C at its lowest in Ujung Pandang. Humidity is also high. Ujung Pandang city has an average humidity of over 90% from December through February and about 50% from August through October and frequent rainfalls, the province belongs to the tropical zone, and is sustainable to monsoon.

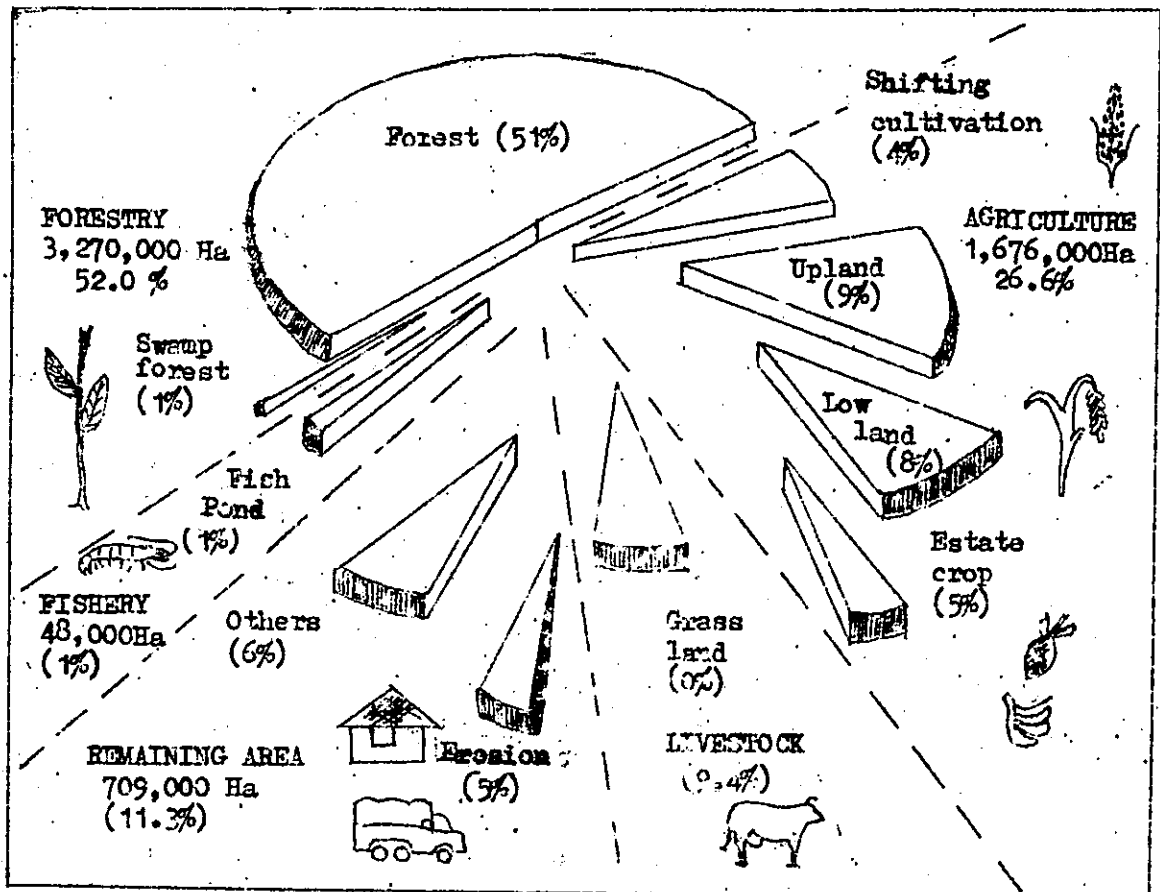
Fig. 4.1. Regions and Kabupaten of South Sulawesi Province and 5 Bloc



4002. The Total acreage of land use in the South Sulawesi Province is about 6,293 thousand ha. consisting of the following land use in 1976 (Chapter 6.12) :

	Unit : 100 ha.
Forest area	3,222
Shifting cultivation area	58
Grassland	590
Upland	909
Paddy field	509
Fish-pond	46
Others	759
Total	6,293

Fig. 4.2. Present Land-Use



Source: Estimation by the Team based on collected data.

4.1.2. Population

4003. Current estimation of the province's population shows a number of nearly 5.4 millions (1976) or about one third of the population of D-zone in eastern Indonesia, and only 4% of the whole population of Indonesia.

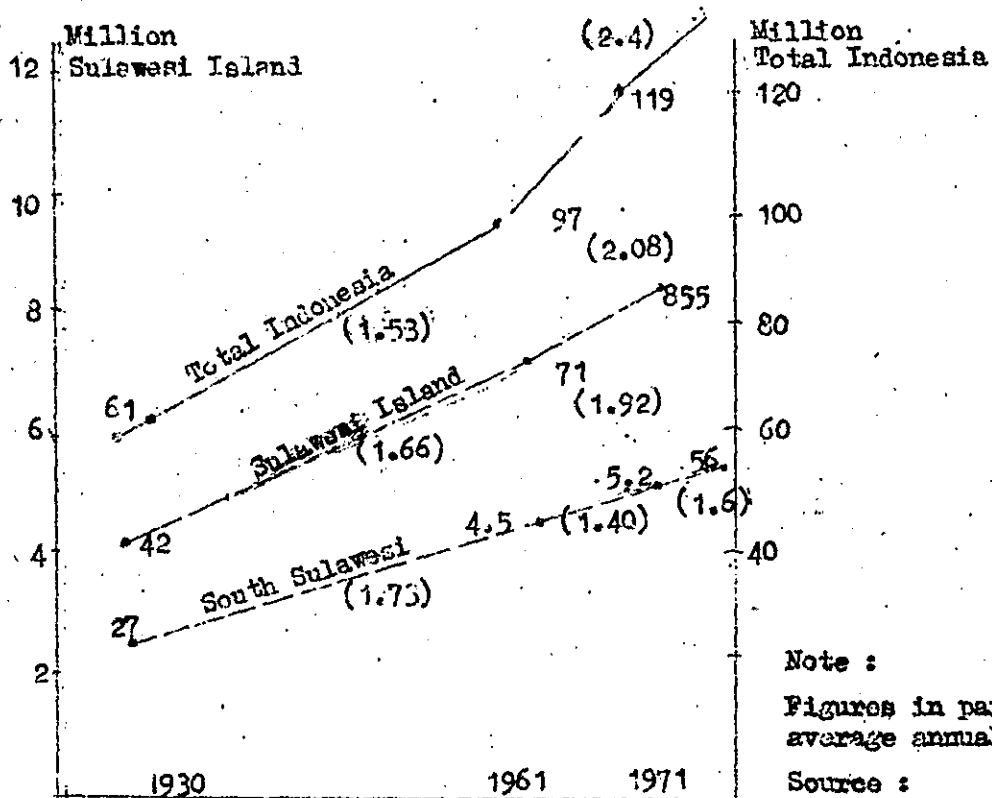
4004. The province's population growth is characterized by the following points :

1) Low rate of increase.

During the decade of 1961 to 1971, South Sulawesi population increased at an annual rate of 1.4%, compared with the national average which is over 2%; according to data from 1971 to 1976, the annual rate of population increase in the province was 1.6%, compared with 2.4% of the nation as a whole (Refer to Fig. 4.3).

ii) High dependent burden coefficient (i.e. the rat of the non-working age group to the non-working age group.

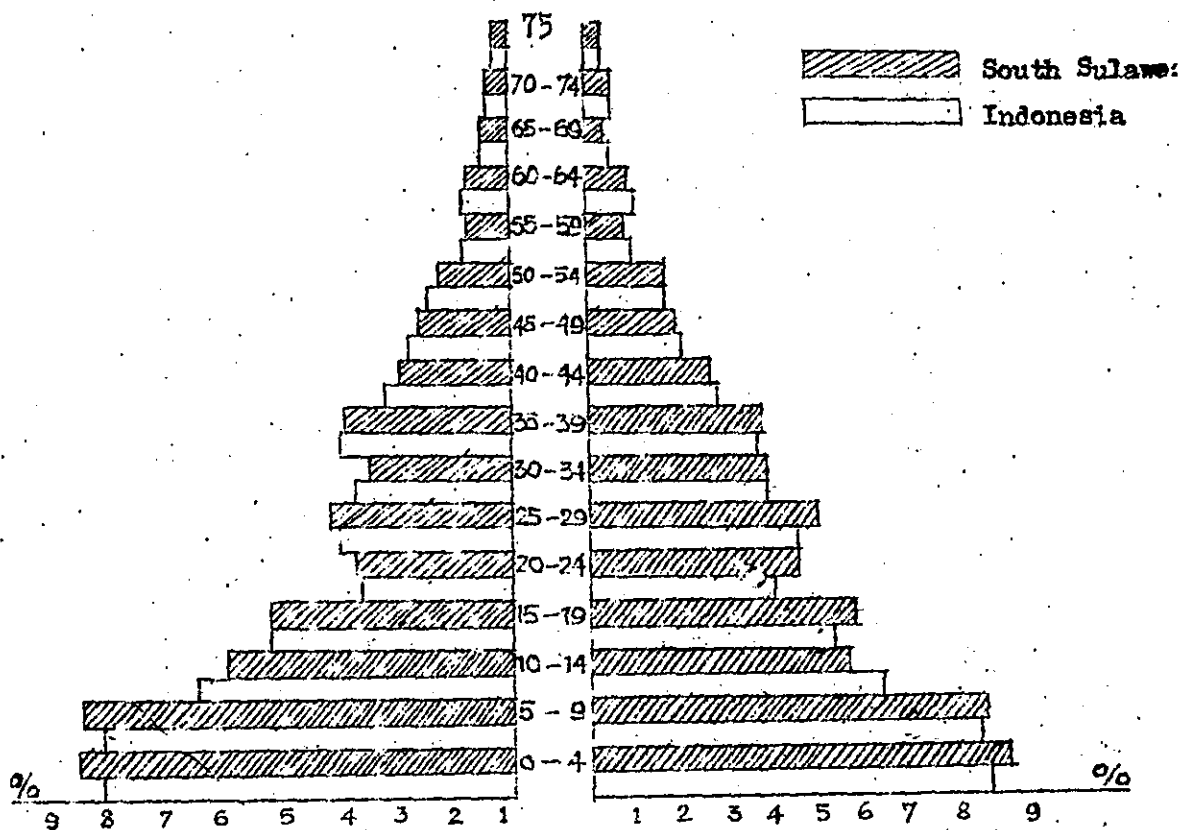
Fig. 4.3. Growth of population



Note :
 Figures in parentheses sh
 average annual growth rat
 Source :
 prepared from Census.

- iii) Female population is larger than the male.
The gap expands to 6.5% averagely and to 16.5% in the age group of 15 to 44 years in South Sulawesi Province.
- iv) There is a rapid population outflow.
The three facts above come from the population outflow.
- v) An average rate of natural increase.
The rate of infant population is the highest in Sulawesi island and average in South Sulawesi province.

Fig. 4.4. Composition of Population by Age Group (1971)



(Source) Prepared from 1971 Census

4.1.3. Labour force and Employment

4005. In the province, workers in Indonesian basic industry, agriculture, account for 2/3 of the total working population, (Refer to table 4.1).

In terms of Colin Clark's industrial classification, the percentages of primary, secondary and tertiary industries come to 66 : 8 : 26 in the province and 8 : 12 : 80 in Ujung Pandang city.

4006. Thus a policy ought to be taken in South Sulawesi to determine the priorities requiring full attention in the promotion and development of the agricultural sector in particular and that of other sectors in general.

Table 4.1. Labour employment by occupational field in South Sulawesi in 1975

No.	Occupational field/sector	N u m b e r	Percentage
1.	Agriculture	1,029,186	66,33 %
2.	M i n i n g	1,040	0.07
3.	Processing industry	114,664	7.39
4.	Electricity & gas plant	1,132	0.07
5.	Construction	15,206	0.98
6.	Commerce, Restaurants/Hotel	121,957	7.86
7.	Communication	47,324	3.05
8.	Finance & Insurance	2,638	0.17
9.	S e r v i c e s	150,507	9.70
10.	O t h e r s	67,961	4.38
T o t a l		1,551,615	100.00 %

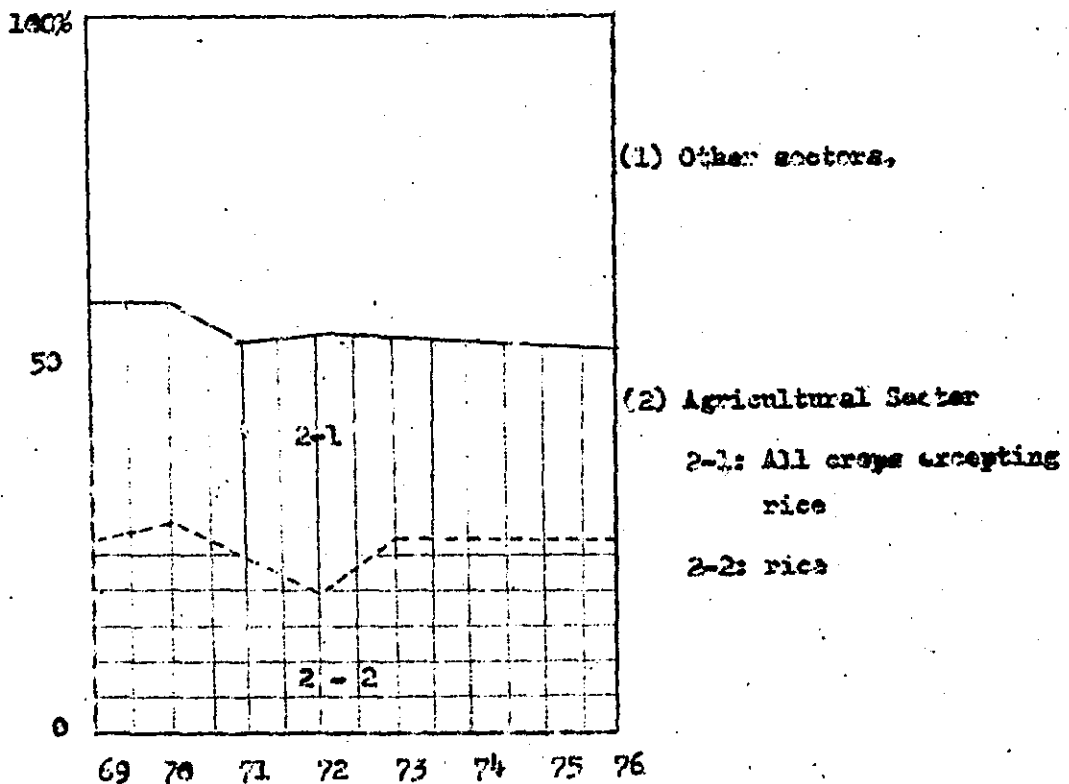
Source : Department of labour force in South Sulawesi.

4.1.4. The Economy and Industry.

4007. The province's gross product accounts for about 3% of gross national product (excluding the petroleum industry). The composition of gross regional products by industry presents a pattern similar to that across the country (Refer to table 2.3 of Vol. II).

4008. Interinsular trade of the South Sulawesi province depends heavily upon agricultural production, because agricultural products such as rice and sugar are the main items of trade. The province has the strongest trade relations with west Java and East Java, followed by those with North Sulawesi and North Sumatera.

Fig. 4.5. Weight of regional income by sector in South Sulawesi



Source: The Team estimated from data of Bappenas Sulsel.

4009 Income per capita of South Sulawesi in 1972 was about 73% of the national average, and this implies that the province was behind the nation's average income per capita. On the other hand there is a large income differential among each industry, such as shown in table 4.3. Income per capita in the agricultural sector is only 68 against that of non-agricultural sectors.

Table 4.2 Gross income development in the South Sulawesi Province

Year	Total million	Agricultural Sector			Per capita	Population 000
		Sub-total million	Percentage %	Per farmer 000 Rp		
1970	101,700	61,100	60	95.1	13,500	4,517
1971	119,700	64,900	54	95.4	12,500	5,180
1972	143,700	79,700	55	114.8	15,100	5,292
1973	192,900	106,900	55	154.0	20,185	5,296
1974	269,300	151,500	56	216.4	28,400	5,339
1975	368,800	205,600	56	289.2	37,800	5,446
1976	464,500	261,100	56	361.5	46,200	5,654

Source : 1969 - 1973

1974 - 1976 The Team's estimation.

Table 4.3. Comparison of income in agricultural sector and in other sectors (1975).

Sector	Person		Income		Per capita	
	000	%	million Rp	%	Rp	Index
Agriculture	1,029	67	205,600	57	199,800	64
O t h e r s	523	33	163,200	43	312,000	100
T o t a l	1,552	100	368,800	100	237,600	-

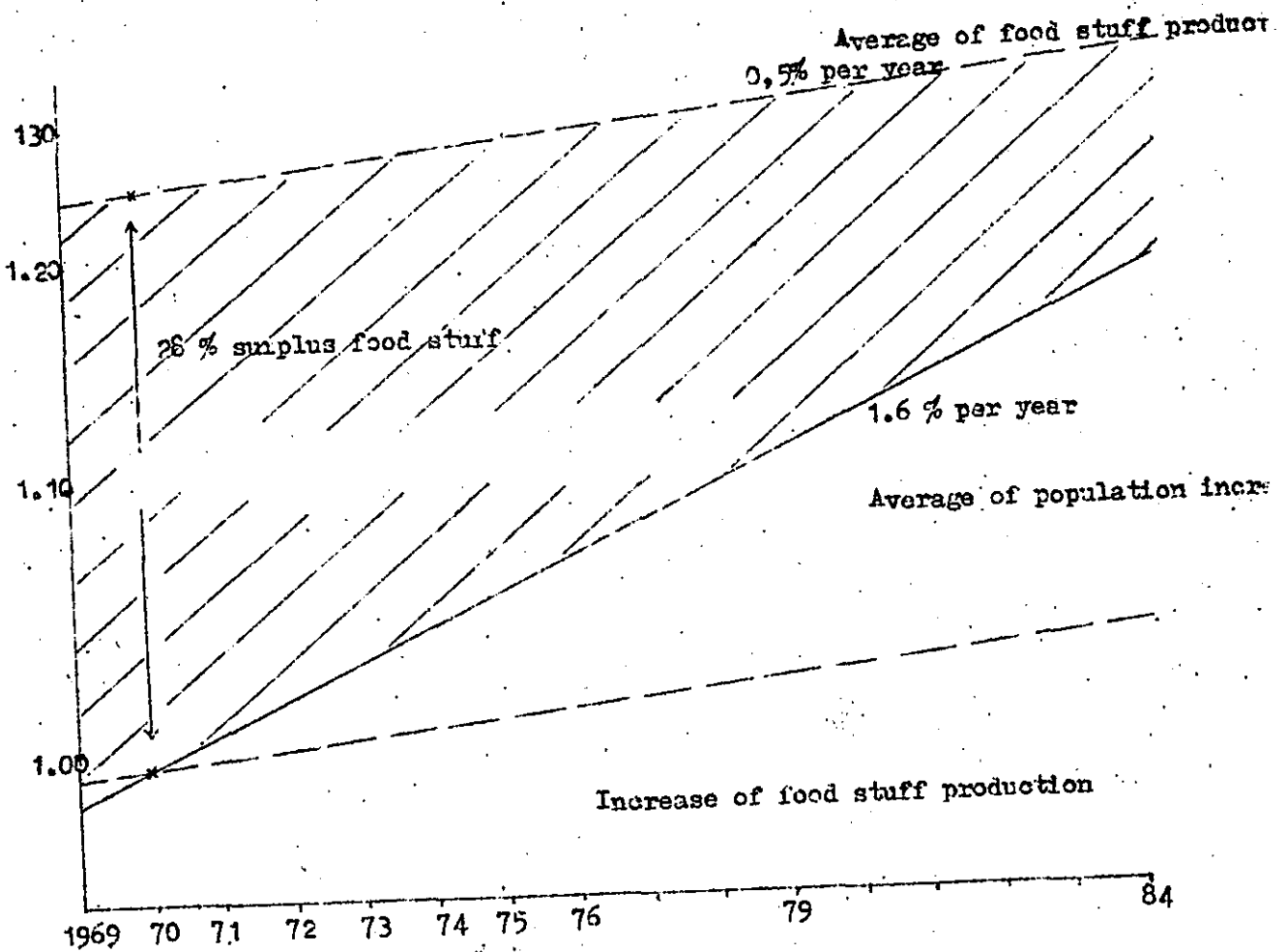
Source : Self analysis from data of the RAPPEDM, Department of Manpower.

4.1.5. Demand and supply of main food stuff

4010. South Sulawesi is one of Indonesia's greatest agricultural and rice-producing areas which accounts for about 70% of all food production. In terms of equivalence to rice, the average production of main food crops (rice, corn and cassava) in 1974-1976 amounted to 1,231,000 tons or 131% against the self-sufficiency volume of 937,000 tons. It was possible to ship main food crops amounting to 294,000 tons or 31% of the self-sufficiency volume to other province.

4011. Yet South Sulawesi's agricultural production increased at an annual rate of only 0.5% compared with the annual rate of population growth which was 1.6% (Refer to Fig. 4.6). In this way, the continuous supply to other province will yield trouble in the future.

Fig. 4.6. Estimation of food crops and population
in South Sulawesi Province.

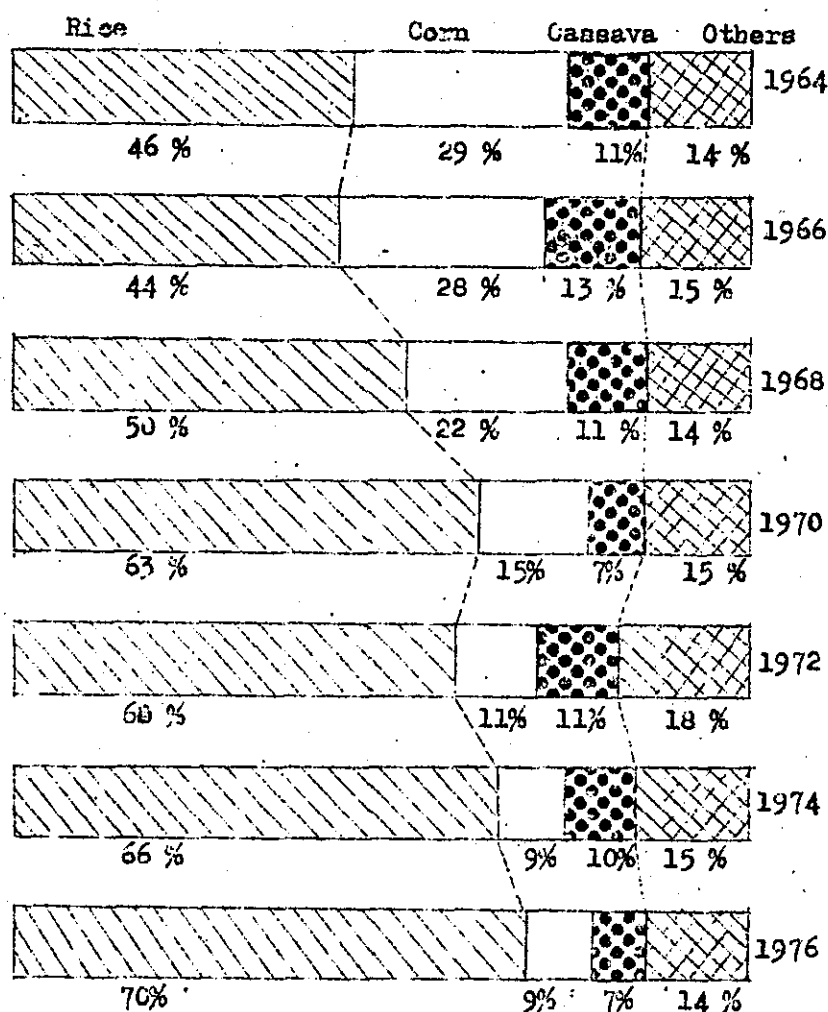


Source: The team Estimated from many data

4.1.6. Present change in the demand structure and regional production structure

4012. The percentage of rice in the whole amounts (ton) production in South Sulawesi keeps expanding, such as shown on Fig. 4.7, while the demand structure keeps changing, i.e., in the expansion of rice consumption, as people develop the preference for rice rather than corn and cassava. There by the productions of corn decline, in spite of the increased price of corn (Refer to Fig. 4.13).

Fig. 4.7. Composition of food production (ton)
from 1964 to 1976



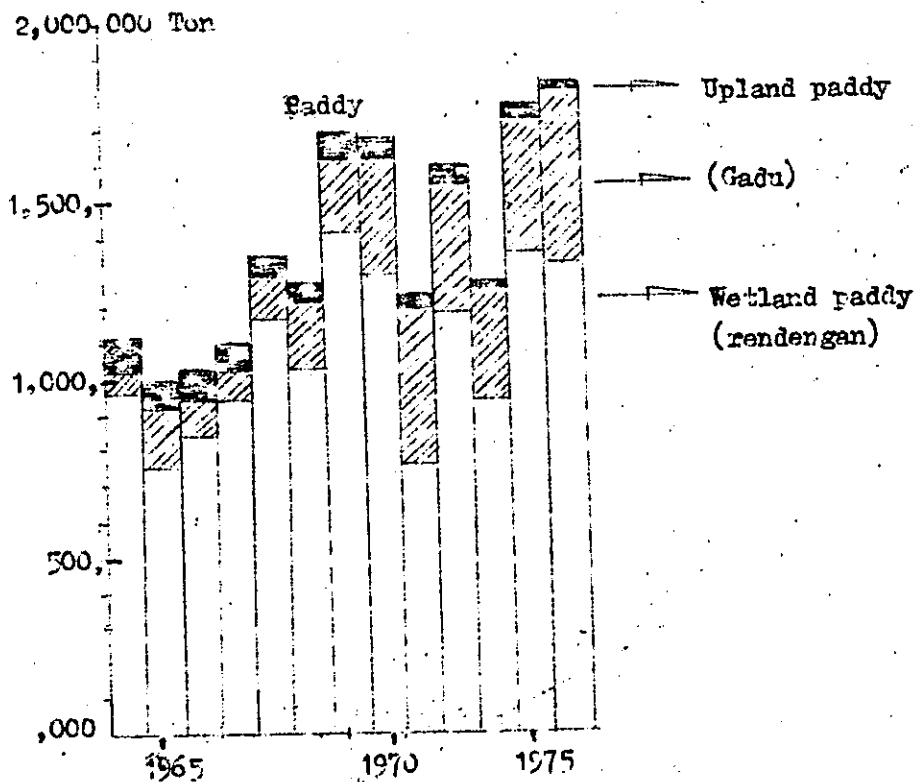
Source: The team estimated from data of Diperta Sul-Sel.

4.1.7. Evaluation of rice production during Repelita II

4013. During the periods of Palita I and Repelita II, agricultural policy was only concerned with rice production and less attention was paid to other crops; thus, the increase rate of each crop from 1969-1971 to 1974-1976 was 1.0% of rice, 11.6% of corn and % of cassava, as shown on Fig. 4.11, while for fruit and vegetable it was similar.

4014. Table 4.4. will show the benefit of projects in increasing rice production during Palita I and II (1969-1976). According to the table, the great majority of benefit was contributable to be expansion of gadu paddy, possibly in irrigated areas. KIMAS/INMAS, too, had a great contribution in increasing rice production, but it had the disadvantage of debt accumulation, as the credit from the B.R.I. for KIMAS/INMAS implementation was not able to be paid back yet.

Fig. 4.8. Development of Rice production and average yield per ha in South Sulawesi Province.



Source: The team estimated from data of Diperta Sul-Sel.

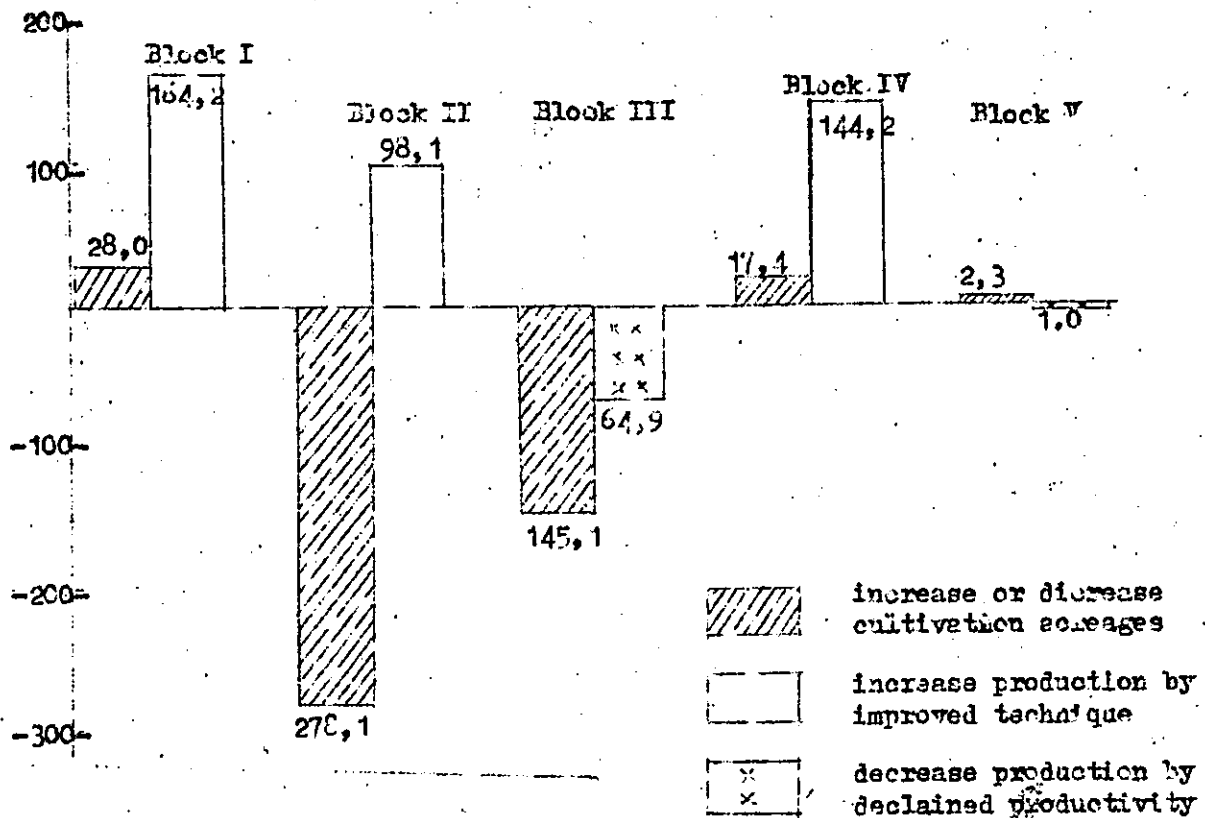
4015. The actual increase of rice production volume by gadu paddy was 117,400 tons, because most of the expanding areas of gadu were to change the season for cultivation (Refer to Fig. 4.9).

Table 4.4: Benefit of projects in increasing rice production

Benefit of projects	Annual average (ton)
i) Increasing production of gadu by area expansion	174,400
ii) Increasing yield of gadu by technical improvement	65,400
iii) Reducing production by area	-122,400
iv) Increasing yield of wetland paddy (rendengan) by technical improvement	109,300
v) Reducing upland paddy	-39,300
Total	187,400

Source : The team estimate.

Fig. 4.9. Various Benefit of Repelita I and Repelita II in the rendengan paddy production



Source : The team estimate.

4.1.8. Tendency of increase in secondary crop production

4016. Recently, yield of most rain staple food per ha., except for rice, keeps declining which was due to not only socio-economic factors but also technical problems. The latter is a considerable problem particularly in marketing, because in export marketing, stabilized shipment quantity and quality of commodities are considerable factors for profitable trading.

4017. In the near future, even in the region there would probably be a shortage of food stuff, and many infrastructures and much budget will be required to increase rice production. If farm technique for other crops will also be raised, and yield per ha. by commodity is kept steady, the budget requirement would not be so large.

Fig. 4.10. Production development of Corn and Cassava.

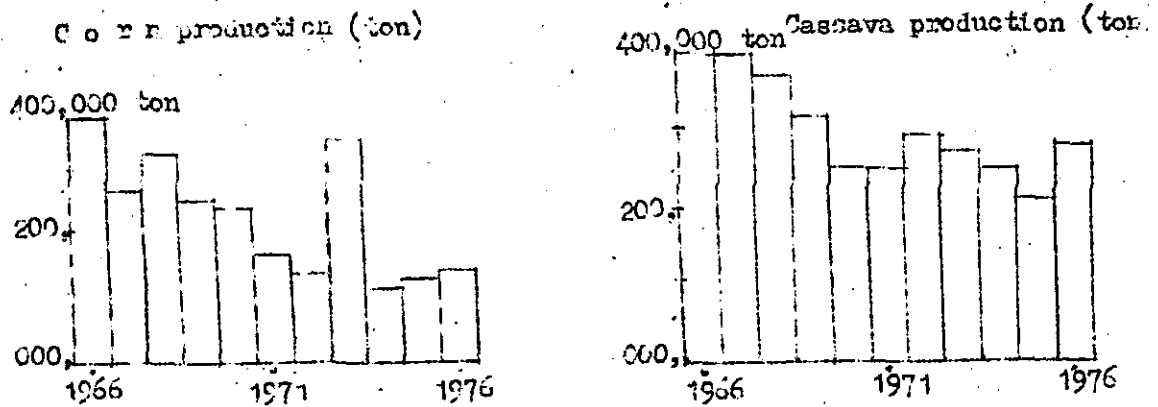
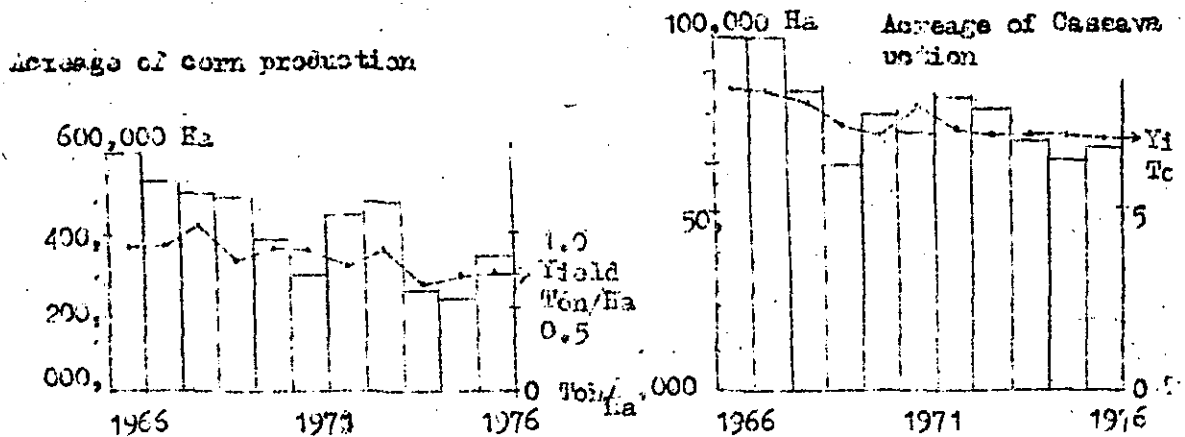


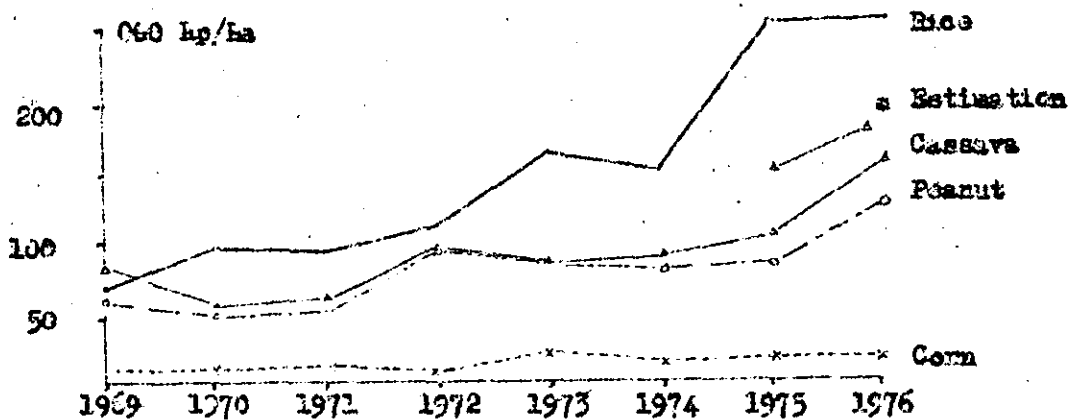
Fig. 4.11. Planted acreage of Corn and Cassava.



Source : Report by the Agricultural Extension Service in South Sulawesi

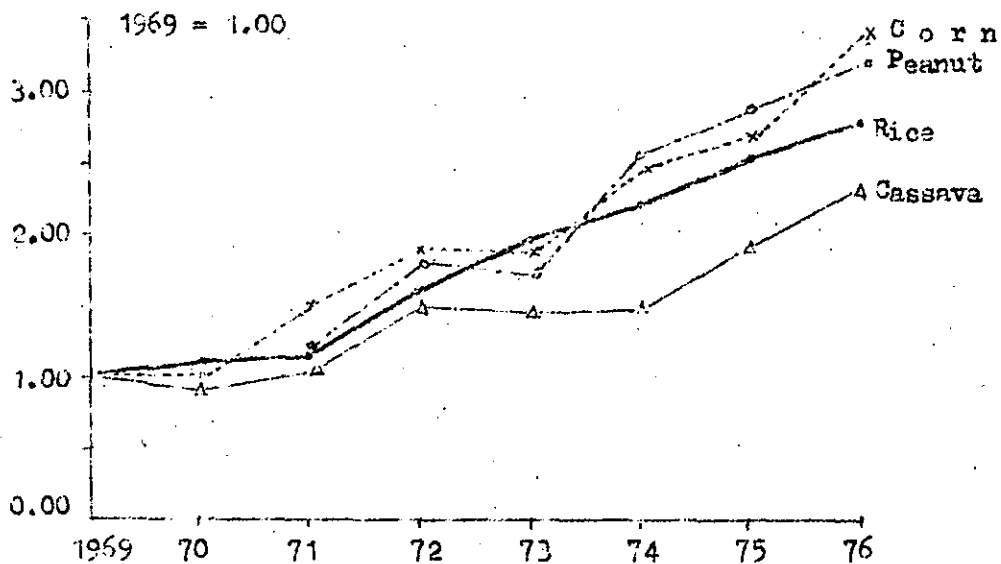
4018. Tendency of secondary crops, the production of corn and cassava have decreased year by year since 1964. Despite the unit price has been hiked because of the productivities per hectare also have declined, consequently the gross income per hectare have been stagnant. The countermeasure to increase the productivity per hectare should be emphasized.

Fig. 4.12. Gross income fluctuation (Rp/ha) by commodity in South Sulawesi (1969-1973 farmers level)



* Estimation : if yield per ha. were the same as 1969, farmers would get more income

Fig. 4.13 Fluctuation of prices by commodity in South Sulawesi



Source: Refer to table II.15 - 19, Vol. III

4.1.9. Agricultural disaster

4019. The agricultural disaster, in the past years, was not only caused by the total amount of rainfall but also by the beginning period of the wet season.

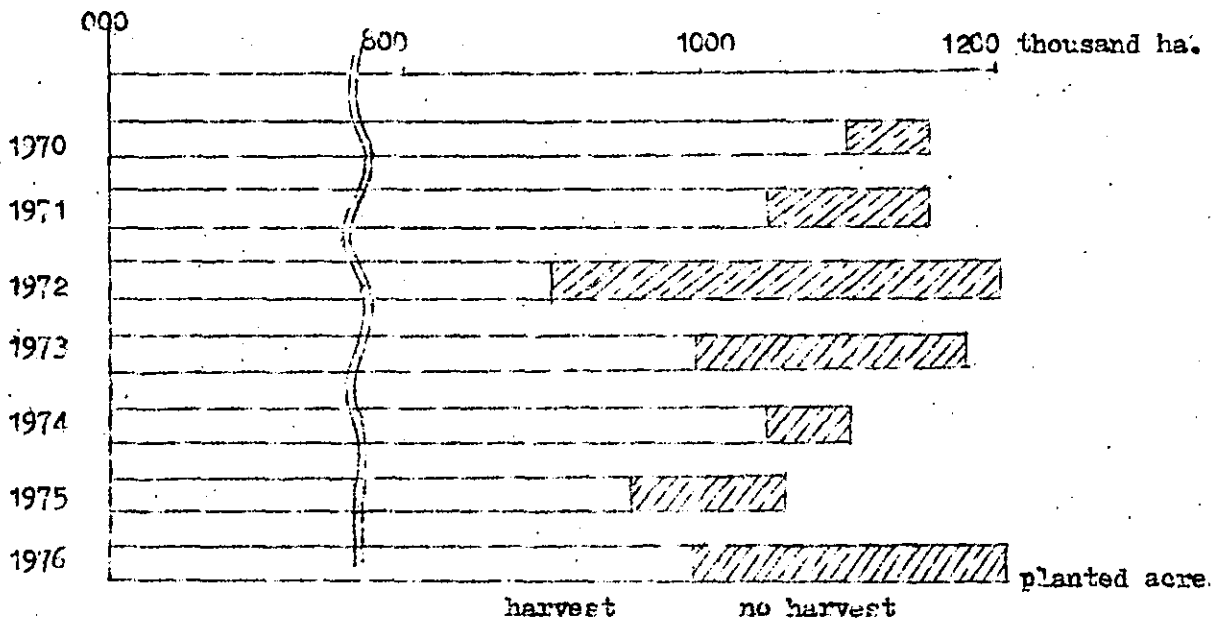
Crop yields in drought year in South Sulawesi

<u>Drought year</u>	<u>Commodity</u>	<u>Wet season yield</u>	<u>Upland yield</u>	<u>Corn</u>	<u>Peasut</u>
1972	(kg/ha.)	2,185 (78.2%)	813 (62.8%)	310 (36.3%)	332 (42.2%)
1976	(kg/ha.)	2,379 (106.6%)	1,240 (95.8%)	403 (47.2%)	242 (30.9%)
<u>Normal year</u>					
1)	(kg/ha.)	2,794 (100%)	1,295 (100%)	853 (100%)	783 (100%)

Note : 1) Average from 1969 to 1976 without drought year.

In any case, whenever the crop production declined, it was the cause of an abnormal rainfall condition. Particularly the overdue beginning of the wet season has an effect over a wide range of region in South Sulawesi

Fig. 4.14 Present farmland utilization



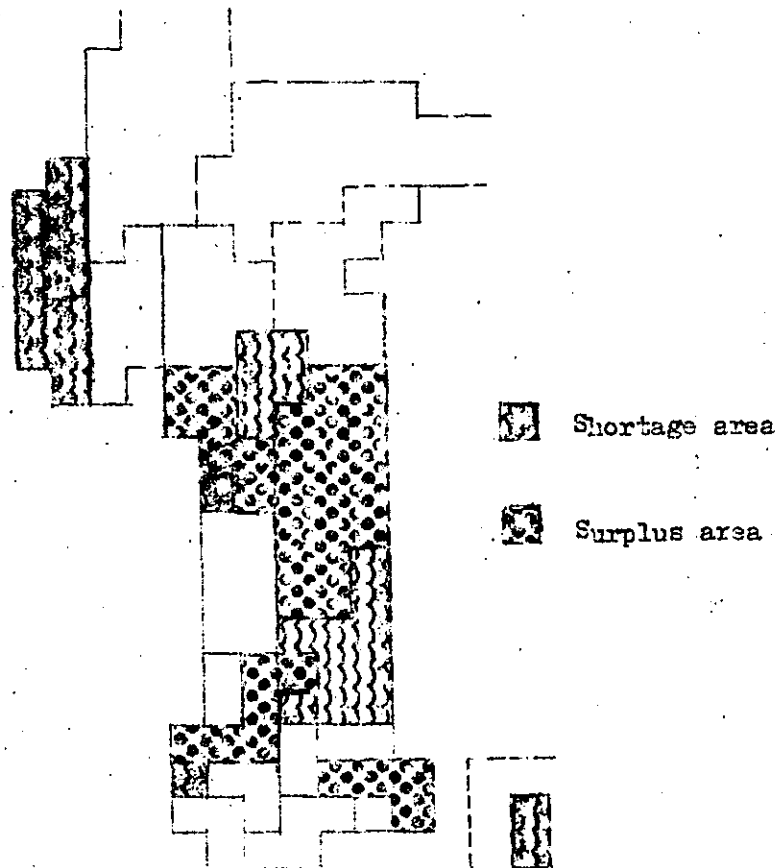
Source: The team estimated from data of Diperta Sul-Sel.

4.1.10. The Kabupaten-s of surplus food stuff production

4026. This figure shows the distribution of surplus food production areas in South Sulawesi during the period from 1974 through 1976. It is seen in this figure, that Kabupaten-s of Pinrang, Sidrap, Wajo, Soppeng, Maros and Bulukumba are surplus areas; But the Kabupaten-s Wajo and Bulukumba are unstable (i.e. no surplus in 1976 as shown on Fig. 6.1, Vol. II).

On the other hand, the Kabupaten-s Pinrang, Sidrap and Maros are stable in their surplus food production, because they have a lot of irrigation areas.

Fig. 4.15 Shortage and surplus area of Main food stuffs 1974-1976/Average



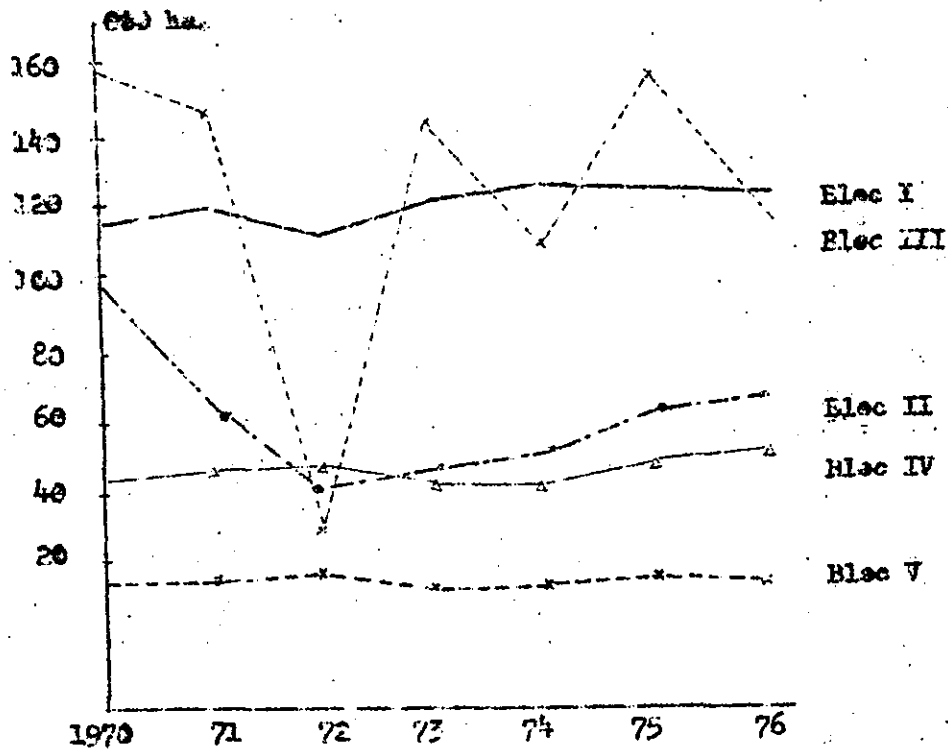
Source: Refer to Chapter 6.1.2. in Volume II

4.1.11. Characteristics of each Bloc

4C21. It is shown in Fig. 4.16 that the harvested areas of rendengan paddy in the Blocs I, IV and V are stable but in Blocs II and III they are of different cases; the reason is, that in Bloc III there is a scarce rainfall. On the other hand, in Bloc II, with the development of irrigation system in paddy fields, rendengan paddy decreases while gadu paddy increases.

Only Bloc III has a big fluctuation in its rendengan paddy harvest area. Various socio-economic condition in Bloc III are resulted by this condition, such as shown in Figures 4.17 and 4.19 (Refer to Chapter VIII in Vol. II).

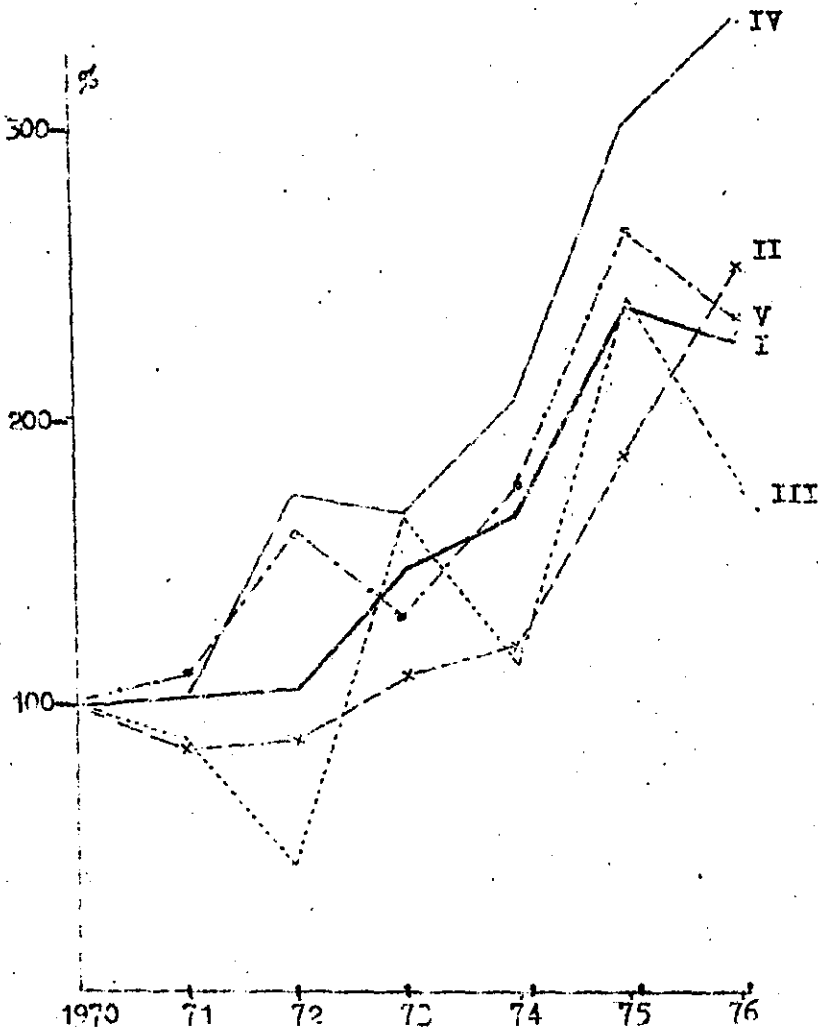
Fig. 4.16. Harvested areas of rendengan paddy



Source: The data estimated from data of Departemen Sulsel.

4022. This Figure also shows a big fluctuation in Bloc III only. The reason is estimated to be based on the unstable harvested area of rendengan paddy, which is the effect of scarce rainfall. The tendency of increase in Bloc IV is not the result of the Jawa Project but that of the construction of semi-technical irrigation projects in South Jawa.

Fig. 4.17c The rate of increase in the gross value of food crop production



Source : BAPPEDA Sul - Sel.

4.1.12. Developed areas and underdeveloped areas

4023. The priority area of regional agricultural development is Bloc III. According to Fig. 4.17, the balance of food supply and demand by Bloc, excluding Bloc III, has a slight fluctuation. There seems to be a big correlation in the fluctuation between Bloc III and the entire province (Refer to Figs. 4.16 and 4.17).

4024. It may be said that the big fluctuation in Bloc III is the main reason for the fluctuation of products in the province. If the production of food crops in 1972 and 1974 were not decreased, the surplus shown on Fig. 4.18. would be stabilized. The gross income by food crop production has the same tendency in Bloc III. Consequently the farmers' economy has not developed as compared with the other Blocs (Refer to Fig. 4.14). The reason why Bloc III has been a very unstable harvest area is mainly the fact that paddy is merely rainfed in its cultivation (Refer to Fig. 4.15).

4025. On the other hand, Bloc II which comprises the Kabupaten-s of Sidrap, Pinrang and Polmas as stable area is provided of water from the Saddang Irrigation Project and moreover, the areas have a comparatively well-developed farmers' organization.

Food crop production of the province in the past was unstable by year. This tendency prevented the development of transportation and marketing of staple food.

4026. Developed areas and underdeveloped ones are distributed as shown in Fig. 4.20, based on many data, particularly those from Chapter VI and VIII in Volume II, and Figures 4.15 to 4.19 and Section 7.8 respectively in this Volume.

4027. As a conclusion, the instability of paddy production and agricultural transportation in Bloc III constitute the bottleneck of the development of the entire province. Consequently the priority for development should be put on Bloc III and the development of this area would be available by the Central South Sulawesi water resource development project in the surrounding area of the Tempe Lake.

Fig. 4.10. Balance of total demand & supply of coal in South Sulawesi

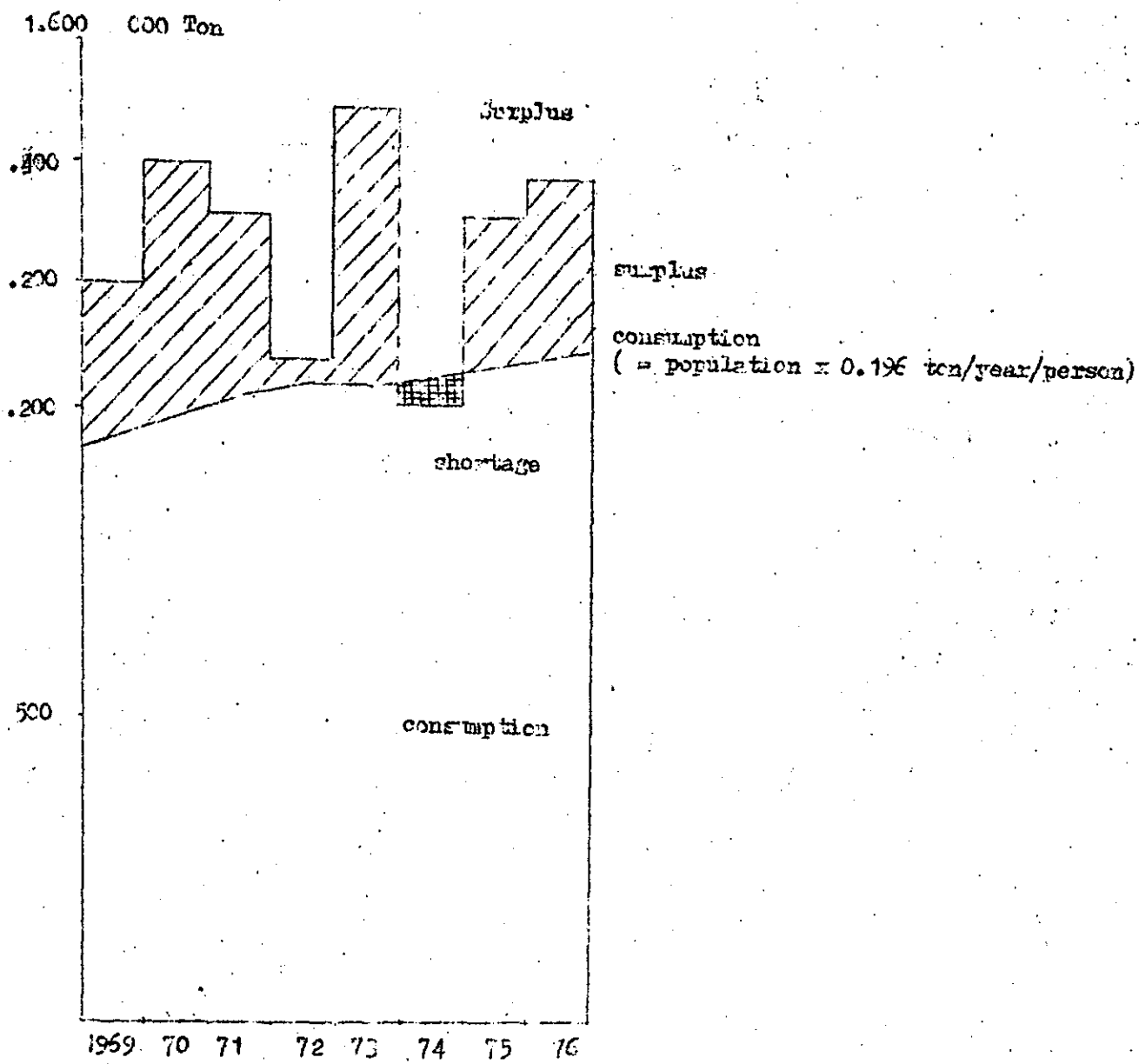


Fig. 4.19. Balance of food supply and demand by bloc

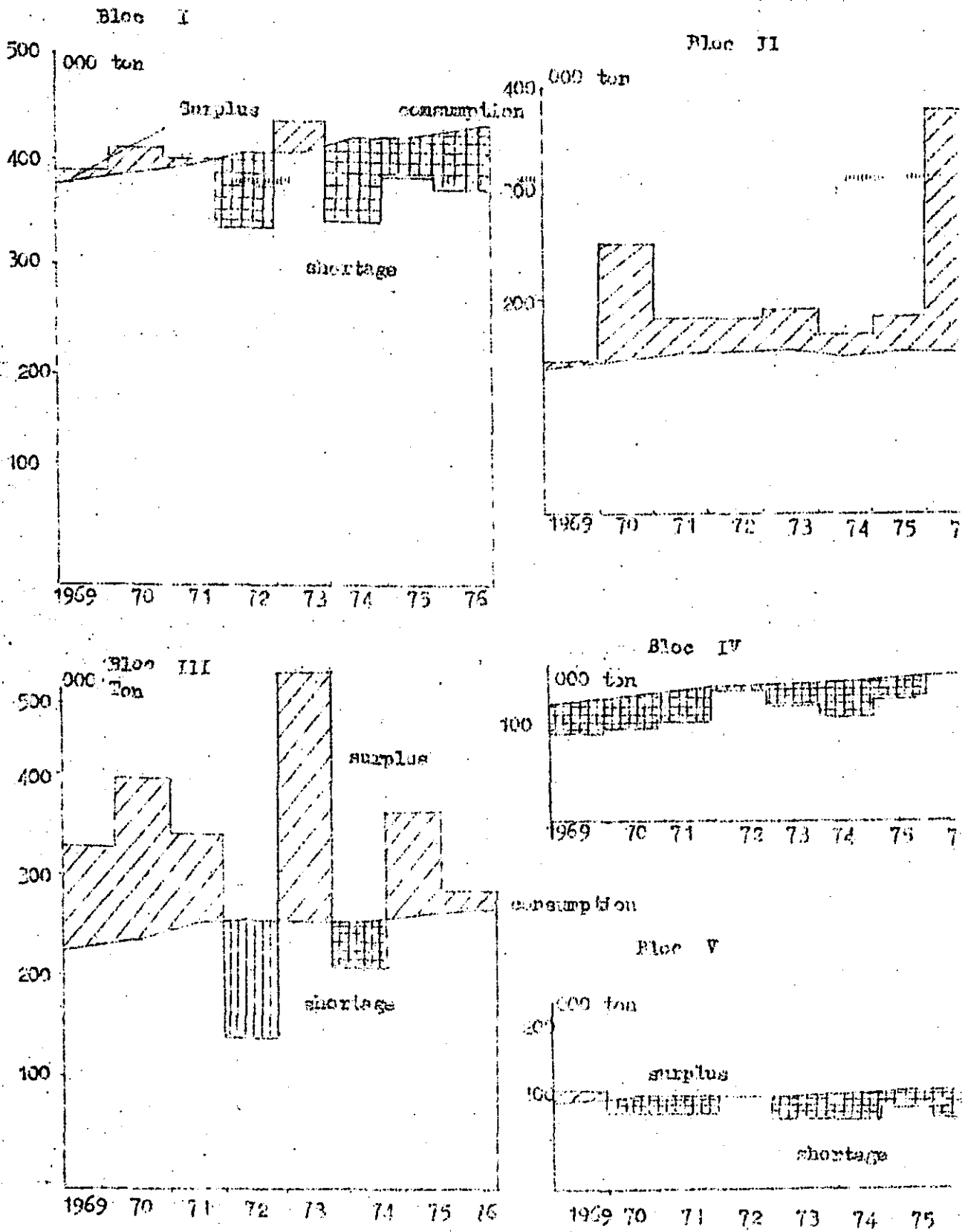
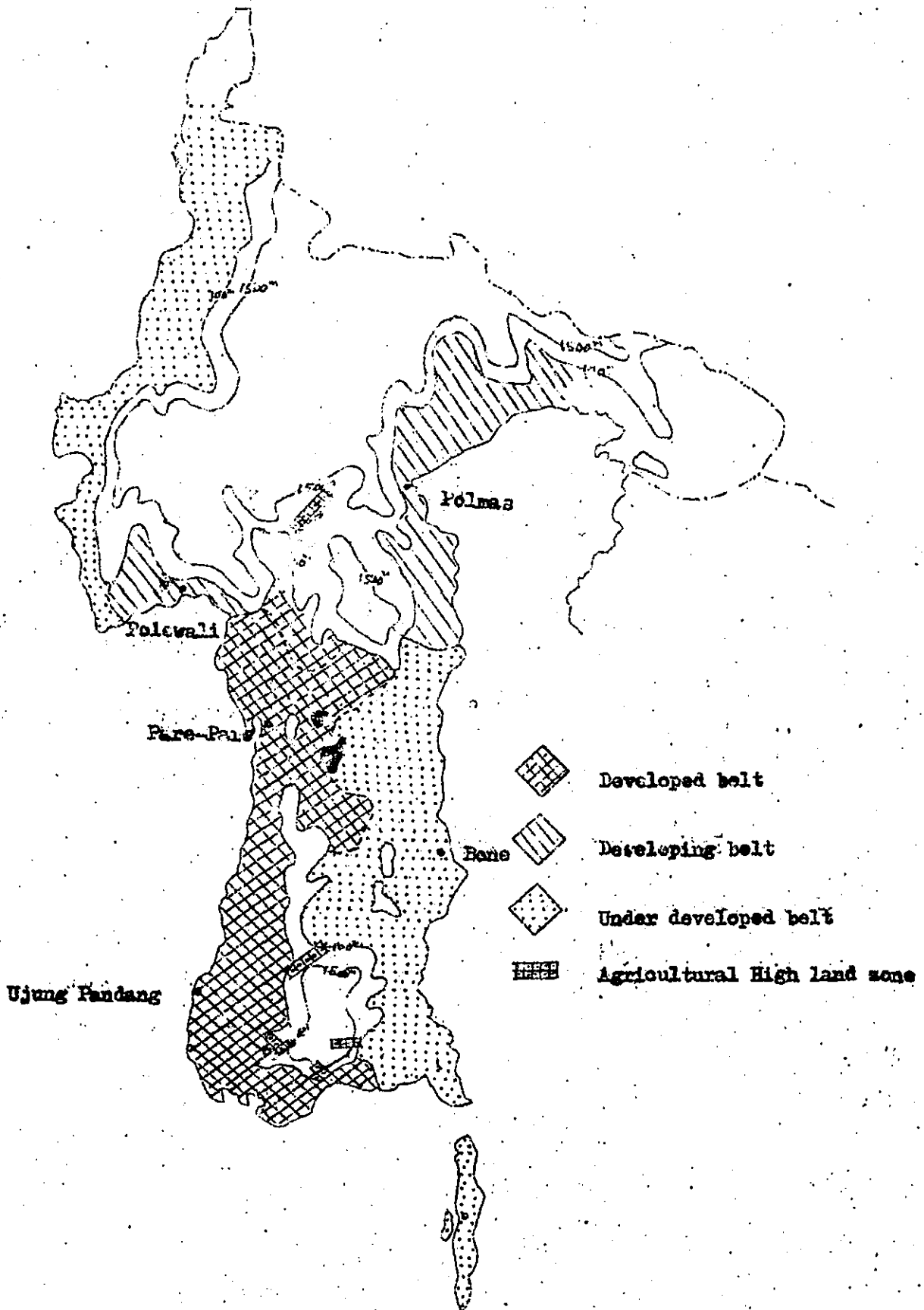


Fig. 4.20. Geographic Division of Agricultural Development Rank



4.1.13. Animal Husbandry and Fishery

4028. The majority of animal protein is taken from fish, and the annual supply per capita was 26.6 kg of fish meat and 3.7 kg of meat in 1976.

4029. South Sulawesi is the position as one of the centres of fishery development in East Indonesia, with the following aims :

- a) to satisfy local needs,
- b) to supply for inter-insular trade, especially to Java, and
- c) to supply for export.

During the periods of Pelita I and Repelita II, fish capture increased only slightly. However, since the beginning of the 1970-s fish price has risen rapidly and thereby the total value grown sharply.

4030 Fishery resources in the province have not been cultivated intensively due to the following reasons:

- a) the used of traditional fishery equipments,
- b) the restrictedness of the range in the capacity of sailing boats,
- c) the restricted application of the Five Fishery Principles (Panca Usaha Perikanan) in brackish water fish ponds,
- d) the lack of capital and skill,
- e) the restricted means and device of production, processing and marketing,
- f) the small-scale level of fishery industry,
- g) the non-functioning of the fishermen's organization, and
- h) the old-fashioned mental attitude of the fishermen.

4031. Fish cultivation at lake Tempe was extensive before, but constant inflow of sand has reduced the depth of the lake by 10-20 cm a year, and fish cultivation is becoming difficult in the lake.

But a switch to shrimp cultivation in brackish water fish pond is undergoing and the greatest composition of export value is occupied by shrimp today.

4032. Cattle raising is the backbone of livestock industry in the South Sulawesi province. In 1976 production amounted to about Rp 31.5 billion including cattle, buffaloes and other livestock. On the other hand, two large pasture land reclamation projects, respectively at Maiwa in Kabupaten Enrekang and at Siwa in Kabupaten Wajo, are run with a loan from the World Bank.

4033. However, there has not been so much of small pasture land or grassland improvement projects yet, and therefore animal husbandry development by small-scale farming remains stagnant. This does not merely imply big livestock but also small livestock such as goats and fowls.

4034. Particularly, small farmers graze their livestock in the homeyard only and don't use stable feeding. Cattle are also grazed in the paddy fields and uplands in the dry season and are pastured in the mountains in the wet season. Therefore the management of livestock is poor, and an urgent policy on the introduction of suitable livestock management in South Sulawesi need to be schemed for the development of livestock industry by small farmers.

4.1.14. Cash crops and forestry

4035. Copra accounts for approximately 60% of the total production of industrial crops. Formerly copra was distributed through Ujung Pandang, but today it is produced mainly in the North Sulawesi Province. Palms are produced in such Kabupaten-s as Mamuju, Majene and Selayar. The next largest product in value is coffee, followed by tobacco and candlenut, but recently clove cultivation advanced rapidly.

4036. Most areas (86%) of industrial crops are managed by small-scale farmers in the province and the Estate Crop Service fosters farmers' organization, but the effects were not achieved because of the following reasons :

- i) low quality of cash crops due to poor production technique,
- ii) complicated collection of cash crops from a large number of farmers,
- iii) delay of old tree juvenescence due to some socio-economic situation such as the lack of finance or persistence of old custom between land-owners and tenant farmers.

4037. Wood production amounted to about 4.5 million m³, which was worth Rp. 8.3 billion. The South Sulawesi province makes efforts to help raise industries of cane processing, lumbering and furniture. On the other hand a large budget is given for greening in the forest areas by afforestation and reforestation. But the following reasons obstruct the progress of afforestation and reforestation :

- i) few silvicultural technicians and few workers,
- ii) deficiency of transportation system as access to the planting area,
- iii) delay the examination of the proper tree in each region, and
- iv) poor maintenance and fire in the planted areas.

4.2. Forecasting of the future situation

4.2.1. Population

4038. Under Pelita I and Repelita II, population control by family planning has been employed as Governmental policy. In spite of its great effect, the province's population grew gradually year after year, i.e., at an annual rate 1.4% from 1961 to 1971 and 1.6% from 1971 to 1976. According to a population estimate by the Cohort Trend method, the annual rate of population growth will be 1.9% from 1976 to 1986 and 2% from 1986 to 1991. The estimation results are shown on table 4.5.

Table 4.5. Population estimate

Region	Year	1971	1976	1981	1986	1991
South Sulawesi		5,180	5,650	6,210	6,820	7,500
D-zone		15,040	16,550	19,890	25,500	32,800
Indonesia		120,100		153,000	196,500	252,300

Source : South Sulawesi : self estimation from Census
D - zone : prepared by U.P.I.E.

4.2.2. Food production and shipment volumes

4039. Present production volume of main food stuff such as rice, corn and cassava is 1,231,000 tons (equivalent volume to rice and average volume during 3 years from 1974 through 1976); but the tendency of productive development is an annual growth rate of merely 0.5%. Productivity per capita in 1991 will only be 178 kg., compared with 217 kg. in 1976; therefore the surplus will decline to 88,000 tons in 1991, from 294,000 tons in 1976. (Refer to table 4.6).

Table 4.6. Estimation of food shipment volume and production per capita

I t e m	Unit	1974 1976	1981	1986	1991
Equivalent vol. to rice	000 ton (a)	1,231	1,268	1,300	1,333
Required volume in S.S	000 ton (b)	932	1,031	1,132	1,245
Shipping to other prov.	000 ton (c)	294	237	168	88
% of shipping volume	(a) : (c) %	31	23	15	7
Production per capita	kg	217	204	191	178

Table 4.7. Number of labour force by region in South Sulawesi in 1961 and 1971, and estimated number in 1981-1991

Year	Unit : 000 manpower		
	Rural area	Urban area	T o t a l
1961	2,466.6	675.9	3,142.6
1971	2,735.1	749.5	3,484.7
1977	2,898.3	784.4	3,646.7
1981	2,983.8	917.7	3,801.5
1991	3,847.0	1,054.0	4,901.0

Note : Manpower : inhabitants aging 10 years and older.

Source : The South Sulawesi BAPPEDA and the Team's estimation.

Table 4.8. Number of labour supply in South Sulawesi in 1961, 1971 & 1977 and estimated number in 1981-1991

Year	Unit : 000 manpower		
	Rural area	Urban area	Total
1961	1,404.8	216.6	1,621.4
1971	1,613.1	248.7	1,861.9
1977	1,753.4	270.3	2,023.7
1981	1,827.8	281.8	2,109.6
1991	2,356.6	363.2	2,719.8

Source : The South Sulawesi BAPPEDA and the Team's estimation.

4.2.3. Labour supply and employment

4040. According to data found, the availability of labour force in the rural area is more than that in the urban area. It is estimated to be 78.49% in the rural area while in the urban area it is only 21.51%. The number of labour supply absorbed in employment in each sector is found respectively : about 86.6% in rural areas and about 13.6% in urban ones. With the growth rate of manpower in South Sulawesi of 1.04% each year, the available labour supply in 1961, i.e. 3,142,600, and in 1971, i.e. 3,484,700 will become 4,901,000 in 1990 (Refer to Fig. 4.7).

4041. Estimating that 80.95% of the number of employment in South Sulawesi is located in the rural area, and about 2.37% in the urban area, we can calculate the number of labour supply in 1971 to be 1,861,900, in the rural area 1,613,100 manpower, and in the urban area 248,700.

The estimation for 1991 yields a number of 2,719,800, with the specification : 2,356,600 in the rural area and 363,200 in the urban area.

4042. According to the Census in 1971, the number of labour employment in the agricultural sector was 855,600 manpower, 753,300 male and 102,300 female. The percentage of agricultural labour against the total population was 16.5%; particularly the percentage of female labour force against the total population was only 4%; but in the future the percentage of female labour force will be increased. The ratio of entrance into schools of higher level is shown in Tab. 4.9; but the entrance rate will also increase in the future.

Table 4.9. Percentage of labour employment in South Sulawesi
by educational level

1. Elementary School drop-outs	69.97 %
2. Elementary School graduates	20.27 %
3. General Secondary School graduates	3.97 %
4. Vocational " " "	1.83 %
5. General Senior Sec. School "	1.34 %
6. Vocational " " " "	2.32 %
7. Academic/University "	0.41 %
	100.00 %

Source : The South Sulawesi Provincial Office, Ministry of Manpower.

4.2.4. Economic growth

4043. According to Dr. Sumitro's forecast, Indonesian GDP will reach Rp. 42,000 billion (approximately \$ 100 billion) or Rp.170,000 (\$ 420) per capita in the year of 2000. Per capita GDP indexes for East Indonesia and South Sulawesi Province are currently 74 and 73 respectively, vis-a-vis the national average of 100. Economies of these regions must grow at an annual rate of 7.6 to 8.7 %, in order to narrow and eventually eliminate the gap by 2000. Table 4.10 shows the targets for those areas.

In the agricultural sector, alternative plan 2 (7.4%) and alternative plan 3 (7.7%) should be employed. (Refer to Table 2.3).

Table 4.10. Targets for economic growth

Region	Annual Growth of GDP %			Per capita GDP (US\$)			
	73/80	80/90	90/2000	1973	1980	1990	2000
Indonesia	7.35	7.00	7.00	130	180	275	420
East Indonesia	7.60	8.70	8.70	96	135	234	420
South Sulawesi	7.70	7.60	8.00	95	144	248	420

4044. To attain the targets, it is necessary to outgrow the monocultural rice production and improve and diversify the present industrial structure. If South Sulawesi is to catch up with the national average per capita GDP, the share of industry in the provincial GDP should be increased to 15% (US\$ 95.6 million) in 1990 and 19.3% (US\$ 180 million) in 2000, while the share of agriculture now at more than 60%, will decline to 40-45 %. (Refer to Dr. Sumitro's Report).

Strategies of Agricultural Development in South Sulawesi

5.1. Leading projects

5001. The result of the analysis on the present condition of regional agriculture development in South Sulawesi shows the importance of rice income on the land resources and fishery income in the water resources. As shown on Vol.II, Chapter 3, gross income from rice occupies more than 50% of total agricultural income, and of this amount the marketable surplus of rice is only 5% for DOLOG and 20% for other marketing routes. This indicates that cash income originating from rice is considered to be about 10% of total agricultural income.

5002. On the other hand, most of fishery income is cash income occupying about 10% of gross agricultural income in South Sulawesi province. Consequently the contribution of fishery in raising cash income, especially foreign currency, is quite significant, and shrimp occupies 29% of the total export in the province in 1976.

5003. The two mentioned above, i.e. developments of rice fields and fish ponds, respectively on land and water resources, would be leading projects in agricultural development in South Sulawesi.

5.2. Supportive measures

5004. The development of upland and grassland resources shall be considered as supportive measures in agricultural development of South Sulawesi province. The upland resources development deals with secondary crops (foods, feeds trees, silkworms and silk) and estate crops (annual and perennial crops), and grassland development in the base of livestock development.

5005. From the viewpoint of cash income, estate crops, horticulture and sericulture are quite significant, occupying more than 20% of total gross income. The locality of those cash income resources mentioned above lies mainly in hilly and mountainous areas where rice crops are not enough for the farmers' livelihood.

5006. The grassland for livestock improvement, additionally, is also located in the mountainous areas as a resources of cash income and a precious resource for soil fertility, especially in upland orchards and vegetable gardens.

5.3. Preventive maintenance

5007. Thus the forestry and sea fishery resource developments shall be stressed as preventive maintenance in agricultural development in South Sulawesi province in order to prevent more-destruction in the bare and denuded lands and more discrepancy of income among the fishery village people.

5.3.1. Afforestation and reforestation

5008. The small number of people in the vast area of forest lands cannot prevent the critical destruction in a positive way, and more destruction is foreseeable in spite of the large sum of financial budgets given by the central government for afforestation and reforestation. The introduction of a new technique of silviculture shall be studied in the most effective area in the province.

5009. At the same time, part of the shifting cultivation area shall be planted to grass and reforested to prevent destruction, and most of the shifting cultivators shall be resettled in suitable areas for normal cultivation with transportation development. It is needless to say that those shifting cultivation areas shall be afforested as a series re-settlement projects.

5010. Exploitation of natural forest for timber and so forth in the province should be saved as far as possible, as the most important preventive maintenance in the province.

5.3.2. Sea fishery.

5011. The poverty of sea fishermen in the province is more critical and miserable than that of farmers (peasant) in the paddy fields and upland field areas in the province. Restoration of socio-economic conditions is beyond the scope of technical cooperation on a regional agriculture development planning project, because laws and regulations should be established to enforce the development of those aspects.

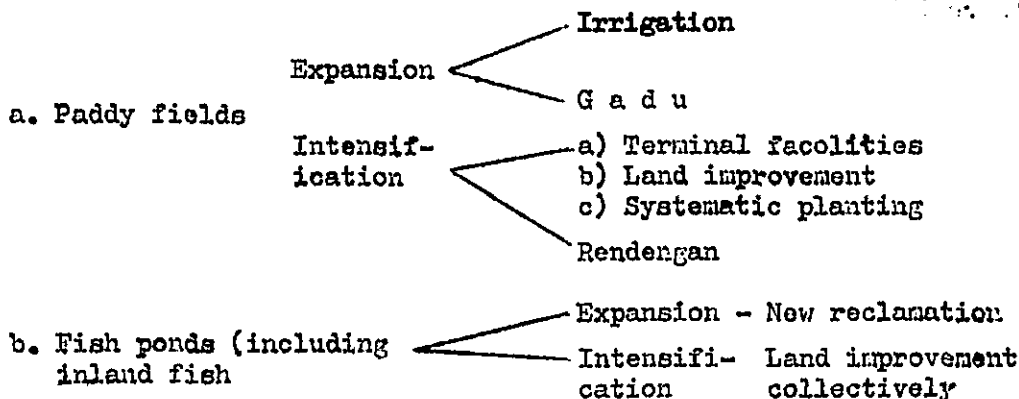
5012. The development of sea fishery economy under those prevailing socio-economic conditions resulted as the consequence of the long historical period, is quite difficult. If the subsidies are given to those villages, the result will be in vain for ordinary fishermen except for a few ship-owners, bosses and middleman in the village.

5013. Thus, sea fishery development is for the time being considered as the preventive maintenance under the prevailing socio-economic conditions in the province. As far as the way of technical development is concerned, the recommendations made by Dr. T. Kafuku would be quite essential as shown in the recommendations in Chapter VIII.

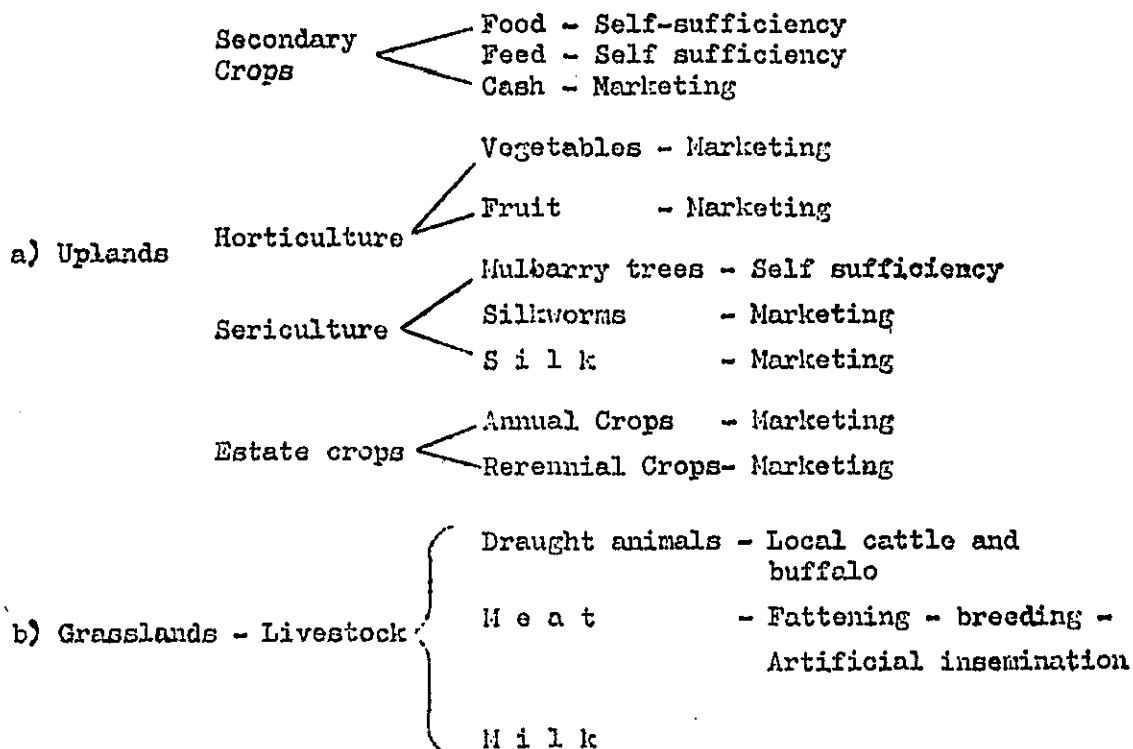
5.4. Basic features of the strategies

5014. The basic features of the strategies can be summarized as follows:

1) Leading Projects (Infrastructure improvement)



2) Supportive Measures (Technical improvement)



3) Preventive maintenance (Resource conservation)

- i) F o r e s t - Afforestation (Greening)
- ii) S e a - Sea fishery

VI

INTEGRATED PLAN

6.1. Planning procedure and definition.

6.1.1. Period of the plan.

6001. As a result of study, it is forecast that big projects for water resources development in South Sulawesi, such as the North Luwu Project and the Water Resource Development Project in the Central part of South Sulawesi, will be realized mostly by 1990.

6002. On the other hand, population increase in the province up to 1990 is able to be estimated by means of the Cohort Trend method, based on the existing data.

Although it will not be forecast concerning the extent of time to which the tendency of population outflow from the South Sulawesi Province will continue, it must be estimated that the outflow will continue for a 15 year period.

6003. Demand and supply of staple food in the future will be able to be clarified from the two aspects mentioned above. Thus the target year of the integrated plan is concluded to be 1990 after a period of 15 years from 1976.

6.1.2. 45 main commodities for staple food.

6004. The available acreages for each commodity are calculated in the land use plan. If the necessary acreage for some commodity exceed the available acreage, alternative food commodities should be considered. The team selected the 45 food commodities because those are the main crops among a lot of crops in South Sulawesi.

6005. In case the available acreage for some commodity is larger than the necessary acreage for it, the commodity can be traded to other provinces or be exported. In the province it will be possible to improve the quality of shipment commodities within the coming 15 years, and the Government will be able to improve interinsular trade and export upon the improved quality.

6.1.3. Planning area and used data.

6006. For the easy transfer of know-how on the mechanism of plan making to the counterparts it is considered to process the lucid data and to use a simple planning method. Therefore the data are taken in such

a way as not to complicate plan making:

i) The planning area is merely 2,725 thousand ha. excluding part of kabupaten Mamuju, Majene, Polmas and Luwu, because there is no map on the forest territories of those Kabupaten-s and it impossible to design projects of land reclamation in those areas for a 15 year period.

ii) In the studies of land classification by crop and of forestation, many factors are expected to be processed, but the examination of land classification was done based on the followings 6 factors: such as a) topography, b) altitude from sea level, c) soil type and so on (Refer to text book Vol.IV)

6.1.4. Planning procedure and the study flow.

6007. The planning procedure and the study flow in this report are as follows: (See Fig. 6 1.).

1) Order of National Plan

Input data of family planning and transmigration plan in relation to population plan.

2) Estimation of population.

The estimation is done by means of the Cohort trend method based on data of the years 1971-1976.

3) Required nutrition per capita.

Evaluation by weighed-arithmetic-average based on the required calory and protein by age group in target year (Refer to table 6.3).

4) Required food per capita.

Estimation in relation to the required nutrition per capita based on component-proportion-ratio of food in the developed region. (Refer to table 6.5.)

5) Required food in the region.

(Required food per capita) x (estimated population).

6) Food shipment to other regions.

Estimation based on the national plan or tendency of past record. (Refer to table 6.7).

7) Required production of estate crops.

(Present production volume) x (growth rate) -- in this report, 4.6% which was planned in Repelita II. (Refer to table 6.8).

- 8) Production plan for each crop.
(Required food in the region) + (Required shipment to other regions) + (Required production of estate crops).
- 9) Existing acreages.
Average data from 1974 to 1976.
- 10) Required expansion.
(Required food in the region) : (farm productivity - ton/ha) x (1 + rate of loss in reservation, marketing and transportation etc.)
- 11) Potential of farmland.
(Preparation of maps based on soil condition, topography and climatic condition, refer to table 6.20 method is shown in Vol.IV, text book).
- 12) Possibility of expansion/
Comparing the required expansion acreage with the farmland potential.
- 13) Production acreage.
(Existing acreage) + (expansion acreage).
- 14) Required labour for farming.
(Production acreage) : (labour productivity - day/ha).
- 15) Agricultural labour force.
(Population) x (rate of labour force in target year) x (present distribution for agriculture against the entire labour force).
- 16) Balance of labour employment.
(Agricultural labour force) - (Required labour force) 0
- 17) Required material for farming.
Production acreage: input material per hectare.
- 18) Agricultural material supply.
Estimation based on national plan or tendency of the supply.
- 19) Possibility of material supply.
Comparing the volumes of required material with that of material supply
- 20) Possibility of improvement of agricultural technique.
Improvement of production system and study of farm labour use and material supply volume in order to intensify agricultural production.

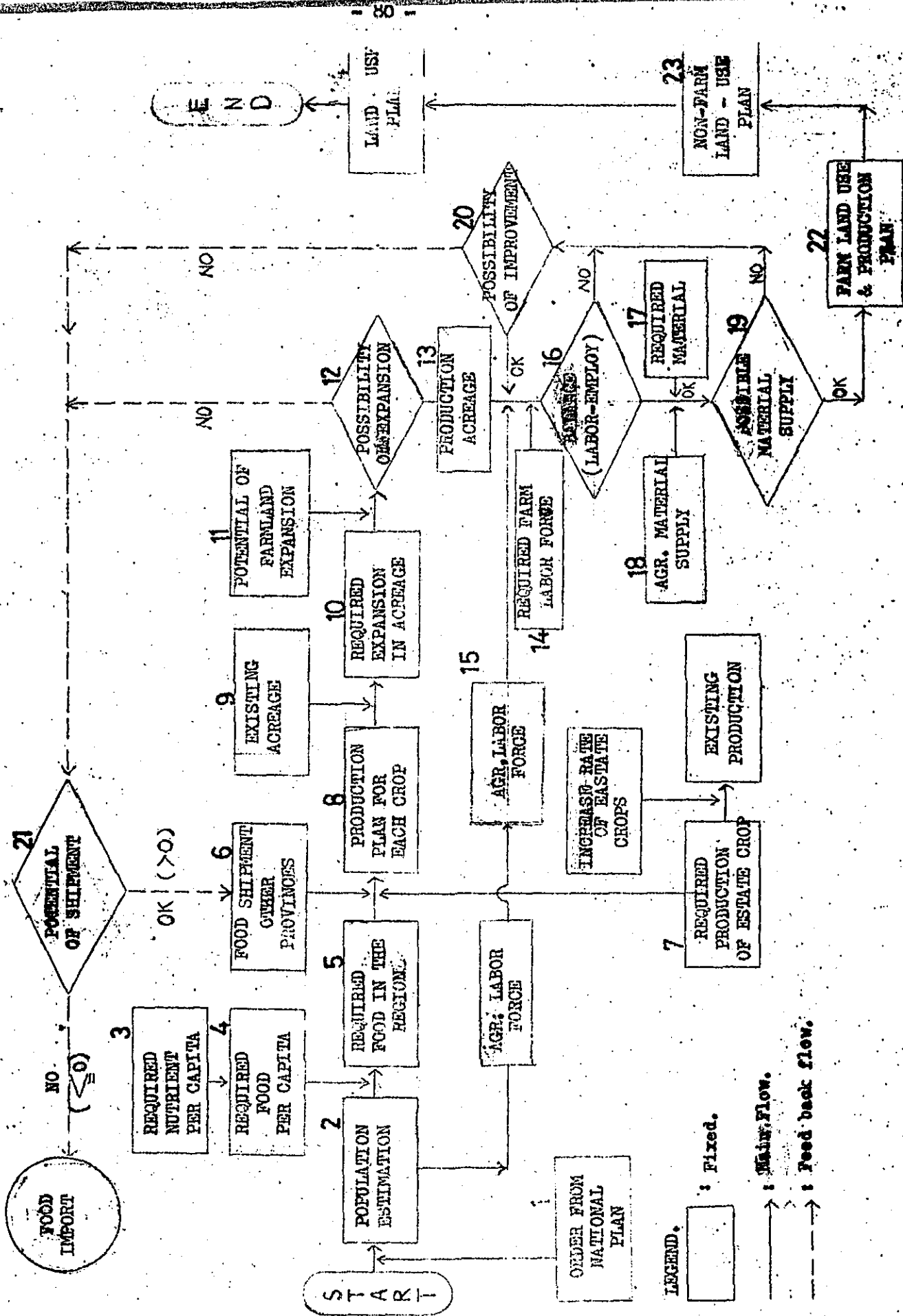
- 21) Potential shipment from other regions.
A substitution for import in case of shortcomings and impossibility of intensive agriculture.
- 22) Farmland use and production plan.
Final coordinated plan by which farmland use, labour use and material supply are balance.
- 23) Non farmland use.
Land use plan for non-agricultural sector such as village factory, airport etc.
- 24) Land use plan.
Final integrated plan in which the development of the entire region is considered.

6008. This chapter is compiled according to a Flow Chart of the Demand and Supply plan for food (Refer to Fig. 6.1.).

T o p i c		<u>Number of procedure in the flow chart.</u>		
6.2.1.	Request from the National Plan	(1)		
6.2.2.	Estimation of population and labour force	(2)	(15)	
6.2.3.	Estimation of food requirement			
	i) required calory and protein per capita	(3)		
	ii) required food in South Sulawesi province	(4)	(5)	
	iii) food shipment to other province	(6)		
6.2.4.	Estimation of required industrial crops	(7)		
6.2.5.	Production plan for each crop for food	(8)		
6.2.6.	Plan for farmland expansion	(9)	(10)	
6.3.	Study on the potential of farmland expansion	(11)		
6.4.1.	Auxmary of the studied alternative plans	(6)	(24)	
6.4.2.	Food demand and supply plan	(22)		
6.4.3.	Checking on availability of input and labor force		(14) (15) (16) (17) (18) (19)	
6.4.4.	Plan of farm land use	(22)		
6.4.5.	Land use Plan	(23)	(24)	

and so on.

FIG. 6.1. FOOD DEMAND & SUPPLY PLAN.



6.2. Human Request and Political Request towards planning.

6.2.1. Request for a population plan from the National Plan.

6009. There is an estimation that the total population of Indonesia will grow twice as much (about 25 million) in 1980. The Government keeps a positive population control by means of family planning, with international cooperation. Needless to say, the effect of family planning is taken into consideration in the population plan of this report.

6010. The rate of population growth in the province was 1.6% during the past five years until 1976, but according to a calculation by the Cohort Trend Method it is forecast to be 1.9% for the next fifteen years, and there will be 7.5 million persons in the province after 15 years. However, the team subtracted 0.1% from 1.9% of the population growth rate in the population plan such as the following:

Table 6.1. Estimation of population increase

					Unit: 000 persons
Year	1971	1976	1981	1991	Difference
Tendency	5,180	5,650	6,210	7,500	
	← 1.6% →		← 1.9% →		>200
Family plan	5,180	5,650	6,150	7,300	
			← 1.8% →		

6.2.2. Estimation of population and labour force.

6011. The team estimated future population of the South Sulawesi Province by means of the Cohort Trend Method, taking into account the survival rate as a result of the birth rate and the death rate, and the social outflow and inflow of population.

Birth rate is naturally affected by the family planning, but the transmigration policy affects the inflow of population in this province today. And table 6.2. is a result of population estimation by the Cohort method.

Table 6.2. Estimation of population in South Sulawesi

		<u>M a l e</u>					
		1971	1976	1981	1986	1991	Survival rate
13)	0-14	1,178,276	1,266,884	1,402,831	1,549,316	1,710,650	10362
14)	15-19	250,079	268,885	289,103	320,126	353,554	02282
15)	20-24	160,565	172,639	185,611	199,568	220,983	06903
16)	25-29	186,923	200,980	216,092	232,329	249,799	12517
17)	30-34	145,059	155,967	167,698	180,307	193,855	08344
18)	35-39	170,903	183,755	197,579	212,440	228,113	12668
19)	40-44	111,696	120,095	129,125	138,839	149,282	07027
20)	45-49	94,003	101,072	108,674	116,845	125,635	09049
21)	50-54	69,989	75,260	80,918	87,004	93,546	08006
22)	55-59	42,788	46,005	49,468	53,187	57,188	06573
23)	60 +	110,133	118,414	127,310	136,879	147,168	07743
24)	Sub total :	2,520,414	2,709,956	2,954,409	3,226,840	3,529,773	
		<u>F e m a l e</u>					
1)	0-14	1,105,100	1,223,671	1,355,041	1,496,536	1,652,374	10009
2)	15-19	271,592	300,732	332,961	368,707	407,207	02721
3)	20-24	216,876	240,146	262,058	290,142	321,291	08714
4)	25-29	239,322	265,000	293,434	320,209	354,525	12219
5)	30-34	185,248	205,124	227,132	251,502	274,451	08571
6)	35-39	181,573	201,055	222,621	246,506	272,955	10853
7)	40-44	128,029	141,766	156,984	173,822	192,472	07808
8)	45-49	93,266	103,233	114,348	126,623	140,205	08066
9)	50-54	83,419	92,369	102,282	113,250	125,407	09904
10)	55-59	40,672	45,036	49,870	55,222	61,144	05399
11)	60 +	114,463	126,674	140,201	154,647	171,358	08165
12)	Sub total :	2,659,497	2,944,846	3,256,932	3,597,166	3,973,389	
25)	Total	5,179,911	5,654,802	6,211,341	6,824,006	7,503,162	

(Family plan reducing 1% of total) - 62,113 - 68,240 - 75,032

Consequently: 1981 ; 6211,300 - 62,100 = 6,149,200 persons

1986 ; 6824,000 - 62,100 - 68,200 = 6,693,700

1991 ; 7503,205 - 62,100 - 68,200 - 75,000 = 7,297,900

6012. According to the Census of 1971, the percentage of agricultural labour against the total population was 16.5%, and particularly the percentage of female labour force against the total population is only 4%. However, the agricultural sector gives the most significant contribution in increasing the regional domestic products in South Sulawesi. In addition to this, the agricultural sector is one which absorbs the largest number of labour supply available. It shows that the agricultural sector will still be the backbone of the economy in South Sulawesi in the future, since the majority of the inhabitants live on this sector.

6013. Thus a policy ought to be adopted in South Sulawesi to determine the priorities requiring full attention in the promotion and development of the agricultural sector in particular and that of other sectors in general. If we say the promotion of the agricultural sector, we are not referring to the promotion of this sector alone, but also other sectors which will develop and promote; it is even hoped that the other sectors, particularly the industrial one, will increase in their growth rate, so the aims of the development will be attained. In either case, the chief priority of the agricultural sector is urgently felt to be fixed in arranging steady and goal-conscious programmes, based on the following data.

Table 6.3. Estimation of the number of agricultural labour force

	1971	1976	1981	1991
Population	5,180	5,650	6,150	7,300
Labour force	3,143	3,485	-	-
(15-59 years)	(2,673)	(2,920)	(3,186)	(3,822)
Agr. labour	856	1,078	1,170	1,410

Note : $1,029.2$ (Agricultural labour in 1975) \times 1.0475 (annual rate of increase) = $1,078.1$

Source: Data of 1971 and 1976 from the Census and the Ministry of Manpower; other data are the Tema's estimation.

6.2.3. Estimation of food requirement

1) Required calory and protein per capita

6014. A plan for the achievement of first priority in the Master plan, i.e. increase of food, is shown according to the following criteria. The average calory and protein intake per capita in 1990 will be about 2,180 cal. and 65 grams (Refer to table 6.4), though in 1975 only 1,720 calories and 49 grams of protein per capita were taken in Ujung Pandang, Because there is sufficient potential of agricultural production and it is possible to achieve such calory and protein level in South Sulawesi in the future.

6015. A consumption plan by food commodity is shown on table 6.5., considering the target set by Health Service on consumption by commodity. An authority of the Health Service stated that 18 grams of animal protein and 47 grams of vegetable protein per capita are required for living. To improve living condition it is not only necessary to increase livestock production but also to make a change in the food composition, i.e. to take more rice than corn and cassava.

Table 6.4. Estimation of required calory and protein per capita in 1990

Age group	Sex	Population 000	Weight	Calory cal.	Protein gr.
0-14	Male	1,625	0,227	1,890	38
15-19		336	0,046	3,000	65
20-39		893	0,122	2,600	65
40-59		426	0,058	2,400	65
over 60		147	0,020	2,000	65
0-14	Female	1,570	0 215	1,820	38
15-19		387	0,053	2,100	57
20-39		1,223	0,168	2,000	55
40-59		519	0,071	1,900	55
over 60		171	0.024	1,600	55
Weighted average		7,297	1,000	2,075	62
Allowance				5%	5%
Total				2,179 cal	65 gram

Note: The increase of calory for each group will be forecast in the future because body weight will increase. That is why an allowance of 5% is added. Average of calory and protein per capita is the weighted.

6016. South Sulawesi Province is an important region as the base of food supply to other regions in Indonesia. In this report three alternative plans were studied; one is for foods to be supplied to D-Zone exclusively (8 provinces of Eastern Indonesia), and the other is for foods to be supplied to the entire region on Indonesia (Refer to section 6.6.)

Table 6.5. Nutritional sufficiency recommended in Indonesia

Group	Age (year)	Body weight (kg)	Calory (cal)	Protein (g)	Calc. (mg)	Iron (mg)	Vit.A (mg)	Vit.B (mg)	Vt.C (mg)
Male									
adult	20-39	55	2,600	65	0.5	10	4,000	1.0	60
	40-59	55	2,400	65	0.5	10	4,000	1.0	60
	60--	55	2,000	55	0.5	10	4,000	1.0	60
Female									
adult	20-39	47	2,000	55	0.5	12	4,000	0.8	60
	40-59	47	1,900	55	0.5	12	4,000	0.8	60
	60--	47	1,600	55	0.5	12	4,000	0.6	60
In preg-	Extra		+ 300	+10	+0.5	+5	+ 500	+0.2	+30
Breast	Extra		+ 800	+25	+0.5	+5	+2,500	+0.4	+30
feeding									
Boys									
	16-19	50	3,000	65	0.6	12	4,000	1.2	60
	13-15	42	2,900	58	0.7	12	4,000	1.1	60
	10-12	35	2,300	50	0.7	12	3,450	0.9	60
Girls									
	16-19	45	2,100	57	0.6	12	4,000	0.8	60
	13-15	42	2,400	58	0.7	12	4,000	1.0	60
	10-12	35	2,300	50	0.7	12	3,450	0.9	60
Children									
	7-9	27	1,900	42	0.5	10	2,400	0.8	50
	4-6	18	1,600	30	0.5	10	1,000	0.6	40
Infants	1-3	12	1,200	25	0.5	8	1,500	0.5	30

Source: Dinas Kesehatan in Ujung Pandang.--

2) Required food, calory and protein per capita

6017. In estimating the amount of calory and protein in certain kinds of food, there are the following categories:

- a) estimating the componen proportion ratio from the tendency of the regional food production;
- b) estimating the developed componen proportion ratio around the region;
- c) to adopt a domestic policy in order to raise the living standard of the nation and to modify an agricultural policy.

The last category (c) is adopted in this master plan, because the Health Service in Ujung Pandang has already formulated a policy on the component of food consumption.

Table 6.6. Measuring average of consumption volume by calory and protein per capita per day in 1990.

Commodity	Consumption		Required			
	per- capita Kg/year	per capita g/day	calory/ capita per day	protein/ capita per day	calory/ 100 g.	protein/ 100 g.
Rice	120	328	1184	22	360	6.8
Corn	23	63	227	5	361	8.7
Cassava	49	134	196	2	146	1.2
Potato	26	71	88	1	123	1.8
Peanut	5	13	49	2	360	13.5
Beans	11	30	90	8	300	28.0
Fruits	66	180	117	6	65	3.0
Vegetable	33	90	27	1	30	1.5
Meat	8	22	64	4	290	20.0
Fish	30	82	119	13	140	16.0
Eggs	4	11	18	1	162	12.8
Total			2,179	65		

Data of food crops, from rice to vegetables mentioned on the table, is made according to the data of Dinas Kesehatan. It is possible to add 5% more (about 100 cal) from sugar, oil and so on, but basic data to estimate these are unavailable.

Table 6.7. Measuring the average of consumption by commodity

Commodity	Weight of production/consumption				Kg/ capita	Remarks	
	1975	1976	1984	1990			
Potatoes							
Sweet potato		0.92	0.90	0.90	23		
Potato		0.08	0.10	0.10	3		
	1.00	1.00	1.00	1.00	26	Projection from data of consumption/capita 1975 from Kantor Kesehatan.	
Beans							
Soy bean	0.45		0.45	0.45	5		
Green gram	0.55		0.55	0.55	6		
Fruit							
Banana	0.32	0.54		0.45	29.7		
Papaya	0.12	0.04		0.10	6.6		
Orange	0.05	0.03		0.05	3.3		
Durian	0.05	0.05		0.05	3.3		
Mango	0.29	0.25		0.25	16.5		
Salacca	0.06	0.04		0.05	3.3		
Pineapple	0.08	0.03		0.05	3.3		
	1.00	1.00		1.00	66.0		
Vegetable							
Cabbage	0.24	0.18		0.25	8.2		
Potato	0.11	0.13		0.12	4.0		
Big plant	0.09	0.12		0.10	3.3		
Cucumber	0.07	0.07		0.08	2.6		
Beans	0.13	0.08		0.10	3.3		
Spanish-pepper							
Onion leaves	0.07	0.15		0.10	3.3		
Other (onion)	0.15	0.09		0.10	3.3		
	0.16	0.18		0.15	5.0		
	1.00	1.00		1.00	33.0		
Meat							
Cow		0.11	20	0.20	1.6		
Buffalo		0.16		0.10	0.8		
Horse	0.00	0.00		0.00	0.0		
Goat		0.01		0.02	0.2		
Sheep				0.00	0.0		
Pig		0.05		0.60	0.6		
Poultry		0.67		0.10	4.8		
	1.00	1.00	1.00	1.00	8.0		
Fish							
Inland fish		0.16		0.20	6.0		
Fish pond		0.16		0.20	6.0		
Lake/river		0.08		0.07	2.0		
Marine fish		0.76		0.73	22.0		
	1.00	1.00	1.00	1.00	30.0		

There is a big difference between the existing consumption weight at present and in the future, based on the results concerning the rate of livestock increase. For instance, annual increase rate of each kind of livestock is as follows:

Cow	4.20%	Target Year
Buffalo	2.75%	Present
Goat	1.85%	
Pig		
Poultry		
and so on		

Note: Calculation method of Kg/capita by commodity

Example: Sweet potato in 1990 $0.90 \times 26 = 23$
 Potato in 1990 $0.10 \times 26 = 3$
 Soy bean in 1990 $0.45 \times 11 = 5$
 green peas in 1990 $0.55 \times 11 = 6$

3) Plan of food shipment to other province.

6018. The shipment of agricultural products in the past is shown on table 6.8 and although rice is traded throughout Indonesia, most of the other crops are traded in D-zone only. Livestock and fish products are exported to Singapore and Japan today.

6019. The tendency of interinsular trade and export in the future seems to decrease as mentioned above in Chapter III, but South Sulawesi's potential for cultivation is sufficient in the agricultural environment, in which potential land and labour force can be used. Therefore it is possible to keep the existing percentage of food shipment to other regions as a domestic policy despite the decreasing tendency mentioned above.

Table 6.8. Percentage of shipments to other provinces against volume of self-consumption in South Sulawesi.

	1974-	1984	Prototype	Alternative plan		
	1976					
	% *	%	%			
Rice	30	25	30	no limit	no limit	no limit
Corn	30	2	30	30	30	no limit
Cassava	30	50	30	} same as prototype	30	30
Potato	30	50	30		30	30
Peanut	-	5	5			
Beans	-	1	5			
Fruit	-	1	1			
Cabbage	1	4	5			
Other vegetable	1	1	1			
Cattle	5		10			
Buffalo	-	4	1			
Other livestock	-		-			
Brackish water fish	5		10			
Lake/river fish	-		-			
Sea fish	1	10	15			

Note: - Refer to section 6.4 about alternative plan

* Present percentage are maximum during three years.

Source: The team estimate.

6.2.4. Estimation of the required production of industrial crops (including Sericulture).

6020. There are two kinds of industrial crops, i.e. annual crops and perennial crops. Annual crops such as tobacco and cotton are scheduled in the crop rotation for upland fields. Perennial crops will occupy the uplands for along period. Since most industrial crops and sericulture originated from cash crops, they will be distributed to suitable areas from the viewpoints of soil and climatic conditions.

6021. The plan is made on the basis of the following criteria:

Expansion of industrial crops in the future is estimated by profitable commodities. Therefore, at first the priority of the industrial products should be decided, afterwards, land resources should be used according to the priority of the commodity until the possible demand for each commodity is met.

6022. The following order of industrial crops according to land productivity, or, in other words, profitability per hectare, are forecast in South Sulawesi Province in particular:

1. Clove, 2. Coffee, 3. Tobacco(Virginia), 4. Pepper, 5. Sesame;
Indonesia in general:

1. clove, 2. Pepper, 3. Nutmeg, 4. Coffee, 5. Tobacco(Virginia).

6023. A positive policy of the Provincial Government on the expansion of coffee, coconut, cotton and sugar cane, however, is formulated in South Sulawesi. The following order of priority of industrial crops should be decided according to the policy of the Provincial Government: 1. Coconut, 2. Coffee, 3. Clove, 4. Cotton, 5. Sugar cane, and then annual crops will be planted together with other crops in multiple cropping.

6024. Increase of demand volume in 1990 is estimated as shown on Table 6.10. The substitution of import volume is 10% of the national import volume at present. The increase of export volume in 1990 is taken at 10% of the increase of national export volume. And the increased volume of the regional consumption is estimated by the annual rate of increase, which is 6.4%. This rate is accounted for in REPELITA II.

Table 6.9. Plan of industrial crop shipments

Unit: 000 ton

Commodity	From S.S.	Into S.S.	Remarks
Coffee	12.5		10% of increased export vol. from Indonesia.
Coconut	30.0		d i t t o
C l o v e	1.0		10% of the sufficient volume for import into Indonesia
Cotton	10.0		50% of the sufficient volume for import
P e p p e r	1.4		10% of increased export vol. from Indonesia.
Sugar cane		12.4	50% of present interinsular trade from other regions.
Nutmeg	1.9		Twice the present export vol.
Candlenut	14.8		Estimated volume of present planted area
K a p o k	2.2		Twice the present production volume
Castor oil	0.3		d i t t o
S i l k	-		
T o t a	74.1		

Note: The increased export volume is estimated by the Team.

Table 6.10. Estimation of the required production of industrial crops in South Sulawesi.

Unit: 000 ton.

Commodity	Present production	Present export	Production in 1990
Coffee	5.89	1.15	18.5
Coconut	69.89	5.36	137.2
Clove	0.03	-	1.1
Pepper	0.15	-	1.7
Sugar cane	2.38	-	17.0
Nutmeg	0.02	1.24	2.5
Candlenut	9.98	-	14.8
Kapok	2.34	1.11	4.6
Castor plant	0.11	0.18	0.5
Silk	-	-	-

Note: Annual industrial crops are planted in upland fields.

6.2.5. Production plan for each crop

6025. Based on the required nutrient and the required shipment to other regions, a production plan for each crop is made, such as shown on Table 6.11. The Plan should not merely be carried out for the development of the South Sulawesi Province.

Table 6.11. Production plan for each crop in 1990 (Prototype)

Commodity	Unit: 000 ton			
	Total volume	Local demand v.	Shipment volume	Import volume
<u>Food Stuff</u>				
Rice	1,309.6	1,007.4	302.2	-
Corn	261.9	201.4	60.5	-
Cassava	511.5	393.5	118.0	-
Sweet potato	240.0	184.6	55.4	-
Potato	31.3	24.1	7.2	-
Peanut	44.1	42.0	2.1	-
Green gram	52.9	50.4	2.5	-
Soy bean	44.1	42.0	2.1	-
Vegetables	256.8	251.3	5.5	-
Fruit	553.0	547.5	5.5	-
Beef	14.1	12.7	1.4	-
Other meat	5.0	5.0	0	-
Fish	296.8	262.6	34.2	-
<u>Industrial crop</u>				
Coffee	18.5	6.0	12.5	-
Coconut	137.2	107.2	30.0	-
Clove	1.1	0.1	1.0	-
Pepper	1.7	0.3	1.4	-
Sugar cane	29.4	29.4	-	12.4
Nutmeg	2.5	0.6	1.9	-
Candlenut	19.6	4.8	14.8	-
Kapok	4.6	2.4	2.2	-
Silk	-	-	-	-
Cotton	10.3	0.3	10.0	-
Tobacco	11.6	1.1	10.5	-
Sesame	0.2	0.0	.	-
Rosella	1.1	0.0	1.1	-

Source: Data from Tables 7.4 - 7.8, 7.16 and 7.17.

6.2.6. Request for the expansion of farm-lands

6026. In order to supply the required agricultural products in the region, the existing farm-land should be more intensively used, because the expansion area of farm-lands and fish ponds will be cultivated in multiple cropping and mixed cropping. Consequently the expansion of farm-lands as shown on Table 6.12 will not only mean land reclamation but also multiple farming as intensive land-use etc.

6027. The potential farm-land in this province will still be larger than the required one up to 1990.

Table 6.12. Plan of farm-land expansion

	P l a n 1990	Present 1976	Increase/ decrease	Unit: 000 ha.		
				Alternative plan		
				1	2	3
P a d d y	516.7	508.8	7.9	742.5	1,406.2	1,320.4
C o r n	291.0	209.8	81.2	291.0	291.0	445.5
Cassava	92.5	34.9	57.6			
Sweet potato	53.4	10.1	43.3			
Potato	9.0	0.8	8.2			
Peanut	86.3	42.4	43.9			
Green gram	121.6	33.2	88.4			
Soy bean	80.5	9.9	70.6			
Fruit	151.1	53.9	97.2			
Vegetables	75.3	15.6	59.7			
Grass-land	843.0	590.0	253.0			
Fish ponds	72.3	46.4	25.9			
<u>Industrial crops</u>						
Coffee	33.0	25.4	7.6	same as prototype		
Coconut	146.0	100.0	46.0			
C l o v e	9.2	9.3	- 0.1			
Pepper	2.2	0.8	1.4			
Sugar cane	9.7	0.9	8.8			
Nutmeg	4.1	1.4	2.7			
Candlenut	46.6	28.3	18.3			
Kapok	19.2	24.5	- 5.3			
Castor oil	1.4	0.2	1.2			
Cotton	10.1	0.9	9.2			
Tobacco	24.2	13.7	0.3			
Rosella	1.1	0.8	0.3			
Mulberry	11.0	5.0	6.0			

Note: a) Including twice a year of rice production
(Total extent 544 ha.)

b) In case of second production, the yield is 50%;
thus the required hectarage is 2 x 129 ha. = 258 ha.

6.3. Study on the potential of farm land expansion

6.3.1. Potential acreage of agricultural land-use.

6028. The total extent of land use in the South Sulawesi Province is about 6,293 thousand ha. consisting of the following land use in 1976 (Refer to Volume III, Table 1).

Unit: 000 ha.

Forest area	3,222
Shifting cultivation area	58
Grassland	590
Upland	909
Paddy field	509
Fish-pond	46
Others	759
T o t a l	6,293

6029. There are some potential areas for land reclamation in the forest area and the grasslands. The framework in making the potential area of land-use plan is as follows:

As stated in the Annual Report, 28 kinds of maps on the same scale of 1 : 500,000 have been drawn, based on collected data and maps of several scales, "standard for the estimation of land utilization" etc. (Refer to Section 2.2, Vol. IV.)

After the mapping was finished, first of all each of those maps was divided by mesh method into meshes of 1 cm². on the map (A mesh of 1 cm² on the map at a scale of 1 : 500,000 shows an area of a,500 ha.) with revision of the collected data or real condition of the land. (Refer to Vol. V.)

Then, according to the categories such as forest area, shifting cultivation area, suitable area for grassland, paddy field etc., each area of the same category is calculated by way of counting the number of meshes.

6030. The total forest area is about 3.2 million ha. large, covering over 50% of the entire area of South Sulawesi. Therefore the forest area should be studied most urgently, not merely to make the regional agriculture development plan but also to clarify the aims of various projects.

Table 6.13 shows the result of classification according to a suggested standard. The method of this analysis is described on the Volume IV.

6031. The forest area can be divided into 6 categories based on the physocal factor (Refer to table 6.13)

- I₁ Artificial reproduction area of over 2,500 ha.
Economical tree species are possible to be introduced in this area.
- I₂ Artificial reproduction area of over 2,500 ha.
Economical tree species (70%) and soil improving tree species (30%) have to be mixed.
- I₃ Natural regeneration area of over 2,500 ha.
Natural useful trees should be grown in order to get a good forest.
- II₁ Artificial reproduction area of over 400 ha.
Economical tree species (70%) and soil improving ones (30%) have to be mixed.
- II₂ Artificial reproduction area of over 400 ha.
Economical tree species (50%) and soil improving ones (50%) have to be mixed.
- II₃ Natural regeneration area of over 400 ha.
Natural useful tree should be grown in order to get a good forest.

6032. Based on the above-mentioned analysis, a land classification for reclamation has been done, and some suitable reclamation area has been pointed out on the map. The standard of this analysis includes several items such as: erodible degree, gradient, altitude, annual rainfall, soil condition and soil fertility. The results of this are shown on table 6.14

6033. The expected suitable area for reclamation is indicated as the best class on table 6.14, at a total acreage of about 555,000 ha. provided for transmigration with the North Luwu irrigation development project.

Table 6.13. Classification of Forest Area by the Management guide.-

Unit: 1,000 ha.

Name of Kabupaten	I ₁	I ₂	I ₃	II ₁	II ₂	II ₃	Total
1. U. Pandang	-	5.0	-	-	-	-	5.0
2. Maros	-	52.5	5.0	-	20.0	-	77.5
3. Pangkep	-	50.0	-	-	-	-	30.0
4. G o w a	-	35.0	30.0	-	15.0	-	80.0
5. Takalar	-	15.0	-	-	7.5	-	22.5
6. Jeneponto	-	-	-	-	15.0	-	15.0
7. Bantaeng	-	-	5.0	-	5.0	-	10.0
8. Bulukumba	-	7.5	5.0	-	15.0	-	27.5
9. Selayar	-	-	-	7.5	20.0	-	27.5
10. Sinjai	-	15.0	7.5	-	-	-	22.5
14. Barru	-	82.5	-	-	2.5	-	85.0
15. Pare-Pare	-	7.5	-	-	-	-	7.5
16. Pinrang	-	10.0	10.0	-	62.5	5.0	87.5
17. Sidrap	-	2.5	-	-	57.5	17.5	77.5
18. Enrekang	-	20.0	-	-	40.0	40.5	100.0
11. B o n e	-	15.0	7.5	12.5	155.0	-	190.0
12. W a j o	-	-	-	-	75.0	-	75.0
13. Soppeng	-	2.5	-	-	60.0	-	62.5
22. T a t o r	-	60.0	100.0	-	-	7.5	167.5
23. L u w u	-	597.5	75.0	47.5	112.5	25.0	857.5
19. Polmas	-	87.5	60.0	2.5	37.5	7.5	195.0
20. Majene							
21. Mamuju							
T o t a l		1,045.0	305.0	70.0	700.0	102.5	2,222.5

Note: 1) Refer to mentioned 6029 and Volume IV.

2) Collected maps do not cover Kab. Majene, Kab. Mamuju and partial area of Kab. Luwu.

Source: Forest classification map for management guide/map No.22

Table 6.14 Classification for Reclamation in Forest Area

Unit: 1,000 ha.

Name of Kab.	Best	Better	Less-good	No good	Total
1. U. Pandang	5.0	-	-	-	5.0
2. Maros	2.5	10.0	40.0	5.0	77.5
3. Pangkep	10.0	5.0	15.0	-	30.0
4. G o w a	2.5	20.0	25.0	32.5	80.0
5. Takalar	10.0	2.5	10.0	-	22.5
6. Jeneponto	-	-	7.5	7.5	15.0
7. Bantaeng	2.5	-	2.5	5.0	10.0
8. Dulukumba	7.5	5.0	10.0	5.0	27.5
9. Selayar	-	-	17.5	10.5	27.5
10. Sinjai	-	5.0	12.5	5.0	22.5
14. Barru	17.5	20.0	47.5	-	85.0
15. Pare-Pare	-	-	7.5	-	7.5
16. Pinrang	32.5	5.0	32.5	17.5	87.5
17. Sidrap	10.0	12.5	37.5	17.5	77.5
18. Enrekang	2.5	27.5	37.5	32.5	100.0
11. B o n e	95.0	12.5	75.0	7.5	190.0
12. W a j o	47.5	12.5	15.0	-	75.0
13. Soppeng	15.0	-	45.0	2.5	62.5
22. Tator	2.5	20.0	60.0	85.0	167.5
23. L u w u	245.0	67.5	437.5	107.5	857.5
19. Polmas	32.5	12.5	95.0	55.0	195.0
20. Majene					
21. Mamuju			(N. A.)		
T o t a l	555.0	237.5	1,030.0	395.0	2,222.5

6034. Grassland constitutes one of the most significant natural resources for livestock improvement in South Sulawesi, at an estimated acreage of about 590,000 ha. (Estimation by the Animal Husbandry Service)

The policy for livestock improvement was carried out intensively in recent years, and an area of about 70,000 ha. has been approved of as concession area. But it seems probable that there is still some suitable area for reclamation in the grassland area outside the concession area. Table 6.15 will show the result of the above-mentioned analysis.

6035. Part of the present agricultural land, on the other hand, will be able to be changed into grassland, if no productive commodity could be cultivated thereon. The result of study on "upland use" shows a potential area of 62,500 ha. from upland area, and 60,000 ha, from reclamation area.

6036. The total extent of shifting cultivation area is about 260,000 ha. which covers about 4% of the whole land at present. The areas are scattered in the forest area or in the neighbouring upland area. The shifting cultivation area seems to be the cause of the damage of sheet erosion or gully erosion. Therefore the selection of a suitable cultivation area has been carried out (Refer to table 6.16). Water conservation for the catchment area must be promoted, and this area will be converted into forest area. The unsuitable area for cultivation will be converted into forest if the gradient is over 40%, and the other area will be able to be used as grassland.

6037. Upland use.

Upland areas occupy an acreage of 909,000 ha. at present. The map on location of estate crops in this Province has not been cleared, therefore each commodity map is carried out by the total acreage including upland area and estate crop area. Table 6.17 shows the suitable area for cultivation in the uplands. The steep sloping area must be converted into forests, and the unsuitable cultivation area will be changed into grassland area and fish ponds.

Table 6.15. Classification for Reclamation in the Grassland Area

Kabupaten	Suitable cultivation area	Suitable grassland area	Steep sloping area
1. U. Pandang	-	-	-
2. Maros	-	7.5	5.0
3. Pangkep	-	-	-
4. G o wa	-	5.0	2.5
5. Takalar	-	2.5	-
6. Jeneponto	-	12.5	-
7. Bantaeng	-	-	-
8. Bulukumba	-	-	-
9. Selayar	-	2.5	-
10. Sinjai	-	12.5	5.0
14. Barru	-	-	-
15. Pare-Pare	-	-	-
16. Pinrang	5.0	5.0	-
17. Sidrap	-	7.5	-
18. Enrekang	2.5	7.5	-
11. B o n e	30.0	42.5	-
12. W a j o	2.5	7.5	-
13. Soppeng	-	5.0	-
22. Tator	7.5	40.0	20.0
23.	5.0	25.0	15.0
19. Polmas	10.0	22.5	12.5
20. Majene	-	-	-
21. Manuju	-	-	-
o t a l	62.5	270.0	60.0

Note: 1) This analysis was done after deducting all concession area, up to 1917, fo stock-farm ranch.

2) Refer to the note of table 6.13.

Source: Land classification maps for reclamation in the grassland/Map No.24.

Table 6.16. Classification of the suitable Area for cultivation area in Shifting Cultivation Area.

Unit: 1,000 ha.

No.	Kabupaten	Steep sloping area	Water conservation area	Best	Better	Less good	No good
1.	U. Pandang	-	-	-	-	-	-
2.	Maros	5.0	-	-	-	2.5	-
3.	Pangkep	2.5	2.5	-	-	-	-
4.	G o w a	2.5	5.0	-	-	-	-
5.	Takalar	-	-	-	-	-	-
6.	Jeneponto	-	-	-	-	-	-
7.	Bantaeng	-	-	-	-	-	-
8.	Bulukumba	-	5.0	-	-	2.5	-
9.	Selayar	-	-	-	-	5.0	15.0
10.	Sinjai	5.0	7.5	-	-	7.5	-
14.	Barru	-	2.5	-	-	-	2.5
15.	Pare-Pare	-	-	-	-	-	-
16.	Pinrang	2.5	2.5	-	-	-	-
17.	Sodrap	2.5	2.5	-	-	-	-
18.	Enrekang	7.5	2.5	-	-	-	-
11.	B o n e	5.0	12.5	-	-	12.5	-
12.	W a j o	-	-	-	-	-	-
13.	Soppeng	-	-	-	-	-	-
22.	Tator	5.0	-	-	-	-	-
23.	L u w u	12.5	-	2.5	-	-	5.0
19.	Polmas	15.0	-	-	-	-	-
20.	Majene	-	-	-	-	2.5	-
21.	Manuju	-	-	-	-	-	-
T o t a l		65.0	43.0	2.5	-	37.5	27.5

Note: 1) This analysis has been done after deducting all steep sloping area of 40%

2) Refer to the standard in Note of table 6.13.

Source : Land classification suitable area for cultivation Map of in shifting cultivation Area/Map No.25.

Table 6.17 Suitable area for Cultivation in Upland Area

			Unit: 1,000 ha.
No. Kabupaten	steep sloping area	Unsuitable cultivation area	Suitable cultivation area
1. U.Pandang	-	-	1.3
2. Maros	2.5	12.5	9.1
3. Pangkep	-	-	19.8
4. Gowa	2.5	2.5	34.6
5. Takalar	-	-	12.3
6. Jeneponto	-	-	30.9
7. Bantaeng	-	-	25.6
8. Bulukumba	-	2.5	47.3
9. Selayar	-	-	14.7
10. Sinjai	2.5	-	17.8
14. Barru	-	-	11.5
15. Pare	-	-	2.5
16. Pinrang	2.5	-	32.3
17. Sidrap	2.5	-	23.9
18. Lhrekang	5.0	10.0	2.3
11. Bone	-	12.5	56.0
12. Wajo	-	-	59.8
13. Soppeng	-	-	49.7
22. Tator	25.0	5.0	7.2
23. Luwu	15.0	2.5	101.4
19. Polmas	-	-	76.7
20. Majene	2.5	-	7.4
21. Mamuju	-	-	145.0
Total	67.5	52.5	789.1

Source: Map of classification of suitable area for cultivation in upland area/Map No. 26

6038. Fish ponds

In South Sulawesi, brackish water pond culture is one of the most promising industries in the production of commodities for export and domestic consumption. The acreage of present fish ponds is only 46,000 ha. in this province (Refer to table 6.18), and the expansion of productive fish ponds is urgently required.

6039. An analysis for the possibility of expansion has been conducted; besides, the forest area, the farmland of about 30,000 ha. and so on will be developed as new projects of fish ponds.

6040. The suitable area for the cultivation of eleven commodities was studied. The method of analysis for land-use in the future was suggested in the Annual Report (p.101), and was formulated for principal crops based on altitude, slope, soil texture, fertility and acidity. A result of the analysis is shown on table 6.19.

6.3.2. The available farmland expansion.

6041. The available land-use is as follows:

Paddy field areas, the main land for food stuffs, increased by an extent of about 300,000 ha. (Refer to table 6.19) due to reclamation including 85,000 ha. from the forest area in the North Luwu project. The total extent of paddy field area became more than 800,000 ha. from 508,800 ha. in 1976.

6042. Though the extent of upland areas in the present condition is decreased by 120,000 ha. by conversion into forest (67,500 ha.) and grassland (52,500 ha.) the total acreage can increase by reclamation in forest areas (555,000 ha.) and grassland area (62,500 ha.) and conversion of paddy field areas (2,500 ha.) to upland areas.

The total extent of upland area is expended to over 1.5 million ha. from 909,100 ha. in 1976.

6043. Forest area is the largest area, occupying over 50% of the land in South Sulawesi, not only in present condition but also in the future plan. The total extent of forest area at present has decreased due to reclamation into an upland area of 555,000 ha. (including Mamuju transmigration area). But the total acreage of forests in the plan also increases by afforestation in grassland area of 60,000 ha., in upland area 67,500 ha. and in shifting cultivation area 190,300 ha.

6044. The total extent of grassland area, a vast area in the province, is at present decreased by more than 100,000 ha. by conversion of steep sloping areas into 60,000 ha. of forest area and 62,000 ha. of upland area. On the contrary, grassland increased from shifting cultivation area (69,500 ha.) upland area (52,500 ha.) and forest area; the total grassland area increases by more than 10,000 ha. to over 600,000 ha.

6045. At present a shifting cultivation area of 257,800 ha. becomes a major problem in the activities of erosion control and land conservation in South Sulawesi. Thus the activities to clear away the shifting cultivation area are conducted in several ways, i.e. reclamation of resettlement areas, reforestation and afforestation etc. To attain the above-mentioned purposes, shifting cultivation areas will be cleared away in the future by reforestation and conversion/reclamation to grassland areas extending 69,500 ha.

6046. Salt farms in the future plan will stay the same as in the present condition, i.e. 2,000 ha. only. Details of the available agricultural land-use, and locations of the reclamation, afforestation, conversion, forestation etc. are shown on the maps in Volume V. At present, some parts of the analysis for upland areas (including estate crop areas) are still being conducted, the land-use plan will be completed by counterparts.

Table 6.18 Fish Pond area in present and future plan
in South Sulawesi

Unit: 000 ha.

No. Kabupaten	(1) Present Situation of Fish pond				T o t a l
	Type-A	Type-B	Type-C	Fish water pond	
1. U. Pandang	-	1.3	0.2	-	1.5
2. M a r o s	-	-	4.4	-	4.4
3. Pangkep	-	-	5.2	-	5.2
4. G o w a	-	-	-	0.2	0.2
5. Takalar	-	1.9	0.1	-	2.0
6. Jeneponto	-	1.7	0.2	-	1.9
7. Bantaeng	-	0.1	-	-	0.1
8. Bulukumba	-	3.6	0.1	0.1	3.8
9. Selayar	0.1	-	-	-	0.1
10. Sinjai	-	0.4	-	0.1	0.5
14. Barru	-	2.0	-	-	2.0
15. Pare-Pare	-	-	-	-	-
16. Pinrang	-	6.0	0.5	-	6.5
17. Sidrap	-	-	-	-	-
18. Enrekang	-	-	-	0.1	0.1
11. Bone	4.3	0.5	-	0.1	4.9
12. J a j o	6.4	0.2	-	-	6.6
13. Soppeng	-	-	-	-	-
22 Tator	-	-	-	-	-
23. Luwu	2.4	0.1	-	0.6	3.1
19. Polmas	-	2.7	-	0.1	2.8
20. Majene	0.6	-	-	-	0.6
21. Mamuju	0.1	-	-	-	0.1
Total	13.9	20.5	10.7	1.3	46.4

Note: Type A: No spreading fry, no fertilizer and no pesticide

Type B: Spreading of fry, no fertilizer and no pesticide

Type C: The five fishery principles

Source: Laporan Tahunan Dinas Perikanan 1976.

Table 6.19 Land classification of suitable areas for cultivation
of 11 commodities

No.	Commodity	Unit: 1,000 ha.				Total
		Very good	Good	Fair	Poor	
1.	Wetland paddy	877.5	1,190.0	547.5	110.0	2,725.0
	(in forests)	297.5	187.5	27.5	42.5	555.0
	(in grassland)	20.0	45.0	2.5	0.0	67.5
2.	Corn	240.0	270.0	992.5	1,222.5	2,725.0
	(in forests)	7.5	37.5	365.0	145.0	555.0
	(in grassland)	-	20.0	27.5	20.0	67.5
3.	Peanut	195	195.0	725.0	1,610.0	2,725.0
	(in forests)	5.0	22.5	162.5	365.0	555.0
	(in grassland)	0.0	10.0	15.0	42.5	67.5
4.	Cassava	317.5	552.5	1,022.5	832.5	2,725.0
	(in forest)	10.0	5.0	375.0	165.0	555.0
	(in grassland)	0	2.5	55.0	10.0	67.5
5.	Staple crops	290.0	462.5	1,155.0	817.5	2,725.0
	(in forest)	80.0	132.5	260.0	82.5	555.0
	(in grassland)	15.0	30.0	20.0	2.5	67.5
6.	Vegetables	27.5	160.0	1,347.5	1,190.0	2,725.0
	(in forest)	7.5	37.5	365.0	145.0	555.0
	(in grassland)	0.0	5.0	55.0	7.5	67.5
7.	Citrus fruit	140.0	80.0	1,640.0	865.0	2,725.0
	(in forest)	2.5	5.0	390.5	157.5	555.0
	(in grassland)	0	5.0	55.0	7.5	67.5
8.	Coconut	317.5	552.5	1,022.5	832.5	2,725.0
	(in forest)	95.0	192.5	142.5	125.0	555.0
	(in grassland)	15.0	32.5	15.0	5.0	67.5
9.	Coffee	382.5	1,352.5	895.0	95.0	2,725.0
	(in forest)	132.5	322.5	97.5	2.5	555.0
	(in grassland)	42.5	20.0	2.5	2.5	67.5
10.	Clive	52.5	647.5	1,202.5	822.5	2,725.0
11.	Upland	230.0	305.0	1,435.0	755.0	2,725.0

Note: "In forest" is the best reclamation area in forest area.

Source: Land classification for 11 crops by Kabupaten

(Refer to volume II)

Table 6.20 Potential acreage of farmland utilization from other land use at present

	Unit: 000 ha.								Remarks
	1	2	3	4	5	6	7	8	
	Forest	Shifting	Grass	Upland	Paddy	Swamp	Fish	Others	Convertible area
1. Forest *A	3,222	[2667]	555 *C	230 *D	298 *E				-555 Suitable for cultivation
2. Shifting use	258	[3]	68						-258
3. Grass land	590	60	[465]	43 *F	20 *E				-125 Not suitable for cultivation
4. Upland	909	68	52	[789]					-112 ditto
5. Paddy field	509			2	[507]				-2 ditto
6. Swamp forest	50					50			± 0
7. Fish pond	46						[46]		± 0
8. Others *B	709						150 *G	[552]	-150
9. Total of S.S. 6,293									
Suitable potential	+317	0	+615	+275	+318	-0	+150	X	double count

Note: Numbers inside the box, are non-changing areas and most number excluding those inside boxes are counted double

*A) including mulberry tree area (5000 ha), *B) including salt area (2000 ha), waste land village area and so on, *C) all of best class of reclamation area (from table 6.19),

*D) all of best class of reclamation area (from table 6.19), *E) best class for upland area (some tables), *F) best class for paddy (some tables), *G) best class for coffee (some tables), *H) Estimation data of fishery office in S.S. Locations of C.D.M.F. are classified in the map (Refer to volume V)

6.4. Result of Flow

6.4.1. Summary of the studied alternative plans.

1) The prototype is as follows:

6047. Condition

- a. The basic condition of this flow is stated in the calculation flow.
- b. The existing paddy field and upland are supposed to be used entirely (100%).

Results

- a. The development of new paddy fields and upland fields are not required under this condition, and the South Luwu Project is included herein.
- b. There is sufficient agricultural labour force under this condition. There will be a surplus of 265.6 thousand workers in agriculture in 1990.
- c. The surplus upland and paddy fields used for secondary crops amount to 65,000 ha. and the surplus labour force in agriculture consists of 387,000 manpower.

2) Alternative 1 is as follows:

6048. Condition

- a. The rate of interinsular trade will be raised as much as possible under a condition of restricted new development of paddy fields.
- b. Upland paddy is planted once a year on the surplus upland field of 65,000 ha.

Results

- a. The rate of interinsular trade is increased from 30% (prototype) to 35%.
- b. The surplus of agricultural labour force is 354,000 under this condition.
- c. There is no surplus of present farm land in this flow.

3) Alternative 2:

6049.

Condition

- a. In order to increase the rate of interinsular trade of rice as much as possible, the potential paddy field will be developed as far as possible. The potential area was surveyed by the team and the result is shown on Table 6.22.
- b. The paddy field will be newly developed and expanded in accordance with the official plan.
- c. The analysis of the investment on paddy field development is not made by the Team.

Results

- a. There is no surplus of agricultural labour force at the point of the new development of 474,000 ha. of paddy field, in spite of the potential development area of 550,000 ha.
- b. The rate of interinsular trade is 114% against the local consumption under this condition.

4) Alternative 3 :

6050.

Condition

- a. Under the above-mentioned condition, all the surplus farm land is planted with rice and corn.
- b. The rate of interinsular trade in other commodities than rice and corn is not fixed as shown in Table 6.8.
- c. As much rice and corn as possible will be planted on the potential farm land.
- d. The potential of new development area for suitable corn cultivation will be 550,000 ha., which was calculated by the potential farm land.
- d. The potential of new development area for suitable corn cultivation will be 550,000 ha., which was calculated by the Team (Table 6.21).
- e. The analysis of the investment on new rice and corn field development is not made by the Team.

Results

- a. There is no more surplus of agricultural labour force and land resources under the above-mentioned condition.

b. 2,371,500 tons of rice and 401,000 tons of corn will be produced. This figure means a 181% increase in rice and 153% increase of corn production of the prototype flow.

Table 6.21. Potential land suitable for rice and corn

		Best	Good	Suitable for rice		Total
				Less good	Poor	
Suitable for corn	Best	2.5	5.0	0	0	7.5
	Good	17.5	17.5	0	0	35.0
	Less good	177.5	105.0	5.0	10.0	297.5
	Poor	120.0	107.5	25.0	32.5	282.5
Total		317.5	232.5	30.0	42.5	622.5

Note: The potential land suitable for reclamation extends 550,000 ha., excluding the one classified as less good and poor in common for both crops.

Source: The Team's estimation.

6.4.2. Demand and supply plan for food stuff in the target year

6051. According to the results of study on the possibility of required lands, land resources are sufficiently available in the Province, if cropping intensity of about 135% will be executed in the future. Therefore it is possible to supply sufficient food without import (Refer to Table 2.3). But on paddy fields and some upland areas, cultivation of 175% of the field will be necessary, and the mixed cropping in orchards will be applied in the future. However, if farmers will produce more profitable commodities such as clove, tobacco etc. in stead of secondary crops and grass for livestock feed, which are low profit commodities, there will be a necessity to reduce the export of secondary crops and to import some meat, or to reclaim the potential farm land. Matters concerning these items should be studied further.

6052. According to the result of study by the Team, import of some food commodities is not necessary, because there are still enough of land resources in the Province up to 1990; it is particularly possible to supply food to other regions up to 1990 in conformity with the national target.

6.4.3. Checking on the availability of input and labour force.

Labour force supply for agricultural works.

6053. Percentage of agricultural labour against the total population in 1970 was 16.5%; the percentage of female labour force, in particular, was only 4%. In case of a similar percentage of the present composition of labour by industry, agricultural labour force in the future is forecast to be 1,410 thousand manpower (Refer to Table 6.3). On the other hand, the required employment for agriculture is 1,013,000 manpower and about 387 thousand manpower will be in surplus in 1990 (Refer to Table 6.23).

6054. In alternative plans 1 and 2 it was studied on how to use the surplus labour and the surplus farm-land including the potential reclamation area. In alternative plan 2, expansion of rice production area in the potential paddy field area was calculated, but due to a shortage of labour force, all the potential area for paddy fields cannot be used.

6055. In alternative plan 3, expansion of corn production in the potential area was conducted. The result shows that all of the potential area was used (Refer to Table 6.23 and 2.4).

Table 6.22. Required employment in Agriculture

Commodity	Employment (manpower)			Work day/ year
	Man/ha (A)	Man/year (B)	Required (C)=(B):D	
P a d d y	250	112,314	374.4	300
Other food crops	300	55,991	186.7	300
Livestock	365	16,860	46.2	365
Fish ponds	250	5,784	23.1	250
Estate crops	300	50,597	188.7	300
Others*			203.5	
T o t a l	-	-	1,022.6	

Unit: 000 manpower

* Others : including sea fishery (about 200,000 fishermen) and sericulture.

Source: data from tables 7.4 - 7.8, 7.16 and 7.18.

6.4.4. Plan of farmland use

6056. Since the beginning of Repelita II, emphasis of development has been shifted toward the objective of redistribution, i.e., to reduce the gap in development among regions and to distribute more evenly the fruits of development. According to this policy orientation, rural development has been made a central concern of the Government. A number of INPRESS programmes have been introduced or expanded; however, a number of other new programmes should be initiated to assist under-developed areas.

6057. There is sufficient potential of land resources for agriculture, forestry and fishery in the province, but INPRES for underdeveloped areas is not enough to use the land resources. Therefore, farmland use in these areas is declining in spite of the gradual rise in the volume of demand for agricultural products. Hereafter, farmland should be used more intensively.

6058. The result of study on farmland use is shown on table 6.23 and a plan intercropping and mixed cropping is shown on table 6.24. These two tables are calculated for prototype I na.

6.4.5. Land-use plan

6059. Generally the method of resource utilization is multi-purposed. In the case of land-use plan, land resources can be used not only for farming but also for estates, forest land, pastures and industrial land, or abandoned as waste land. Suitable sites can be considered for each purpose, but land-use is flexible according to the demand and technique on each occasion.

The result of study on land-use is shown on table 6.25 and this table is also calculated for alternative plan no. 1 only.

Table 6.23 Farm cultivation plan in the target year (prototype)

Unit: 1,000 ha.

Classification	Land resources	Land use	Estate crops	Fruit crops	Secondary crops	Vegetable	Grass	Paddy	Remarks
Paddy field	507 (100%)	887 (175%)	8	-	150	16	36	677	50% after a fall in 1-st production
Upland field									
- Upland for annual crop	462 (100%)	744 (161%)	29	-	533	54	128	-	60% after a fall in 1-st production
- Orchards	440 (100%)	511 (116%)	292 * A)	151	51	5	12	-	25% : ha
Grass lands	665 (100%)	665 (100%)	-	-	-	-	665	-	
T o t a l	2,074 (100%)	2,807 (135%)	329 (16%)	151 (7%)	734 (35%)	75 (4%)	841 * B) (41%)	677 (32%)	
Fish ponds	96.4	96.4	-	-	-	-	-	-	Fish pond 96.4(100%)

Note: Calculation method of secondary crops, vegetables and grass by proportional allotment.

Table 6.25: potential acreage of alternative plan

* A) including annual estate crops (3 ha) as mixed cropping

* B) required grass land ha - potential land 665 = shortage 52 ha

Table 6.24 Intercropping and mixed cropping

	Sec. crops	Vegetables	Grass	Estate (Annual)	Total	Remarks
Paddy field	150	16	36	8	210	= (507x1.75)-677
Perennial field	51	5	12	3	71	From Tables 7.8 and 7.9.
Annual field	533	54	128	29	744	*A)=(902-440)x
Total	734	75	176	40	1,025	1.60 *C)
Percentage	(0.716)	(0.073)	(0.172)	(0.039)	(1.000)	

Note: Total acreage of each crop comes from Table 6.12.

*A) : $1005 - (220 + 105)$

Required - Available

*B) : $843 - 667 = 176$ (ha)

*C) : $(902 - 440) : 744$

Perennial field 440,000 ha.

Source: The Team's estimation.

Table 6.25 Land use plan

No.	1. Forest	2. Shifting	3. Grass	4. Upland	5. Paddy	6. Swamp	7. Fish	8. Other
1. Forest L.	3,222	3,162	60 ^{*A)}	68 ^{*B)}				
2. Shifting L.	258	190	0	68				
3. Grass L.	590	60 ^(D)	487	43				
4. Upland F.	909	68	52	789				
5. Paddy F.	509			2	507			
6. Swamp	50					50		
7. Fish P.	46						46	
8. Other	709						27	682
	6,293	3,480	0	667	902	507	73	682

*A) Reclamation (A) - Convert to forest (D) = 0
60

*B) In case of Alternative plan 2 land reclamation is 363,000 ha.

*C) In case of Alternative plan 3, land reclamation is 550,000 ha (350,000 ha for paddy field, 200,000 ha for upland field).

Table 6.26 Present condition and Future Plan of Land use
in South Sulawesi Province (1976 and 1990)

Classification	(A) Present condition (x 1,000 ha) (%)	(B) Future Plan (x 1,000 ha) (%)	(c)=(B)-(A) (x 1,000 ha)	(d)=B/A x 100 (%)
1. Forest area	3,222	3,412	+190	106
2. Grass land area	590	667	+77	113
3. Shifting cultivation area	258	0	-258	0
4. Upland area	909	902	-7	99
5. Paddy field area	509	507	-2	99
6. Swamp forest area	50	50		100
7. Fish pond area	46	73	+27	159
8. O t h e r s	709	682	-27	96
T o t a l	6,293	6,293	+ 0	+ 0
Alternative plan 1.	Same as prototype	Same as prototype		
Alternative plan 2.				
Forest area		(3412-474)	-284	91%
Paddy field		(507+474)	+472	193
Alternative plan 3.				
Forest area		(3,412-550)	-550	89
Paddy field		(507+440)	+438	186
Upland field		(902+110)	+103	111

6.4.6. Agricultural net income

6060. The result of estimations of agricultural gross income and net income is shown on Table 6.27. However, this table is still indefinite as yet, because several indefinite data were taken in the analysis, e.g. the data of yield per ha., the rate of net income against gross income, the rate of loss in transportation by commodity and so on, though data are still available.

6061. On the other hand, a way of measuring the supply of agricultural commodities is estimated according to the increase of food stuff as first priority. Therefore this indicated result is a case which aims at food stuff self-sufficiency.

Table 6.27. Comparison of agricultural gross income and net income
(Prototype) Unit: Billion Rupiahs

Commodity	Gross income		Net income		Increase rate	Annual rate
	1976	1990	1976	1990	1990/1976	
Rice	100.2	137.5	60.1	89.4	1.49	2.7
Secondary crops	27.2	79.7	21.7	59.8	1.76	7.0
Fruit	19.5	57.1	17.6	48.6	2.76	7.0
Vegetables	4.4	35.4	2.6	19.5	7.50	14.4
Meat	16.5	38.8	9.9	29.7	3.00	7.6
Fish	43.1	158.0	17.2	82.7	4.81	11.0
Estate crops (incl. silk)	14.6	38.8	13.1	37.9	2.51	6.4
T o t a l (T)	225.5	602.3	147.2	362.6	2.55	6.4
Altern. Plan 1 + rice	225.5 -	607.3 -	142.2 -	365.8 -	2.57 -	6.5 -
Altern. Plan 2 + rice	225.5 -	722.1 119.8	142.2 -	440.5 77.9	3.10 -	7.7 -
Altern. Plan 3	225.5	721.4	142.2	441.0	3.10	7.7
Rice	-	111.5	-	72.5	-	-
Corn	-	7.9	-	5.9	-	-

Source: Data of 1976 : The Team's estimation.

Other data : From Tables 7.4, 7.5, 7.6, 7.7, 7.8, 7.16 and 7.17

6.5. Recommendation

6062. There will be a qualified plan concerning both the potential land supply and the agricultural labour force supply at the same time. However, this will need plenty of time and manpower, so that alternative are not dealt with by the Team. The team recommends that this work be executed by the provincial government in the near future.

6063. In this plan, the analysis of investment for new development of farmlands is not considered by the Team. Plenty of financial data will be required for the analysis of this matter. The Team recommends that this analysis be conducted by the counterparts in the near future.

6064. Production of fruit and vegetables will increase in the future. In this report, consumption volume per capita is measured physically, but it has not been studied whether or not the planned volume of these commodities will be consumed, although it is an important subject to know what amount of consumption volume of the commodity will occur in the view point of consumers income elasticity.

6065. If the required acreage for a crop exceeds the available acreage, the alternative crop should be considered. On the other hand, if the available acreage for a crop is bigger than the required one, it is possible for the surplus to be provided for interinsular trade of export. However, the crop should have a quality acceptable for the purpose, and besides, the developments of transportation and marketing should be adequate in time.

On the other hand, it is impossible to expand profitable commodities such as tobacco, sesame etc. in stead of expanding pasture land or upland. The target of this plan is to supply food stuff by self-sufficiency; however, if the provision for the expansion of profitable commodities is necessary, meat should be imported from other regions.

6066. For example, domestic transportation cost by sea traffic is higher than international cost. As a result, in spite of the surplus of rice in South Sulawesi, the Government could not buy rice from this province and in stead, rice from Thailand is bought. What is worse, a new reclamation project for paddy production has been carried out in the . . . Luwu Development Project, in order

to accomplish the policy on transmigration by the central Government without improving sea transportation system.

6067. On the contrary, there are underdeveloped rural areas such as the central part of South Sulawesi (Kabupaten Wajo, Bone and Sinjai). Particularly, although those rural areas have a considerable potential of rice production, the North Luwu Development Project is started first. The project is important, being a policy by the central Government, but the development of underdeveloped rural areas is important as well as the policy of the provincial Government.

6068. Based on the analysis of the team, however, there is still a problem on rice transportation in South Sulawesi. The central Government seems to have the same opinion. Consequently the team would recommend that the North Luwu Development Project for the increase of rice production should be reviewed from the point of view on the transportation of rice in the future.

6069. The team would like to emphasize that it is important to review national projects in order to make a provincial plan and the integrated regional development project will not be a collection of various projects, and moreover, will not be a project which only plans the construction of individual physical facilities. The ultimate goal of the development project lies in the promotion of regional community welfare and in the contribution to the development of the entire nation.

For this purpose, planning constitutes the entire process of searching for an effective combination of methods, implementing these programs studying the results of changes in the environment and in project execution, and amending the project. Namely, planning is the entire process of a smooth interaction among various actions of "plan-do-see".

VII

Programmes necessary to achieve the objectives

7.1. A Master Plan

7.1.1. A plan for food stuff increase

7001. Generally, the following measures are 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 service.

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

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

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

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

v) Expansion, i.e. land reclamation

vi) Soil and water conservation.

7002. 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 two categories; one is called the Leading Project (L.P.) and the other as the Supportive Measures (S.M.) (Refer to Fig. 7.1).

7003. For example, a number of projects have been carried out at present without considering the character of the project (whether L.P. or S.M.) Part of DIMAS projects have been carried out in non-irrigated areas. Thus yielding variety of I.R. or a new variety adaptable to heavy manuring has been planted; and in non-irrigable area resulted in a product damaged by drought. DIMAS Project for rice, for example, should not be carried out in unsuitable areas for rice farming, such as areas liable to drought and non-irrigation. Its expansion would only result in financial troubles in the rural area.

7004. Introduction of a new variety has an advantageous effect when the variety is planted on the appropriate farm, if it is planted on an unsuitable farm, it would sometimes result in not so advantageous an effect upon the farmers' expectations. Particularly when the land productivity with the new variety is less than that with traditional

Fig. 7.1. Procedure on Selection of necessary programs.

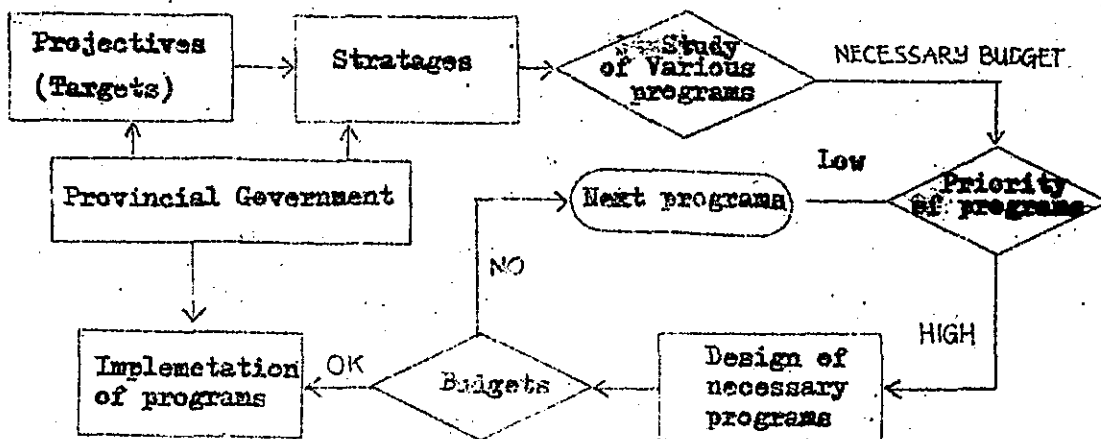
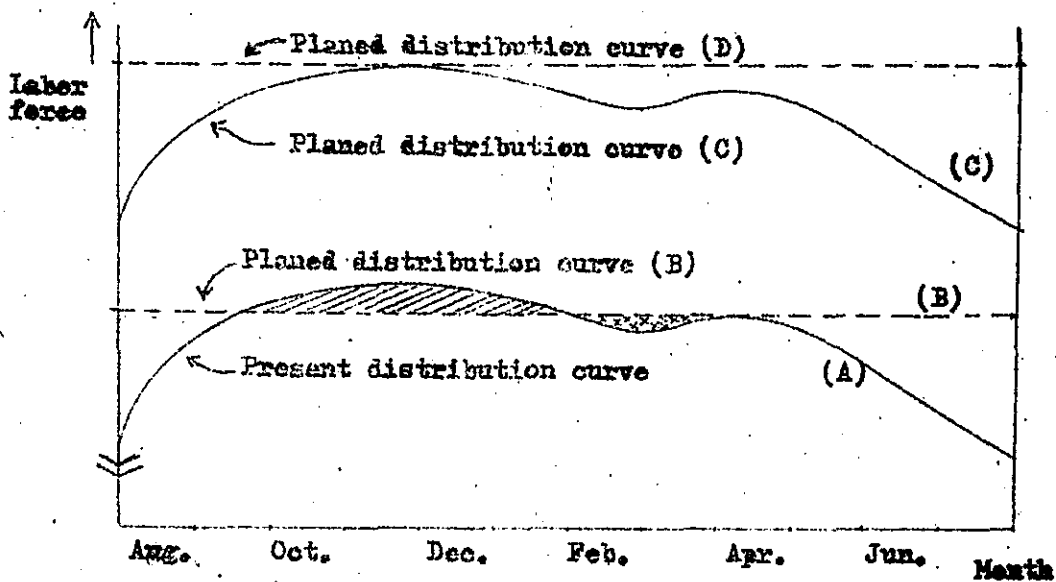


Fig. 7.2. Distribution Curve of monthly labor force.



variety, farmers would not only rely upon the extension workers who introduce the new variety and also distrust the project on the expansion of the new variety.

7005. Thus, projects in the field should be carried out on the basis of the feasibility study for each project without diverging 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.

7.1.2. A plan for developing the employment opportunity

7006. The following measures are generally studied in order to increase labour employment in agriculture, and proper measures are taken in the region:

- i) Labour intensification, i.e. shifting from traditional extensive farming to labour intensive farming, change of cropping pattern, i.e. converting "less labour cropping" into more labour cropping";
- ii) Land intensification, i.e. introducing diverse crops a year and paddy upland rotation.;
- iii) Farmland expansion, i.e. expanding farmland by land reclamation, and reclamation in water land by means of drainage;
- iv) Specialization, i.e. making a speciality of each agro-processing, and special occupations of marketing and transportation.
- v) Home industry, i.e. handicraft, sericulture and agro-processing.

7007. In making the plan of developing labour employment in agriculture, the following three methods should be studied:

- i) In Fig. 7.2, a plan which converts a distribution curve (A) into a planned distribution curve (B) to take away the peak of labour requirement in busy farming seasons;
- ii) A distribution curve plan (C) which is shifted from (A) simply by labour intensification, land reclamation etc;
- iii) A distribution curve plan (D) which is shifted from (A) or (C) by crop conversion, land intensification and specialization.

7008. If such a target as a distribution curve (B) is taken, the measures ii), iii) and v) will act effectively, but it is possible to convert the distribution curve (A) into (B) through other measures, i.e. i) and iv). Based on a systematic organization of various measures, expectations to some distribution curve (D) must naturally be realized.

7009. 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).

7010. In the province, however, the following policies and measures should be emphasized as programmes necessary to achieve the purpose of developing labour employment in agriculture:

i) New land reclamation projects in kabupaten Luwu, Polmas, Wajo and so on where there are big potential farmlands (particularly newly reclaimed lands should be distributed to landless farmers like small tenant farmers, hired workers and farmers' successors);

ii) Improvement of tenant's crop share (for example the landowner's claim on the crop collection should be prohibited or restricted);

iii) Protection of tenant farmer against landowner by rule of law (for instance, the tenant farmer's right should be raised).

7011. 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 those sector have been expanding with the advance of socio-economic condition.

7012. Therefore in the South Sulawesi, where a big surplus volume of agricultural products is possible to be shipped to other provinces, the expectation of expanding employment opportunity in marketing and transportation in the future should be studied urgently.

7.1.3. A plan for income development in agriculture

7013. The following measures are generally studied in order to increase agricultural income, and the proper measures in this region are taken.

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

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

iii) Farmland expansion by land reclamation;

iv) Specialization such as division of each agricultural sector and special occupations in marketing and transportation; and

v) Increase of through agro-processing and quality improvement;

vi) Home industry.

7014. The result of a study on master plan (prototype) gives a high potentiality of land and labour force in 1990. On the other hand the three alternative plans are neither a plan on optimum utilization of land resources and labour force nor a plan for a maximum increase of income. Therefore, in order to study the programmes necessary to achieve the objectives, other alternative plans shall be made in the future.

7015. In the province, generally the following policies and measures should be emphasized as programmes necessary to achieve the purpose of income development in agriculture:

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

ii) Instruction of poultry farming and sericulture because those two commodities can be managed in small areas, though some facilities are required, mulberry trees can be cultivated on waste lands, while feed for the fowls is easy to get. e.g. from wastes of crops, fish and;

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

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

7.2. Programmes for food crops

7016. Leading projects for the increase of food stuff in South Sulawesi are as follows:

i) Land improvement of paddy fields in order to increase gadu paddy and BIMAS/INMAS projects;

ii) Systematic planting of secondary crops in order to increase the alternative crops in non-paddy fields;

iii) Expansion of horticultural gardens, not only in lowland areas but also in highlands.

7017. The following supporting measures are necessary:

i) Composing a guide book on agricultural technique, i.e. to show the methods of maintenance and promotion of soil fertility, and to step up the techniques for culture, and afterwards to show extension works such as the standard of fertilization and standard of yield per hectare by commodity (Refer to table 7.1.);

ii) Fostering an intensive agricultural management, i.e. to reduce management losses in transportation, marketing and storage, and then to reserve seeds, food and agricultural commodities (Refer to table 7.2.);

iii) Suggesting the introduction of a new variety, the adaptability of new cultivation techniques through field experiments in each region by researchers getting the assistance of the Extension Service;

iv) Arranging a time schedule of extension works and researchers for technical guidance to farmers' organization and cooperative shipping there should not only be the descriptions of organization chart and facility construction plan but also the description on the training schedule for the leader and on the systematic procedures of achieving the objectives.

Table 7.1. A guideline of yield per ha. by commodity and amount of fertilizer application

Commodity	Land Productivity ton/ha.	Average amount of fertilizer			Remarks
		N	P	K	
Paddy	2.6. - 4.0	80	40	40	Intercropping with secondary crops
Corn	0.9				Crop rotation incl. tobacco, sesame and other annual industrial crops
Potatoes	4.6. - 6.0				
Beans	0.6 - 0.7	45	25	30	Mixed cropping with other crops
Vegetables	4.0 - 8.0				
Fruit	4.0 - 8.0				

Note *Component fertilizer (N:P:K nearly 2:1:1) from land of 80% will be use fertilizer in the future

Source: The ATA-140 Team itself from several data

Table 7.2. A guideline of stock plan for seed and food

Commodity	Rate of loss in transportation etc. %	Rate of reservation %	Remarks
Paddy	10	5	
Corn	15	5	
Potato	10	-	
Beans	10	-	
Vegetables	20	-	
Fruit	20	-	

Source : The ATA-140 Team from field survey.

Note : In order to estimate the demand for each crop, some estimation data such as the rate of loss in transportation, reservation and conservation, which are results of field surveys, area used after due consideration.

7018. The organization of extension works and researches has the purpose of spreading the suitable techniques and the proper management of farms. If extension work has no effective impact upon farmers due to a low technique in agricultural extension, a training for extension workers is needed first; a change in the official organization will not improve the function; thus a training for extension workers is always required top priority to spread the suitable farming technique and the proper management of farmers.

7019. Due high potentiality of rice production and the characteristics of natural conditions, rice will necessary continue to be the principal crop in the province for the foreseeable future. Continued emphasis on the increase of rice production through governmental programmes is warranted. In this connection, further efforts should be directed to increasing yield. This can be achieved by expansion of gadu paddy through expansion of irrigated areas and expansion of BIRAS/INMAS Programmes. The selection of the right paddy varieties and the improvement in the specification of dosages and timing of fertilizer application are also important means for the increase of yield as supportive measures.

7020. The production of secondary crops is declining now, but in the future the expansion of the production should be implemented; it is especially necessary to increase the yield of crops; so that farmers can produce more secondary crops, because in the present case of secondary crop production there is no more increase of profit for the farmers, even though the commodity price is supported. Therefore in this plan, high yield per ha. is used against the tendency of decline. This condition implies that supports of research and extension workers are urgently needed for farmers.

7021. Efforts should be made in selecting the development of high value crops. Peanut, corn, vegetables and fruit deserve serious attention, and therefore researches should be aimed at the improvement of varieties and production method for these crops. In addition, a study should be undertaken for the improvement of crop rotation by comparing and relating various potential crops in respective areas.

7022. Considerable potentials for agricultural development in highlands (over 500 meters in elevation) such as vegetables and perennial crops, animal husbandry and sericulture, as well as tourism, should be brought to realization by improving access from the highlands to larger market. A comprehensive study should be undertaken for the development of a selected area, possibly in the highlands of Kabupaten Jeneponto, Gowa, Barrakung, taking into account the organization needed for its marketing.

7023. Table 7.1 is to show an example of guideline of yield per ha. by commodity and the amount of fertilizer application. Table 7.2 shows an example of guideline for stock plan of seeds and food. Table 7.3. shows the average yield per ha by season by method of technique. The guideline of the food supply and demand plan is shown on table 7.4. 7.7. and the potential area on the map is shown in Fig. 7.5. (Refer to Vol.4).

Table 7.3. Average yield per ha 1974 - 1976.

	1974			1975			1976			average yield per ha. 1974-1976 (ton)
	(1) planted acreage (ha)	(2) Yield (ton)	(3) Yield per ha (ton)	(1) (ha)	(2) (ton)	(3) (ton) (ha)	(1) (ha)	(2) (ton)	(3) (ton) (ha)	
Wet Season										
	BIMAS/IRMAS	84,018	316,800	3.77	90,116	409,053	4.54	113,248	326,886	2.89
	Traditional	336,334	620,633	1.84	341,801	1009,686	2.95	335,032	1009,776	3.01
	T o t a l	420,352	937,433	2.23	431,917	1418,739	3.29	448,250	1335,661	2.98
Dry season										
	BIMAS/IRMAS	28,992	147,306	5.08	35,062	141,365	4.03	44,675	222,266	4.98
	Traditional	29,211	161,406	2.04	23,778	246,141	3.34	69,553	342,914	3.51
	T o t a l	108,203	308,712	2.85	108,840	387,506	3.56	114,228	466,180	4.08

Note : Data of planted acreage is used instead of harvested acreage, because damage acreage needs to be included.

Source : Dinas Pertanian Rakyat/BIMAS.

Table 7.4. Food demand and supply plan of South Sulawesi
Calculation Table (Prototype)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Population	Crop clas-	C r o p	Consumption	L o s s	Shipment	Conversion
000 person	sification		kg/year	%	%	to paddy
1. 7,300		Rendengan Rice (BIMAS)				
2. ditto	Rice	Traditi- onal	120	15	30	0.52
3. ditto		Gada rice (BIMAS)				
(302,200 ton)						
(8)	(9)	(10)	(11)	(12)	(13)	(14)
Required	Yield/ha.	Rate of	Rate of	Required	Present	Balance
volume	(paddy)	yield	component	land	possible	land
ton	ton/ha	%	%	000 ha.	000 ha.	000 ha.
1. Paddy 2,518.5	3.73	100	55	371.4		
2. Rice	2.60	100	15	145.3		
3. (1,309.6)	4.70	100	30	160.8	Second crop of rendengan rice	
	3.72	100	100	516.7	508.8	-7.9
(15)	(16)	(17)	(18)	(19)		
Extent of	Labour force	Required	Working	Required		
secondary crops	man/ha./crop	labour	day/year	workers		
		000 men		000 men		
1.	170	63,138				
2.	150	21,795				
3.	170	27,336				
346.2		112,314	300	374.4		
Unit Price	Gross income	Net/ha/year	Net income	Net income/		
000 Rp/ton	million Rp	income	million Rp	capita/year		
				000 Rp.		
1.						
2.						
3.						
105	137,508	60	89,380	229		

Note :

- (1) Population : Estimation data by the Team; table 6.2.
- (2) Crop classification : According to the Ministry of Agriculture.
- (3) C r o p : Selection of alternative crops by the Team.
- (4) Consumption : Data from tables 6.5 and 6.6.
- (5) L o s s : Self estimation from field survey and suggestions by agencies.
- (6) Shipment : Data from tables 6.7. and 6.8.
- (7) Conversion to paddy : According to the Ministry of Agriculture.
- (8) Required volume : $(1) \times (4) \times (1 + (5)) \times (1 + (6)) + (7)$
- (9) Yield per ha : Self estimation based on present data ;
Food crops : present yeald/ha. $\times (140.2)$;
industrial crops were shown on table 6.9.
- (10) (11) Rate of yield and component : self estimation
- (12) Required acreage : $(8) + (9) + (10) \times (11)$
- (13) Present possible acreage : from existing data by agencies.
- (14) Balance : $(13) - (12)$
- (15) Acreage of secondary crops.
- (16) Labour force : table 6.2
- (17) Required labour : $(12) \times (16)$
- (18) Working days : Self estimation from field survey results.
- (19) Required workers : $(17) \div (18)$
- (20) Gross income Rp/ha. : Unit price data from each agency.
- (21) Gross income : $(8) \times (20)$
- (22) Net income/gross income : Self estimation from field survey results.
- (23) Net income : $(21) \times (22)$
- (24) Net income per capita: $(23) \div (19)$

The same numbers (1) to (24) are applied for tables 7.4 tp 7.10, having the same meaning.

Table 7.5. Calculation Table

	(1)	(2)	(3)	(4)	(5)	(6)
No.	Population 000 men	Crop clas- sification	C r o p	Consumpt. per cap. kg/year	L o s s	Shipment (Export volume) 000 ton
1.	7,300	Secondary crop	Corn	23	20	30 (60.5)
2.			Cassava	49	10	30 (18.0)
3.			Sw. potato	23	10	30 (55.4)
4.			Potato	3	10	30 (7.2)
5.			Peanut	5	15	5 (2.1)
6.			Green peas	6	15	5 (2.5)
7.			Soy bean	5	15	5 (2.1)
T o t a l						

(7) Shift

(Continued)

(8)	(9)	(10)	(12)	(13)	(14)	(16)
Required volume 000 ton	Yield/ha ton/ha.	Rate of yield %	Required land 000 ha.	Present land 000 ha.	Balance	Labour force man/ha/or.
216.9	1.00	90	291.0			50
511.5	7.37	75	92.5			70
240.0	5.99	75	53.4			70
31.3	4.64	75	9.0			70
44.1	0.73	70	86.3			130
52.9	0.58	75	121.6			40
44.1	0.73	75	80.5			
1,185.8			734.3	(A)	(A')	

(11) and (15) shift

(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Required labour 000 men	Working day/yr.	Required workers 000 men	Unit price 000Rp/ton	Gross income mill. Rp.	Net/gross income	Net income million Rp.	Net income/ cap/yr. Rp.
14,550		48.5	57	14,928			
6,475			42	21,483			
13,738			50	12,000			
630			60	1,878			
11,219		100.5	184	8,114			
4,864			284	15,024			
3,220			142	6,262			
44,696	300	149.0		79,689		59,767	401

Table 7.6. Calculation Table

No.	(1) Population 000 men	(2) Crop clas- sification	(3) C r o p	(4) Consumption per capita kg/year	(5) Loss %	(6) Ship- ment %	Exp. Vol. 000 ton	(8) Required Volume
1.	7,300	Vegetables	Cabbage	8.2	20	5	(3.6)	75.4
2.			Tomato	4.0	20	1	(0.4)	35.4
3.			Egg-plant	3.3	20	1	(0.3)	29.2
4.			Cucumber	2.6	20	1	(0.2)	23.0
5.			Beans	3.3	20	1	(0.3)	29.2
6.			Chili pepper	3.3	20	1	(0.3)	29.2
7.			Onion	4.0	20	1	(0.4)	35.4
8.			Total				(5.5)	256.8

(7) Shift.

(9) Yield ha. ton/ha.	(10) Rate of yield %	(12) Required land 000 ha.	(13) Present land 000 ha.	(14) Balance	(16) Labour force man/ha/cr.
8.64	75	11.6			150
4.97	75	9.5			150
4.33	75	9.0			150
9.01	75	3.4			150
1.44	75	27.0			150
9.01	75	4.3			150
4.50	75	10.5			150
		75.3	(C)	(C')	150

(11) (15) Shift.

(17) Required labour 000 men	(18) Work- days/ year	(19) Required workers 000 men	(20) Unit price 000 Rp/ ton	(21) Gross income mill.	(22) Net/gross income	(23) Net income mill.Rp	(24) Net in- come/cap. /year Rp	
1.								
2.								
3.								
4.								
5.								
6.								
7.								
	11,295	300	37.7	38	35,430	55	19,491	517

Table 7.7. Calculation Table

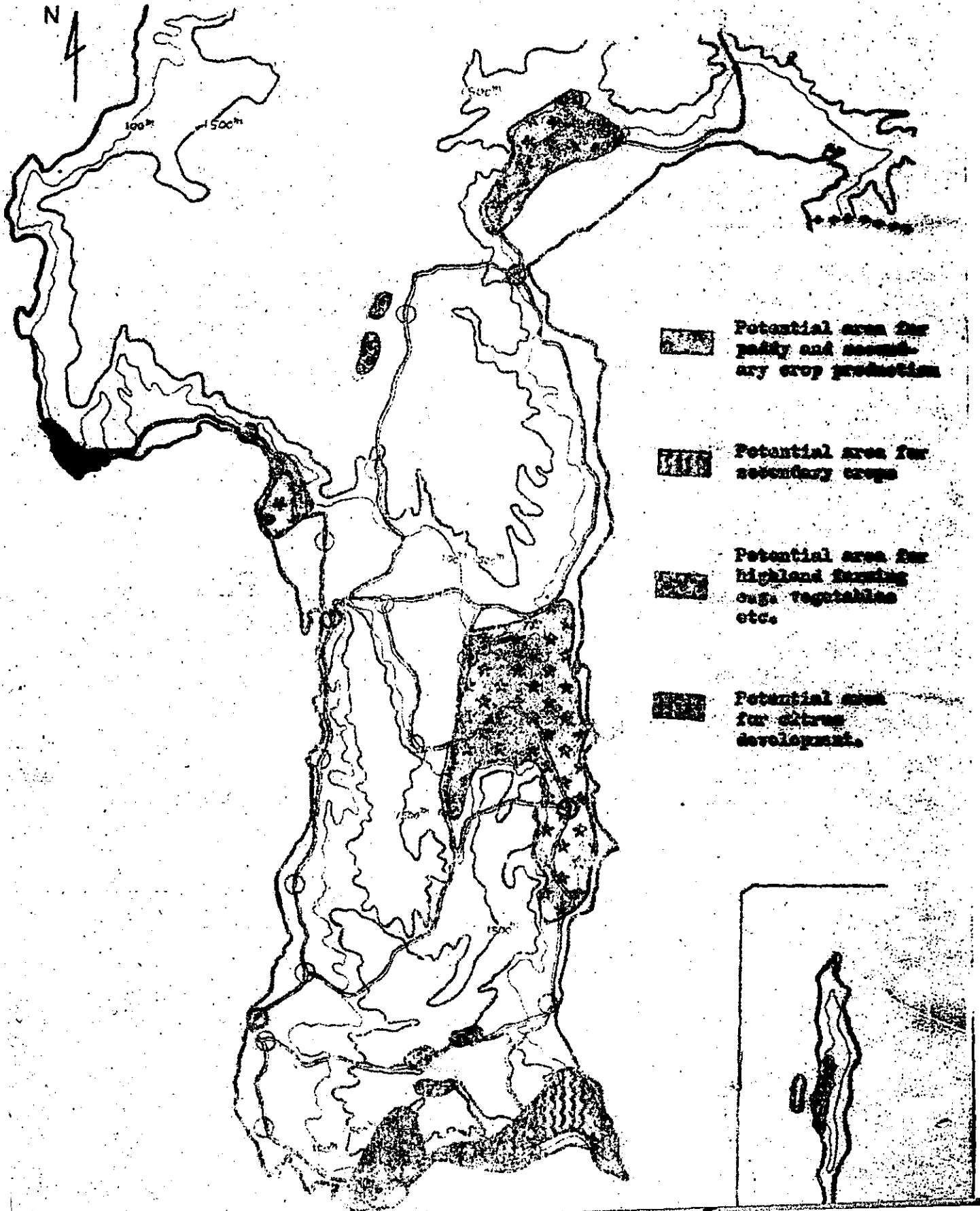
No.	(1) Population	(2) Crop class- sification	(3) Crop	(4) Consumption per capita	(5)	(6)	(8) Required Volume
1.	7,300	F r u i t	Banana	29.6 (kg)	20	1	261.9
2.			Papaya	6.6	20	1	58.4
3.			Orange	3.3	20	1	29.2
4.			Durian	3.3	20	1	29.2
5.			Mango	16.5	20	1	145.9
6.			Salacca	3.3	20	1	29.2
7.			Pineapple	3.3	20	1	29.2
Total							553.0

(7) Shift

(9) Yield/ha. ton/ha.	(10) Rate of yield	(12) Required land 000 ha.	(13) Present land 000 ha.	(14) Balance	(15) Extent of sec. crops	(16) Labour force man/ha/or
4.07	75	85.8			21.5	
8.58	75	9.1			0.8	
4.67	75	6.3			0.8	
10.18	75	3.8			1.1	
6.79	75	28.7			7.2	
8.82	75	4.4			0.8	
3.55	75	11.0			0.3	
		151.1	(B)	(B')	32.5	

(17) Required labour 000 men	(18) Working days/ year	(19) Required workhrs 000 men	(20) Unit price 000 Rp/ ton	(21) Gross income mill.Rp	(22) Net/gross income	(23) Net in- come Mill.Rp	(24) Net in- come/cap. /year
			80	20,952			
			80	4,672			
			200	5,640			
			100	2,920			
			120	17,508			
			100	2,920			
			80	2,536			
15,110	300	50.4	100	57,146	85	48,574	964

Fig. 7.3. Potential areas for food crop development



7.3. Programmes for industrial crops

7024. The leading projects for industrial crop development in the province are as follows:

i) Renewal of old trees, especially coffee and coconut, for the rehabilitation of production;

ii) Expansion of markets, including exports of industrial crops and processed commodities, by means of marketing researches.

7025. The supportive measures for industrial crop development in the province are as follows:

i) Formulating the "special production districts" based on the principle of "the right crop on the right location" like Tana Toraja for coffee markets expansion by breeding of fine quality and spreading of constant shipments;

ii) Preparing a "cropping guide book" by commodity by region applying the cropping system for farmers after putting on trials like the BIMAS project;

iii) Organizing farmers for cooperative sales and cooperative shipments, and specially for the regulation of producing and shipping;

iv) Preparing the production guideline for each industrial crop in order to regulate the crops' shipping volume and the crops' expansion area;

v) Marketing research.

7026. "The right crop on the right farm" is the important aspect in industrial crop farming for commercialization. In this system, attention should not only be paid to the soil type and soil fertility but also to a good traffic condition or to the possibility of road improvement.

2027. In the mountainous areas of Kabupaten Palmas, Enrekang and Tana Toraja, the difficulty in marketing and the inadequate knowledge about the kind of crops suitable to the areas, are the major constraints of underdevelopment. Therefore, when trunk road improvement is combined with appropriate extension services and marketing system development to the port of Pare-Pare, those areas will be able to command a higher income.

7028. A rural development package project should typically include the following elements :

- 1) Improvement of access roads to rural area from the town market such as the Kabupaten centre;
- 2) Organization of an effective and efficient marketing system;
- 3) Establishment of agro-processing facilities on cooperative basis if appropriate commodities are available. Rural development package projects are necessary for the palm sugar area in Enrekang, coconut area extending from Polmas to Mamuju and coffee area from Polmas to Tana Toraja.

7029. For several reclamable areas in the Province, perennial crops will be taken into consideration not only as the main crops of the site development but also for the purpose of preventive maintenance of the area. And labour intensive industrial crops should be introduced according to the province's characteristics. Processing of products should also be studied in such a way that it does not destruct forests, in other words, it does not use fire wood for processing, just the way as palm sugar processing.

The guideline of industrial crop production by commodity is shown on Table 7.8 and the potential areas for industrial crop development is shown on Fig. 7.4.

Table 7.8. Calculation Table for Industrial Crops

(3) C r o p	(8) Required Volume 000 ton	(9) Yield/ha ton	(10) Rate of yield %	(12) Required land 000 ha.	(13) Present land 000 ha	(14) Balance	(15) Extent of sec. crops 000 ha.
Clove	1.1	0.30	80	4.6			0.4
Coffee	11.6	0.55	80	26.4			2.6
Pepper	0.3	0.75	80	0.5			-
Nutmeg	2.4	0.60	80	5.0			0.5
Candlenut	14.8	0.45	80	41.2			10.2
Coconut	137.2	0.95	80	180.5			18.0
Sugar-cane	17.0	3.00	70	8.1			0.8
Kapok	4.6	0.25	80	23.0			5.8
Total	189.0			289.2	(D)	(D')	38.3

(Continued)

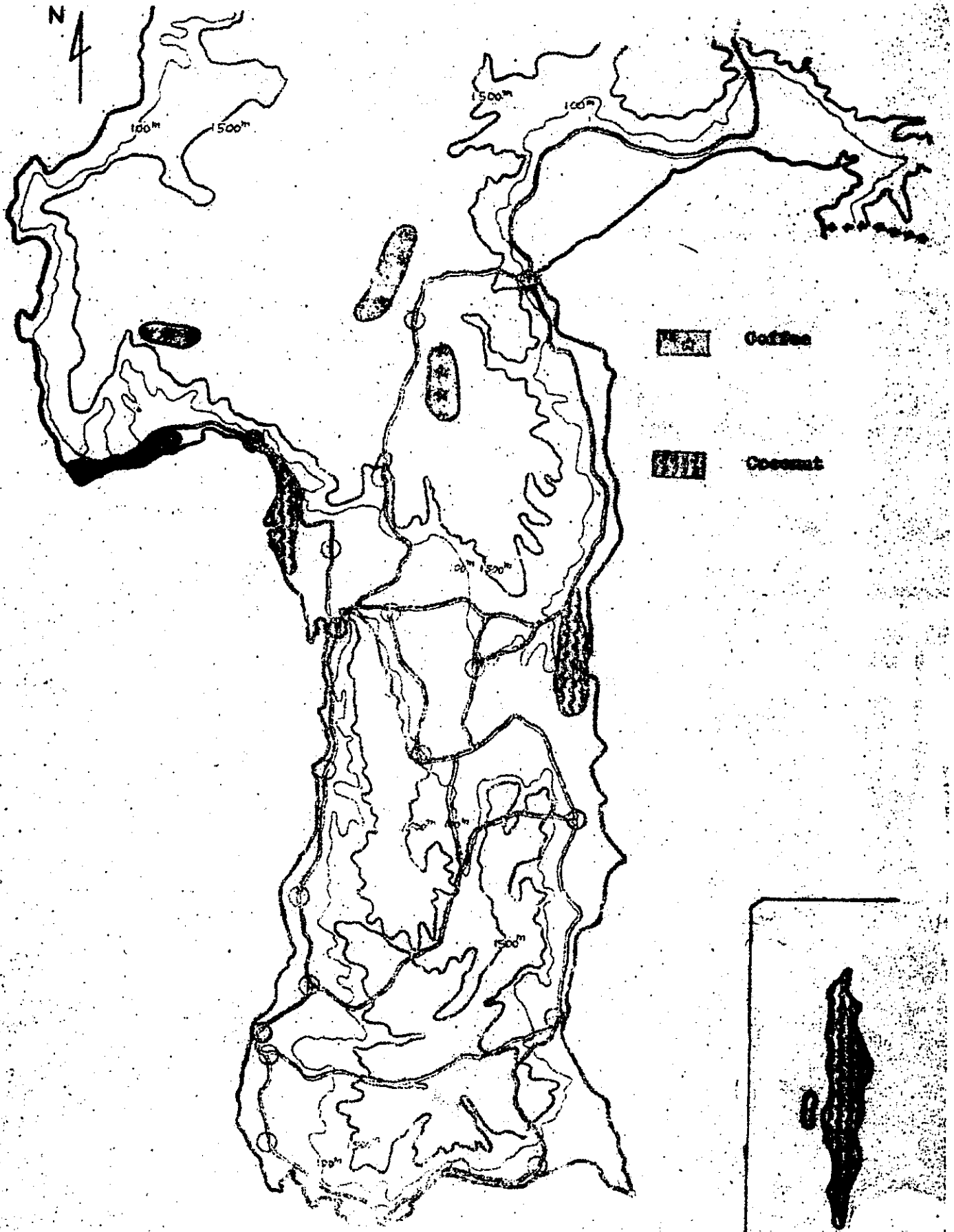
(3)	(8)	(9)	(10)	(12)	(13)	(14)	(15)
Tobacco	11.6	0.65	75	23.8			
Sesame	0.2	0.35	75	0.8			
Cotton	10.1	1.00	75	13.5			
Rosella	1.1	1.00	75	1.5			
Total	23.0			39.6	(E)	(E')	
Grand Total	212.0			328.8			38.3

(Cont.)

(16) Lab. force man/ha.	(17) Required labour	(18) Work- days	(19) Required workers	(20) Unit Price 000Rp/ton	(21) Gross Income Mill. Rp	(22) Net/gross income %	(23) Net income Mill. Rp	(24) Net in- come/ cap Rp
90	414			3,750	4,125			
300	7,920			700	8,120			
250	125			650	195			
120	600			708	1,699			
90	3,699			267	3,952			
120	21,660			95	13,034			
350	2,835			20	340			
120	2,760			310	1,426			
	40,013	300	133.4		32,891	85	27,957	210
450	10,710			132	1,531			
30	24			171	34			
400	5,400			175	1,768			
300	450			26	29			
	16,584	300	55.3		3,362	85	2,858	52
	56,597		188.7		36,253	85	30,815	163

Note : The guideline of production volume in 1990 is calculated on the basis of a political rate of annual production increase, e.g. in Repelita II the annual rate of 6.4% was taken; thus the same rate was taken in composing this table; export/import volumes are taken from Table 6.8.

Fig. 7. Potential areas for coconut and coffee development



7.4 Programmes for Afforestation and Reforestation

7030. The potential acreage for artificial forest, i.e. over 70% of which would be planted by economic tree species i.e., 1.1. million ha.; that for over 50% is 1.1. million ha.; but only natural useful trees should be raised in 0.2 million ha. of forest land (Refer to table 6.13) However, a number of economic tree species and their markets have not been studied yet, because there is little basic data used in examining the tree species.

7031. The most urgent target concerning forest lands in the province is to stop erosion by means of afforestation, reforestation and cover-cropping, because it is very difficult to design silviculture after severely eroded. On the other hand, from the viewpoint of water and land conservation, reforestation and afforestation deserve high priority.

7032. Therefore in order to avoid more destruction in the bare and denuded areas caused by soil erosion, afforestation should be conducted as quickly as possible as preventive measures in the province.

Vast areas as forest lands are in critical condition now, but these areas have a scarce and scattered population. Consequently the financial budget given by the Central Government cannot be utilized effectively in the Province by the traditional way. Thus more destruction and denudation can be foreseen in watershed areas for the irrigation development.

The new technology of afforestation should be developed through a pilot project in the most effective area in the province.

7033. At the same time, parts of the shifting cultivation areas should be planted on with grass and cover crops to prevent destruction and most of the shifting cultivation people should be resettled in the suitable area for normal cultivation with the transportation development. It is needless to say, that those shifting cultivation areas should be afforested as a series of the resettlement projects.

7034. On the other hand, since the improvement of the production areas is one of the most important policies, some effective projects have to be carried out such as reforestation, afforestation and soil conservation projects. The situation of those projects is shown on table 7.9 and 7.10.

Table 7.9 Development of forests

			Unit: 1,000 ha.
I t e m	Progress ('69-'77)	Plan('78-'84)	Total
Reforestation	56.6	121.5	178.1
Afforestation	52.9	213.8	266.7
Soil conservation	12.0	5.2	17.2
T o t a l	121.5	340.5	462.0

Source: Kantor Kehutanan

Table 7.10 Bare lands and critical lands

I t e m	1969	Progress '84	Remainder	'85-'90	Further
Bare	358.2	178.1	180.1	180.1	-
Critical	1,200.0	283.9	916.1	452.5*)	463.6
Land					
Total	1,558.2	462.0	1,096.2	632.6	463.6

Note: * Erodeable area. The Team's estimate.

Source: Dinas Kehutanan SulSel, and revised by data from Direktorat Jenderal Kehutanan Deptan.

7035. A greater variety of plants should be prepared for the afforestation programme, including mulberry trees which can be used for sericulture.

Particular attention should be paid to this plant because it can satisfy a number of objectives, such as: 1) greening, 2) supply of firewood, such as for palm sugar processing and 3) agro-industrial development of silk for export shipping.

7036. And moreover the South Sulawesi Province has a favourable project assisted by Japan (The team of Sericulture Development Cooperation Project in Indonesia) for Sericulture development. The objectives of productivity and total production of cocoon are as follows. (refer to table 7.11, 7.12 and 7.13)

Producing cocoon/ton (1982).

- a) Weight of mulberry leaves20,000 Kg
- b) Amount of silkworm eggs43,5 boxes
- c) Period of product 25 days
- d) Days of labour (c x 1.000 - d) 625 days
- e) Input material of producing cocoon (a x 2).. 239,000 Rp
- f) Raw silk/cocoon 150 Kg
- g) Sericulture farmer 5,000
- h) Cocoon product/box 23 Kg
- i) Labour hour/cocoon (kg) 5 hours
- j) Labour hours/day 8 hours
- k) Price of cocoon/kg 1500 Rp
- l) Raw silk percentage of cocoon 15 %
- m) Price of raw silk/kg 11,000 Rp

* *: incase of price of eggs/box of Rp 5,500,-

Table 7.11. Cocoon production plan

i t e m s	1976	1986	1982
Sericulture farmer	100	100	739
Mulberry field	100	220	259
Cocoon product (ha)	100	330	569

Source: Sericulture Development Cooperation Project
in Indonesia.

Table 7.12. Mulberry leaves production (1982).

Mulberry field (ha)	Product of leaves /ha/time (kg)	Time	Total product/year (ton)	work days/ha/year	Total employ-ment
A	B	C	D (A x B x C)	E	F
11,000	517	6	34,122	Included in pre- ducing cocoon	

Note : Main production area in Kabupaten Soppeng, Wajo, Sidrap, Barrakang and Takalar
 Source : The team of Sericulture Development Cooperation Project in Indonesia.

Table 7.13. Cocoon production (1982).

Cocoon/ha in one time (kg)	Times	Cocoon/ha/year (kg)	Total cocoon/year (kg)	Unit price ton (Rp)	Gross income (Rp)	Net income ratio (%)
G	H	I	J (I x H)	K	L (J x K)	M K-(2-5)-X
25.8	6	155	1,700*	1,500,000	2,550,000,000	84

(Continued)

Net income (Rp)	Work day/ha/year	Total Work day
N	O	P
(L x M)	1 x (2-4)	J x (2-4)
2,142,000,000	96.9	1,062,500

* Product of raw silk (q) = 255,000 Kg (q)
 Gross income of raw silk (Rp) = 2,805,000,000 Rp.
 Source : The team of Sericulture Development Cooperation Project in Indonesia.

7.5. Programmes for animal husbandry

7037. The leading project for animal husbandry development in the Province are as follows:

- i) Grassland improvement for small-scale farmers (mini ranch improvement);
- ii) Increase in poultries and cattle raising;

7038. Supportive measures for animal husbandry development in the province are as follows:

- i) Introduction of the management technique of poultry and goat raising;
- ii) Formulation of a supply plan for each kind of livestock in the province;
- iii) Formulation of a plan for increasing each kind of livestock;
- iv) Systematic multiple cropping of grass and forages, not only for cattle and buffaloes but also for small livestock;
- v) Introduction of intensive management for animal husbandry such as a systematic management and coordination between farm and slaughterhouse, and retention of freshness by quick freezing system or cold storage utilization. *) vi)

7039. The guideline of feed supply plan and the plan for increasing each kind of livestock in the province are shown on tables 7.14 and 7.15. The guideline of livestock production is shown on table 7.16 and the potential areas for pastures and grassland are shown on Fig. 7.5.

About 960,000 ha. of grassland is required for livestock in order to get sufficient animal protein by a self-support and self-sufficiency policy in the region. There is enough land resource for grass production due to the increase of land-use rate such as secondary use in paddy field and mixed cropping in garden.

Table 7.14. Feed supply plan for Livestock:

Livestock	Number 1000 head	Capacity (head/ha)	Required acreage 000 ha	Feed (ton/head)	Required grass 000 ton
Cattle	1,100.0	2.5	440.0	7.30	8,030.0
Buffalo	433.0	1.7	254.7	10.68	4,624.4
Goat	640.0	25.0	25.6	0.73	467.2
Total			720.3		13,121.6

Source: The Team's estimation.

*) Improvement of extension works on animal husbandry, both in its quality and quantity.

Table 7.15 Plan of livestock increase in the province.

	Required meat ton/head	Meat production per head ton/head	No. of slaughter animal 000(head)	% of slaughter (%)	1990 Head(A) 000(head)	1976 Existing feeding head (B) 000(head)	A.B Total increase rate %	Annual increase rate %	Natural increase rate %*
C o w	13.2	0.10	132.0	12	1,100.0	593.7	195	4.20	16.20
B u f f a l o	6.5	0.15	43.3	10	433.0	303.2	143	2.75	12.75
G o a t	1.6	0.01	160.0	25	640.0	486.1	132	1.95	26.85
P i g	4.8	0.04	120.0	25	480.0	369.6	130	1.75	26.75
P o u l t r y	38.5	0.00075	51,330.0	125	41,064.0	13,110.0	255	6.45	131.45

Note : *) Natural increase rate = birth rate - death rate excluding slaughter rate
 Annual increase rate = Natural increase rate - % of slaughter.

Source : Self-calculation by the . . . Team.

Table 7.16. Calculation Table

No.	(1) Population 000 men	(2) Item	(3) Kind	(4) Consumpt. /capita kg/year	(5) Loss %	(6) Ship- ment %	(7) Req. vol. 000 ton	(8) Meat ton/head
1.	7,300	Livestock	Cattle	1.6	10	10	14.1	0.1
2.			Buffalo	0.8	10	1	6.5	0.15
3.			Goat	0.2	10	-	1.6	0.01
4.			P i g	0.6	10	-	4.8	0.04
5.			Fowls	4.8	10	-	38.5	0.00075
Total						(1,400) ^{ton}	64.6	

(9) Required number of livestock 000 head	(10) Required feed ton/head/ year	(11) Required feed 000 ton	(12) Yield of grass ton/ha.	(13) Required grassland	(14) Present acreage	(15) Balance
1,410	7.3	10,293.0				
433	10.68	4,624				
640	0.73	467				
480	1.00	* 1				
41,064	-	* 2				
		15,304	18.25	843.0	590.0	-253.0

(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Required labour 000 men	Work- days/yr.	Required workers 000 men	Unit Price 000 Rp/ ton	Gross Income million Rp	%	Net income million Rp	Net in- come/ capita	

* 3

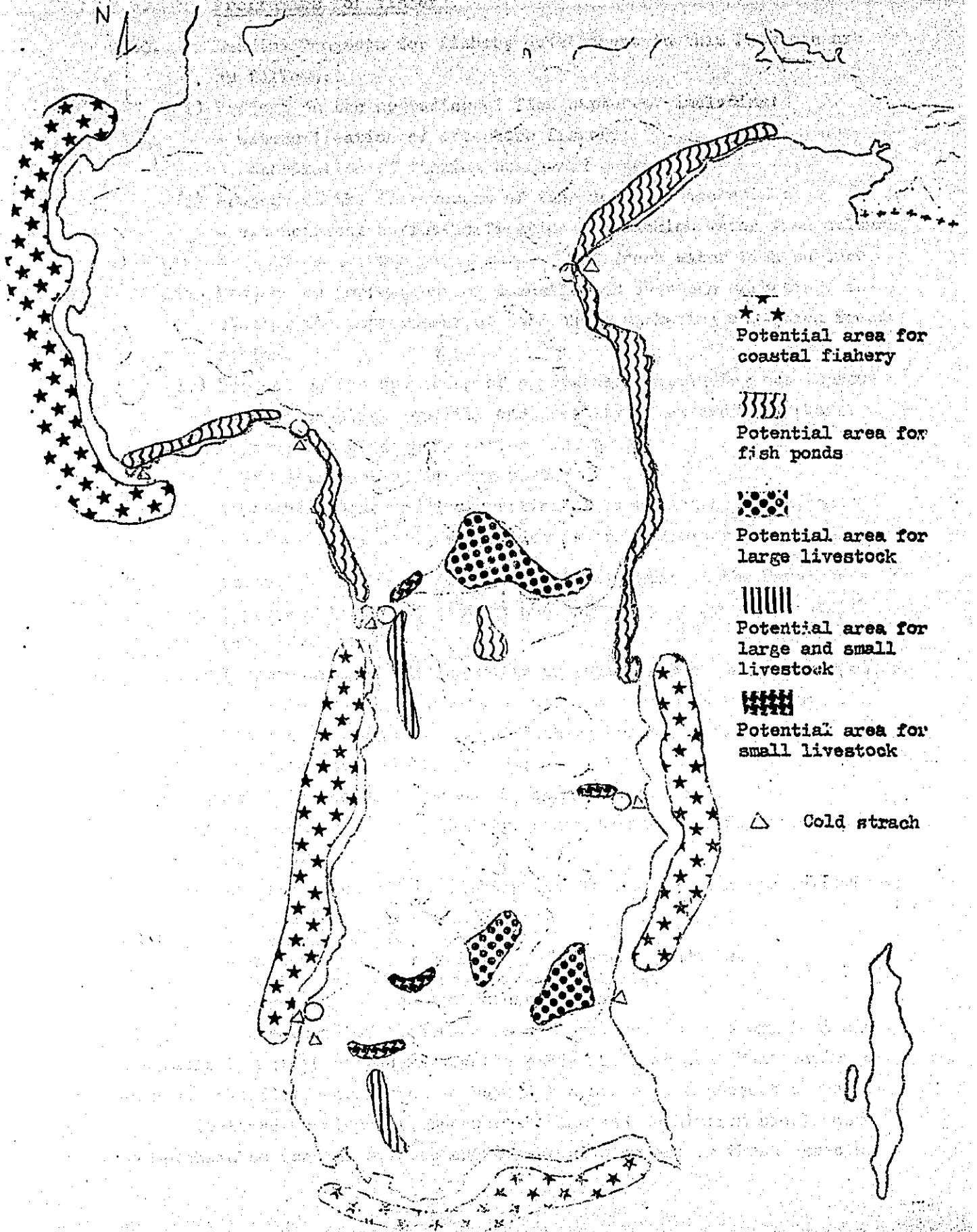
20	16,860	365	46.2	600	38,760	75	29,070	629
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* 1 - In this plan the feed for pigs is sweet potato, which is calculated in Table No.2(secondary crops). The feed required for pigs is 480,000 tons.

* 2 - In this plan the feed for fowls is not considered, because most fowls in South Sulawesi are fed in the garden on waste of agricultural products etc.

* 3 - These figures are converted from the price of meat.

Fig. 7.5. Potential areas for animal husbandry and fishery development



7.6. Programmes for fishery

7040. Leading Projects for fishery development in this Province are as follows:

- i) Project on the upgrading of fish captures, including:
 - extensification of off-shore fishery;
 - motorization of fishing boats and gears;
- ii) Project on the improvement of fish culture, including:
 - extensification/intensification of brackish water fish culture;
 - d i t t o of fresh water fish culture.
- iii) Project on improvement of domestic and overseas marketing, including the improvement of cold chain marketing and quick freeze system.
- iv) Project on the upgrading of apparatuses, including the improvement of quantity, quality and facility of extension workers.
- v) Improvement of fishery device, including:
 - Establishment of fishery ports;
 - Establishment and restoration of fish landing spots, and
 - Establishment and restoration of brackish water pond canals.

7041. Supportive measures for fishery development in the Province are:

- i) Improvement of fish culture and expansion of area in brackish water fish ponds;
- ii) Introduction of shallow water propagation such as pen culture in sea water and improvement of karamba system in fresh water.
- iii) Increase in motorization of fishing boats and fishing gears; expansion of fishing grounds;
- iv) Improvement in ice distribution by constructing ice plants;
- v) Improvement of the quality, quantity and facility of extension workers.
- vi) Manifestation of the fishery development through the followings:
 - Fostering of sea fish capture,
 - Fostering of fish cultures;
 - Fostering of the marketing of fishery products;
 - Fostering of the supporting industries,
 - Upgrading of the apparatuses.

7042. The poverty of fishermen in the province is more critical and miserable than that of peasant in the paddy field areas. Restoration of such socio-economic condition is beyond the scope of a project on regional agriculture development, because the law and regulation should also be established for the enforcement of the development in those aspects.

7043. A home improvement advisor has to devote attention to the following problems. The Team's survey found, for instance, that when there is an upheaval in the prices of fish and crops, and in wages, the fishermen and peasants sometimes do not do any work to get more income but in stead they eat by their income in self-sufficiency under the present living condition, without doing any more work for the rest of the days while there is enough food for them, in consequence of the long period of miserable socio-economic conditions where they have been penniless and possessing just the clothes they wear.

7044. The strategy for the outway from this proverty is: improvement of the living standard of the people in riral, low-income areas, directly through a comprehensive attack on the source of proverty. For this purpose, not only a policy of increasing the total income of the village should be followed but also one of improving the method of income distribution should be carried out in the rural area through the law and regulations in the province. Otherwise, if the subsidies are given to those villages, the results will be in vain for ordinary fishermen, except for a few ship-owners and middlemen in the village.

7045. The guideline of fish production in the province in 1990 is shown on Table 7.17 and the potential area for the increase in fish production is shown in Fig. 7.3.

Table 7.17. Calculation Table

(1) Population 000 men	(2) Item	(3) Kind	(4) Consumption per capita kg.	(5) Loss %	(6) Shipment %	(8) Required Volume 000 ton	(9) Yield/ ha. ton
7,300	Fishery	Brackish- water	6	20	10	57.8	1.00
		lake/river	2	20	-	17.5	-
		Sea	22	20	15	221.5	-
		Total	30		(34,200 ton)	296.8	

(10) Rate of Yield %	(12) Required land 000 ha.	(13) Present land 000 ha.	(14) Balance	(16) Labour force man/ha.	(17) Required labour 000 men	(18) Working day
80	72.3	46.4	- 25.9	80	5,784	250
	*			-	-	-
	*			-	-	-

(19) Required workers 000 men	(20) Unit price 000 Rp/ton	(21) Gross income million Rp	(22) Net/gross income %	(23) Net income million Rp	(24) Net income per capita Rp
23.1	1,500	86,700	45	39,015	1,689
-	237	4,778	80	3,822	-
-	300	66,450	60	39,870	-

Note : Land and water resources for fish pond culture are studied, but matters concerning lake, river and sea fisheries cannot be studied. However, the potential to increase fish production, which was estimated by the Fishery Service, (Dinas Perikanan), is larger than the planned production increase.

7.7. Marketing and rural organizations

7046. The following policies and programmes for agricultural marketing should be recommended to the authorities concerned:

i) Greater freedom should be given to traders so that agricultural marketing may increase in efficiency. Charges and checks on transported goods at check points should be reduced to a minimum.

ii) The following measures should be taken in shipping staple food stuff such as rice, corn and cassava in order to spread out interinsular trade.

- a. applying the policy of reducing sea transportation cost in interinsular trade through "tax reduction" and "assistance by subsidies";
- b. for this purpose fund should be raised to the DOLOG and BUUD/KUD as marketing subsidy;
- c. the fund supplied to BUUD/KUD as marketing credit should be increased, not only for rice and secondary crops but also for other agricultural commodities;
- d. the various rural credit programmes being operated currently should be coordinated and consolidated; greater roles may have to be given to the Village Credit Institution and the Village Unit Bank.

iii) A study on the marketing system of upland crops should be undertaken to encourage the development of less developed rural areas; a case study should possibly be conducted in relation to loans being provided to cooperatives to reduce marketing costs.

7047. For farmers' organization, efforts should be directed at the improvement of performance in the functions currently assigned to the BUUD/KUD.

On the other hand, BUUD/KUD may work better function adding credit provision for their members, but careful screening of the BUUD/KUD should be undertaken before as approval is given to specific BUUD/KUD to go into action.

7048. Particular attention should be stressed upon the recommendation to the founder because the project of farmers' organization shall be established in order to banish poverty in the rural area.

- i) In order to design adequate organization proposals for rural development projects, the multi-sectoral approach and coordination among various departments and government agencies are required;
- ii) Institutions to look after specifically the rural poor are generally lacking, and the rural poor themselves are disorganized;

7.8. Water use plan

7049. The total precipitation volume in the entire South Sulawesi province is about 144×10^9 m³, and the mean annual precipitation can be calculated as follows: (Total precipitation) - (total area) - (mean precipitation), i.e.
 $(144,175 \times 10^6) + (59,325 \times 10^6) = \underline{2,430 \text{ (mm)}}$

Table 7.18 shows the area (km²) classified by the mean annual precipitation (mm) and the total precipitation volume (m³) per year.

The total population of the South Sulawesi province at present is approximately 5,446,000. This means that each person in South Sulawesi has a volume of 26,474 m³ per year and this figure is much larger than that in Japan which is 6,500 m³/year/person.

The source of the mean precipitation in South Sulawesi is the mean annual rainfall map from the Institute of Meteorology and Geophysics, the Ministry of Communication.

7050. Using the following assumption, the potential of paddy field acreage is 2,053,000 ha. If the future crop intensity is 180%, this figure is 160,000.

The assumption: total accumulated water requirement for paddy per one reaping is 1,500 mm.

The availability ratio of precipitation for irrigation is 30%. But in this figure, land resource, labour force, marketing and economic feasibility etc. are not considered.

Table 7.19 shows the total actual possibility of paddy field acreage by using the data from the D.P.U. (Department of Public Works).

The crop intensity in South Sulawesi will be 141.9% in the target year. This means that the production of paddy in dry season will be doubled owing to the development of irrigation facilities.

7051. The development of water resources is fundamental to the establishment of the agricultural and socio-economic standards in the province, because water is one of the most significant resources and at the same time a potential menace of farming and living. Therefore the following points deserve particular attention.

i) Requesting the DPU for new storage schemes to add and to control the supply of large water resource including village irrigation.

ii) Improvement of the existing irrigation system so as to utilize the available water to a maximum extent;

iii) Prevention of floods and drainage improvement in low-lying areas such as around Tempe Lake and along the coast;

iv) Prevention of soil erosion and water prevention by means of promoting reforestation;

v) Recommendation on the DPU concerning the necessity of the following investment projects to obtain an increase of food stuff in paddy fields:

- a. Tertiary construction in the irrigated area,
- b. Rehabilitation of deteriorated canals and dams,
- d. Urgent implementation of the North Saddang Project and the Central South Sulawesi Water Resource Project.

Note of table 19. (page 154)

1. The acreage of 35,000 ha will be newly reclaimed in this project of Luwu, according to the master plan on irrigation development for the North Luwu plain South Sulawesi, March 1977. The source of data is also the above mentioned master plan.
2. The data on Central South Sulawesi water resources development project, July 1974 by the Japanese survey mission. (shown on table 7.20).
3. Remarks No. 3, 4 and 5 are the information from the Ministry of Public works in Indonesia. No.3 is the stage of plan which will be implemented by PORSIDA. No. 4 is the project which is being implemented by PORSIDA. No. 5 is the stage of rehabilitation plan which study will be made by Japan.
* PORSIDA is the project of Irrigation by the International Development Association.
4. The other acreage of each project in rainy season is the data from the Ministry of Public Works and acreage of dry season was calculated by T. Miyazato.
5. The detail acreage of each project of semi technical irrigation and desa irrigation is not clearly known.

Table 7.18 Precipitation in South Sulawesi

No.	Kab.	Range	500	1000	1500	2000	2500	3000	3500	4000	Total Area (Km ²)	Mean on precip. mm	Total amount of Precip. $47,893 \times 10^6 \text{ m}^3$
			-1000	-1500	-2000	-2500	-3000	-3500	3500	4000			
1.	Iuw.		550	-	-	2,625	7,950	3,025	1,625	825	16,700	2,868	47,893
2.	Tat.		-	-	-	75	2,025	875	-	-	2,975	2,884	8,581
3.	Sop.		850	-	-	-	575	-	-	-	1,425	1,557	2,219
4.	Waj.		1,350	-	-	1,050	-	-	-	-	2,400	1,406	3,375
5.	Bon.		175	-	-	4,25	225	-	-	-	4,425	2,216	9,006
6.	Sin.		-	-	-	150	200	300	200	-	850	3,074	2,613
7.	Bul.		-	475	200	-	300	150	25	-	1,150	2,044	2,350
8.	Sel.		-	675	-	-	-	-	-	-	675	1,250	844
9.	Ban.		-	250	100	-	50	-	-	-	400	1,562	625
10.	Jen		-	400	350	-	-	-	-	-	750	1,484	1,113
11.	Tak.		-	200	125	-	125	25	-	-	475	1,882	894
12.	Gov.		-	400	175	-	650	325	200	-	1,750	2,514	4,400
13.	U.P.		-	-	-	-	50	75	-	-	125	3,048	381
14.	Kar.		-	-	-	225	225	600	400	-	1,450	3,155	4,575
15.	Pan.		-	-	-	-	50	775	-	-	825	3,219	2,656
16.	Bar.		-	-	-	75	950	100	-	-	1,125	2,761	3,106
17.	P.F.		-	-	-	-	125	-	-	-	125	2,752	344
18.	Sid.		575	-	-	1,325	-	-	-	-	1,900	1,796	3,413
19.	Enr.		-	-	-	1,650	125	-	-	-	1,775	2,285	4,238
20.	Pin.		175	-	-	1,550	225	-	-	-	1,950	2,173	4,238
21.	Pol.		-	-	-	1,775	1,975	800	-	-	4,550	2,643	12,025
22.	Maj.		-	-	-	225	275	450	-	-	950	2,868	2,727
23.	Mam.		1,525	-	-	8,175	875	-	-	-	10,575	2,075	21,943
Tot.			5,300	2,400	950	22,925	16,975	7,500	2,450	825	59,325	2,430	144,175

Source: D P U P. SulSel.

Table 7.19. Increase of Paddy Field Classified by Rainy and Dry season in 1990

	Kab.	Rainy season	Dry season	%	Remarks
A. TECHNICAL IRRIGATION					
1. New Project					
L u w u	Luw.	105.5	80.0*	75.7	* 1
Central South Sulawesi	Waj. Sop. Bon	141.0	93.5*	66.3	* 2
K e l a r a	Jen.	6.1	2.0	32.8	
Tabo-Tabo	Pan.	11.5	1.2	10.4	
Panungkulu	Tak.	5.1	0.5	9.8	
Saddang Utara	Pin.	7.0	5.9*	84.3	* 3
Lekopancing	Mar.	3.6	0.4	11.1	
M a m b u	Pol.	2.5	0.3	12.0	
Padang Sappa	Luw.	6.7	0.7	10.4	
Sub Total		289.0	184.5	63.8	
2. Rehabilitation					
Saddang	Pin.	56.9	48.4*	85.1	* 4
Jeneberang	Gow.	24.0	9.6*	40.0	* 5
Bili-Bili	Gow.	6.0	0.6	10.0	
Palakka	Bon.	6.0	0.6	10.0	
Pattiro	Bon.	5.4	0.5	9.3	
Salobunne	Sop.	3.5	0.4	11.4	
Lajaroko	Sop.	2.0	0.2	10.0	
Aparang	Sin.	2.0	0.2	10.0	
Bayang-bayang	Bul.	3.4	0.3	8.8	
Sub Total		109.2	60.8	55.6	
3. Constructed					
Bulu Cenrana	Sid.	5.0	0.5	10.0	
Bulutimerang	Sid.	5.3	0.5	9.4	
Bantimurung	Mar.	6.7	0.7	10.0	
M a l o s o	Pol.	7.0	0.7	10.0	
K u n y i	Pol.	2.0	0.2	10.0	
Kiru-Kiru	Bar.	0.9	0.2	22.2	
Sub Total		26.9	2.8	10.4	
Total A		425.1			
B. SEMI TECHNICAL IRRIGATION					
Under construction		66.6	-	-	
Constructed		46.6	-	-	
Sub Total		113.2	-	-	
C. DESA IRRIGATION					
Desa irrigation		53.0	-	-	
Grand Total		591.3	248.1	41.9	

Note: See foot note on page 152.

Table 7.20 Planned irrigation areas

Unit : Ha.

No.	Name of individual Project	Assumed minimum river discharge	Planned irrigation area in previous report	Planned irrigation area in this report	
				Rainy season	Dry season
1 - 1	B i l l a	4-5 m ³ /s	49,000	15,000	5,000
1 - 2	Boya (of which already irrigated area)	5-6	10,000	15,000 (3,600)	6,000 (1,000)
1 - 3	Gilirang	1-2	14,000	5,000	2,000
2	Cendrana Lake Tempe	(enough)	15,000	15,000	15,000
3	L a w o	2-3	4,000	6,000	2,500
4	Langtemme	4-5	15,000	15,000	5,000
5	Sanrego	8	20,000	20,000	8,000
6	Walanae (Ludunge)	(enough)	15,000	15,000	15,000
7	Walanae (Mong Dam)	(enough)	90,000	35,000	35,000

Note : The data from preliminary survey report on Central South Sulawesi Water Resource Development Project Cendranae Irrigation Project needs pumping facilities.

VIII

RECOMMENDATIONS

8.1. General recommendations for Indonesian planners

Attention:

The recommendations in this section are not for implementation projects but for plan making, are once explained to our counterparts by Mr. K. BABA who was the leader of the second Technical guidance team. The recommendations for project making are presented in Chapter VII respectively.

8001. It may be noted that agriculture which is usually expected to play the leading role in the initial stage of development, has the following characteristics:

- i) It produces goods which satisfy the basic need of people,
- ii) It contributes to the solution of food shortage which confronts the Indonesian economy today, and reduces the heavy burden of food imports in the international balance of payments.
- iii) It requires comparatively less intermediate input for its output, and its ration of value added is high. Its production structure is highly self-contained.
- iv) It does not require high level professional technical capability and since it can be labour intensive, it serves in providing employment opportunities.
- v) The exertion of individual effort is possible, with the corresponding relation between effort and result comparatively clear. This is due to the fact that agriculture does not require the grouped and uniform labor as seen in industrial production processes, with the exception of such cases as the release of irrigation water, application of agricultural, etc.

8002. From this, we may see the general importance attached to agriculture during the initial stage of economic development is not only due to the fact that it produces foods which satisfy a basic human need. If the national or international economy is based on free exchange, no matter how important food may be, production will not pay if production costs are much higher than those in other countries or other areas. However, the benefit which accrues to the national economy from agriculture cannot be measured merely by the profit rate seen at the final stage of production.

Since agriculture largely depends on natural conditions such as the sun, soil, rain, and labour, and does not require many inputs from other sectors it does not depend on the growth of other sectors or on capital investment. Hence, in terms of the national economy as a whole, it is capital saving.

8003. The human element, the farmers themselves, is the most important factor in the promotion of agriculture, although the importance for a good location cannot be ignored. The key to production increase lies in the system which sustains agriculture.

At present it is possible to evaluate the activities being pursued under BIMAS/INMAS project including the input supply package, the provision of technical guidance and extension of technology, and the formation of such organizations as agricultural cooperatives. However, the establishment of an integrated macro agriculture promotion policy is desirable.

8004. Practically all businesses are evaluated according to their performance on three standards: profitability, stability and growth. Although the priority may vary, these standards are the universal goal of business activity. Agriculture is no exception. Agriculture, as an enterprise, transforms inputs into outputs, trying to achieve profit in the process.

In order that this transformation process of production process occur smoothly, it is necessary to have a distribution system for both inputs and outputs with prospects for adequate prices for both. Generally, however, in developing countries, such market conditions are usually insufficient.

8005. It is ironical that countries in which the agricultural population occupies a majority of the entire nation's population have food shortages. Since the agricultural population occupies the majority of the population, non-agricultural sectors do not have the purchasing power or effective demand to absorb agricultural products at a price which would bring profit to the farmers. Thus, the market for agricultural products is small and since conditions which might operate to the advantage of market oriented production do not occur, production is not stimulated by a flow of goods, creating a vicious circle. These market conditions may explain the paradox that food shortages occur because the agricultural population is excessively large.

8006. For continuous increase in food production, a reasonable and consistent price policy is absolutely necessary.

On the other hand, the maintenance of agricultural product prices at unreasonably high levels not only increases the burden on the consumer but may ultimately become a cause of skyrocketing commodity prices. Hence, the major emphasis of agricultural policy must be consistently placed on the promotion of productivity and the reduction of production costs. In so doing, the advantages of food imports and other policy measures must be deliberately considered and compared. In the execution of any sort of economic policy, the persistent adherence to the **achievement of a set physical target** or to a certain policy measure will off-set the balance of the economy and may result in diseconomics.

8007. On the other hand, the irrigated regional development project will not be collection of various projects and moreover will not be a project which only plans the construction of individual physical facilities. The ultimate goal of the development project lies in the promotion of welfare of the region's residents and the contribution to the development of the entire national society.

For this purpose, planning constitutes the entire process of searching for an effective combination of methods, implementing these, studying the result of changes in the environment and in project execution, and amending the project. That is, the entire process of smoothly tying up the various actions of "plan-do-see" is planning.

8008. However if the development procedure places emphasis only on the expansion of individual physical facilities and lacks sufficient consideration of consistency and mutual complementary among projects, development will not progress at a desirable speed, and costs will accumulate, while the relative, predominance which the area possesses will decline and would possibly lose priority in the move toward development when viewed from a national context. Moreover, since development is a process of ceaseless effort which aims for endless progress, favourable results cannot be obtained unless suitable actions and working schemes are respectively considered at each stage. For example, the expansion of irrigation facilities requires the development of proper agricultural techniques and management to accompany the expansion.

The improvement of roads concomitantly expands demand from the outside, and increases the supply commodities for consumption and production.

However, without waiting for such expansion of physical facilities, it is also the role of planning to contrive an efficient operational scheme from among the given conditions. To devise a method of efficiently utilizing such productive elements as the labour force, capital and land which are present is the first step toward development.

8009. To be active contributor to the economy in Indonesia, it will be necessary for a regional economy to become self-supporting and a constituent part of the national economy, not just an isolated self-sufficient local economy. In other words, if the area is self-sufficient in terms of resources, possessing the basic productive needs in its land, water and labour force, products with high production costs will be made and it can be expected that the area as a whole will become relatively disadvantaged in its transactions with other regions. Just because it may have resource potential, it would be precipitous simply to choose among options based on a short-term parochial view of the advantages and disadvantages of intra-regional production.

Basically, the area must also exert efforts in the fostering of certain types of local industries, looking far ahead into the future development of a regional economy even while establishing it-self firmly on the principle of comparative advantage. Thus those items which exceed local demand, i.e. surplus products, would be shipped to other areas while materials which are not locally produced or are in short supply would be shipped in from other areas. It would be a desirable aim to balance the area's revenue and expenditure. This economy, in which revenue and expenditure are balance against other areas, is called a self-supporting economy.

8010. As we have observed above, no matter how great the potential for development may be/or how many individual projects are planned, such measures alone are not sufficient to promote regional development. Planning in which each respective project and element occupies its proper position within a consistent, coherent and integrated framework for long-term development must be undertaken.

Planning as referred to here is not a single static action, but a dynamic process in which the results and effects of actions are always monitored, evaluated and fed back to the plan, with overall adjustment made.

8011. The secret to planning is not to have some of the planners become self-satisfied, but to involve every-one in the process: Government administrators, the residents, other related concerns and if possible outsiders, so that all can be enthusiastic concerned about the realization of the plan.

Nothing can be accomplished where there is no participation by the people concerned. For this purpose, it is also necessary to officially announce and submit a logical plan an endeavour to **persuade**. But since "seeing is believing", it would be better to demonstrate immediately the **practice ability** of the plan and let them see what the effects of the plan will be.

In other words, for the time being, efforts should be exerted toward any project which is consistent with the entire plan and yet from which a quick-return may be expected so that tangible results may be realized early.

8012. Such a policy can be recommended not only for **pedagogical reasons** but also from economic considerations. In large-scale projects the gestation period is long and the economic burden also becomes great. Generally, the initial effects of large-scaled projects are often seen in and complemented by medium, small and mini-scale projects or construction work. For example, in an irrigation system, the construction of reservoirs and head works constitute large-scale projects, while the construction of branch canals and laterals comprise or small-scaled projects. Thus the major portion of execution of the project is also a smaller scale.

This notwithstanding, the importance of small-scale projects is not minor. The visible results of an irrigation project is seen when the water first reaches the field it is to irrigate.

8013. To a great extent, the way in which the programme period is determined holds sway over the substance of a regional development programme. In some instances, the programme period or the target year is predetermined, as when it is tied in with that of a higher level programme (e.g., a national development programme). Then there are cases in which the plan period or the target year must be determined independently and optionally on the basis of the substance of the plan. There is no generally accepted theory as to how many years should be set aside for a planned period. Judging from the viewpoint of planning technique, it may be appropriate to set it within a period in which the reliability of forecast may be assured to some extent, or a period in which no basic alterations are considered likely to take place in the targets of the regional plan.

8014. Whether the planned period is long or short is determined by the substance and the degree of precision of a plan. Long-range plans would reach down to projects with gestation periods of three to five years.

In substance, the long-range plan is abstract whereas the short-term one is concrete. In the construction of a **huge** ... dam, concreteness pervade even in the long-range plan. The following are the varied types of plans classified by planned periods.

TABLE. Planned period as classified by types of plans

Period	Classification	Type
More than 20 years	Ultra-long-range plan	Vision, pilot plan
10 - 20 years	Long-range plan	Master plan
5 - 10 years	Interim plan	Plan Program
3 - 5 years	Short-term plan	Project

8015. As a plan gradually takes on concrete shape from the pilot plan to a basic plan, then to a plan and finally to a project, whatever is incorporated in the plan worked out on the higher level (for a wide area) is progressively subdivided into programmes on the lower level (for limited areas). The minuteness of the plan must be stepped up in proportion to this subdivision. As a yardstick for the minuteness of planning, a list of scales for maps for different types of planning is given below. It is to be noted that this **list** serves as a general criterion, and it does not necessarily mean that this list may serve as it is in actual planning.

The scales should be more elaborate in some cases and could be rougher in others.

Table 8.1. Types and minuteness of plan (scales for maps for use in physical plans)

	National land plans:	Regional Plans			Local plans	
		Local	Kabupaten	City etc	Urban	Housing etc.
Pilot plan	1/2,000,000	1/1,000,000	1/200,000	1/50,000	1/15,000	1/10,000
Master plan	1/1,000,000	1/500,000	1/100,000	1/25,000	1/10,000	1/3,000
P l a n	1/500,000	1/200,000	1/50,000	1/10,000	1/3,000	1/1,000
Project	-	-	-	-	-	-

8016. With respect to the relationships among the various types of plans in the table, it might be said that the nature and minuteness equivalent to those of a pilot plan at a city level are required for a master plan (1/25,000) at a wide-area city level, and that the nature and minuteness equivalent to those of a plan at a local level is required for a pilot plan (1/200,000) at a Kabupaten level.

8017. The description of this section is mainly owing to the report of the survey for the Cagayan valley region development planning by JICA.

8.2. Recommendations by the team of experts

8.2.1. Further studies

- i) Necessary maps for the regional agricultural development plan.

8018. During the period of the study by the Team, the most difficult problems have been the lack of basic maps. The topographical conditions of the South Sulawesi Province are quite complicated and land utilization systems are very multitudinous by the specific feature of the climate in the Province. Especially the present condition of land utilization is not clear, but also border line of ownership such as national land and private one, and the border of land classification such as forest, grass land and cultivated land. Cropping pattern through a year is not available on the map at present.

Under these conditions the Team inevitably has taken up the mesh method on the existing maps on the scale 1/500,000 as the first step of technical transfer to the Counterparts. However, those methods are adequate to raise the minuteness of the plan in the future.

As the next step, the land utilization maps should be developed by a remote sensing method, aiming at the clarification of land utilization in the agricultural aspect, utilizing the photograph taken from the artificial satellite.

It is recommended by the Team, that this progress should be developed as an international technical cooperation project.

- ii) Follow-up survey for transmigration

8018. The outflow of population to other regions is a specific phenomenon in the Province. Most of them are farmers and fishermen, and when they seek new jobs, some would prefer non-agricultural work and some would want to be farmers or fishermen as they used to be.

The intentions of those people when they are going to leave their native lands has to be found out, because the reason why they leave for other regions might be their dissatisfaction with the present agricultural and socio-economic conditions to which they were forced to belong. Elimination of those conditions should be the first for the development of agriculture in this Province. And then, what regions should be clarified by means of the follow-up survey under the cooperation with two regions, i.e. the original (native) place and the resettlement place. The same kind of study may be necessary for transmigrants from Java to Luwu area.

The socio-economic study mentioned above should be organized systematically and in a long period under cooperation with universities and other institutes sponsored by the international technical cooperation.

iii) Water and land use

3019. Multipurpose use of irrigation water should be tried for future farming.

According to the Master Plan, the Kabupaten Jeneponto is quite suitable for citrus fruit, and they are getting good price in the markets of Ujung Pandang, some of them are sent to the other island in Indonesia. This will be a magnificent industry in this region and will develop the regional economy greatly.

However, they have a severe problem of water shortage; sometimes the citrus trees are dried, and only the poor quality citrus can be harvested. If they have enough irrigation water, they could get citrus fruit twice a year.

The recommendation to solve these problems is as follows: The utilization of irrigation water in the Kelara Irrigation Channel will be very helpful. Special pumping facilities are required in some part of the citrus field, however the citrus field, however this system will greatly contribute to the stability and increment of citrus production in this area. Kelara Irrigation Project was basically designed for paddy fields; however, the water requirement of citrus fruit would not be so large, and according to the observation, part of the paddy fields are already converted into citrus fields. Therefore the surplus water will be available to the citrus fields.

Coordination between the Ministry of Agriculture and the Ministry of Public Works is necessary on this matter.

iv) Reclamation of upland areas

8020. According to the Master Plan, the acreage of 270,000 ha. is suitable for the development of upland areas in the South Sulawesi Province.

The development of upland areas is not such an expensive work, and it will have a great effect for boosting the regional economy. However, the responsibility for the reclamation of upland fields is not clear at present in the governmental body. The responsible organization concerning this matter should be decided as soon as possible.

v) Establishment of operation & maintenance system for the Irrigation Project.

8021. According to the observation, there are no operation & maintenance system (O & M) for irrigation projects except for the Saddang Irrigation Project. The construction of irrigation facilities has the first priority; however, without the O & M the project will never be complete.

The O & M is like a "heart" in the project; without a heart, every organization does not work properly. Recommendations on this matter are the following;

- a) The Government should subsidize the cost of O & M down to the Desa level irrigation system.
- b) Foremen and gatekeepers should be under the Government's control,
- c) The establishment of training centers for the O & M of the irrigation system is urgently needed, and
- d) The education system of water management is required down to the level of each farmer. This system will belong to the extension Service of the Ministry of Agriculture. The Coordination between the Ministry of Agriculture and the Ministry of Public Works will be strictly required in this field.

vi) Research of shifting cultivation

8022. The number of shifting cultivation is not clear at present. All shifting cultivation areas are not suitable to continue the cultivation. The Master Plan shows that part of the shifting cultivation areas have to be changed to forest areas and grassland in order to prevent soil erosion technically.

Thus, resettlement of those people to suitable areas have to be studied, taking into consideration the survey of reclamable areas.

According to the Master Plan, suitable reclamation areas exist about 252,500 ha in the forest areas, and 62,500 ha in the grassland areas.

The systematic survey has to be practised by the responsible body of the Provincial Government (Refer to 2 of the recommendation).

vii) Minuteness of the data

8023. Necessary data have been collected and analyzed during a year (Refer to the Annual Report) by the Team, getting the heartfelt cooperation from the Agencies concerned. Even though such a great effort has been done, some of them are not **realizable and some of them are not available** to collect. Consequently the necessary coefficients for plan making are empirically estimated by the Experts, considering the effective transferring of know-how of planning to the Counterparts in the restricted period.

During the second phase, the same endeavour will be repeated for more accurate planning, however, those are for the specific Kabupatens

Therefore, the Regional Office of the Ministry of Agriculture in Ujung Pandang has to study those problems in the province continuously over the years in order to raise the accuracy of planning.

8.2.2. Improvement of land-use.

i) New reclamation areas.

8024. The most deplorable fact in land-use in South Sulawesi Province is the shifting cultivation and the forest fires prevailing during the dry season. Prevention of soil erosion is urgently necessary in the Province and reforestation, strongly being implemented, aiming at the erosion prevention. However, ^{is} careless forest fire always have put those efforts in vain.

8025. According to the statistics available, the acreage of shifting cultivation is about 250,000 ha. and arable land is the forest area is nearly 500,000 ha. and existing grass land is about 590,000 ha. The number of cultivators in shifting cultivation area is not available at present. However, if resettlement of those people to the arable land in the national land by means of systematic reclamation were available, those shifting cultivation area would be changed to reforested area and consequently soil erosion will be prevented by the reforestation and greening

8028. In addition to the resettlement of those people, some feeder roads and trunk roads are developed (for instance from Sinjai to M. lino), the area along the roads will be converted into the estate crops area and thus each income for those people will be materialized by the systematic reclamation project. Therefore suitable area for reclamation should be surveyed by the respective level such as Provincial, Kabupaten, Kecamatan and also even in the Desa level. With the cooperation of agencies concerned, some suitable area for reclamation will be found. In addition, the information about useable water resources such as springs may be clear among the people who live in and adjacent to those areas. To involve those people in the development plan of reclamation at the very beginning stage is the most effective and meaningful way for the success of regional planning.

8027. Among 500,000 ha of arable land, a half of it will be used for alternative use of the shifting cultivation area and about 250,000 ha. would be utilized for reclamation for about 250,000 households, if one hectare is given to each farmer as an additional expansion of its present agricultural management area or as a new settler who moves into those areas if locations are isolated from original village site. Since some of those areas will be located in high altitude, its temperature is the most influential factor for the selection of the cropping for land use. The record of temperature is the most fundamental data; however, it is not available by altitude at present. It is recommended that systematic observation of the temperature in the already developed highland area be commenced for the future development of the new reclamation area.

ii) Grassland improvement

It is estimated that an area of 590,000 ha. has been used for animal husbandry. Among the uses, 13 ranches of 43,445 ha. are operating and 22 ranches of 18,755 ha. are under proposal by commercial farming, totalling 62,200 ha. as large scale ranches by the end of 1977, showing about 10.5% of the total grassland area. Other utilizations of the areas are not known, but those areas may be utilized for small farmers' grazing. According to the amount of pasture requirement for the present number of livestock calculated on the basis of daily needs, it is about 2 times that of the available grass production. In addition, as the result of improvement of cattle body by artificial insemination, the required grass per

head is about twice as much as that of local cattle at present (2.4 head/ha. for local cattle; 1.2 head/ha. for improved cattle in improved grassland).

In one year, 590,000 ha. of grassland will produce approximately 4,307,000 tons of grass (590,000 x 7.3 ton = 4,307,000 tons). On the other hand, the entire cattle population will need about 9,214,600 ton of grass in one year. Thus more than half of the needs is not available for livestock, and a deficient feeding is prevailing in the South Sulawesi Province.

iii) Fish pond improvement

8029. The area available for coastal aquaculture in South Sulawesi is about 120,000 ha., occupying more than 43% of the whole area of brackish water fish ponds in Indonesia. Since shrimp cultivation is the most economical one for export at present, milkfish which is also suitable for export and self-consumption of the inhabitants, is not likely to be so highly evaluated as shrimps. However, there is a lot of unutilized fish ponds because of annual shortage of 100-120 million milk fish fry in the fish pond areas of Central Java and West Java. On the contrary surrounding areas of South Sulawesi Province have plenty of milk fish fry. The experiment on long distance transportation of fry from Ujung Pandang and Matarani to Jakarta was reported. Transportation of the fry in oxygenated containers is technically and economically feasible and fish farmers are willing to accept the fry introduced from other areas (Refer to Chap 9.4). The Provincial government and the Central government should have more emphasis on this matter for the improvement of nutrition level and living standards.

8031. In addition to shrimp and milk fish, rabbit fish cultivation is also quite promising in the southern part of the South Sulawesi Province. However, each kind of fish has different nature for salt contents in the water of fish ponds. Shrimp is quite sensitive to high salt contents, and rabbit fish is tolerable for high salt contents; milk fish is moderate. In some parts, pumping facilities are effective for shrimp cultivation in the area of high density of salty water, adding fresh water in dry season and salty water in wet season. But, the cost of the pump is too expensive for diffusion, even though there are some benefits available under the high price of shrimp at present. However, recent tendency of surplus storage of shrimps in Japan because of a stagnancy in

Japanese economy and a surplus of supply throughout the world indicate the price decline in the near future. Shrimp cultivation in brackish water fish ponds in general is comparatively cheaper because of lower production costs compared with that of sea shrimp by boat.

8031. Taking into consideration those conditions mentioned above is shrimp economy, the most suitable fish should be selected, based on the natural conditions by localities. In this sense, specific density of salty water should be measured systematically, using hydrometers for the future planning of fishery cultivation development.

8032. As shown in the spontaneous settlement of fishermen and new opening of fish pond in Kabupaten Wajo, the development of brackish water fish pond is quite promising at present in the South Sulawesi Province. For further development, the scientific survey should be done systematically as mentioned above.

iv) Water resource development

8033. As stated already in land use developments, the erosion protection by reforestation is the most fundamental countermeasure of water conservation in general. What is more, shifting cultivation and forest fire are not unavoidable calamities caused by human beings. If the reclamation policy is adequately improved, those critical calamities would be able to eliminate.

Furthermore, since the amount duration of rainfall are quite different by year, the optimum season for the rice transplanting is not available to fix. Owing to the plentiful solar energy in the tropic zone, rice is able to grow whenever waiting for the changeable rainfall. As a result of this way of planting, however, damages in pest and diseases are severe because of difficulties on practising a systematic way of prevention for such damages.

Therefore, construction of reservoirs to storage the plentiful rainfall in the wet season may be the most effective way for stabilization of rice cultivation in the optimum seasons under the controlled water distribution by reservoirs. However, from the point of view of the geological feature of the province lime stone structure prevents the building of high dams and large reservoirs because of fear for water leakage.

This is the reason why an endeavour for integrated water conservation plans should be made by all agencies concerned including education

system for young generation for prevention of prevailing forest fires. Thus water conservation and new reclamation may co-exist without any conflicts between two ways of implementation.

8034. Water supply and high yielding

The provision of water is one of the most important factors in rice production in South Sulawesi Province, especially for high-yielding varieties, because of scarce and unstable rainfall distribution during a year. In 1975, the total acreage of rice field of 509,000 ha. consisted of technical irrigation 79,000 ha (15.5%), semi-technical 32,000 ha. (6.3%), village irrigation 115,000 ha.(22.6%) and rainfed 283,000 ha. (55.6%). The cultivated area in the wet season is 432,000 ha. and in the dry season is 109,000 ha. Thus the dry season cultivated areas occupy about 25% of that of the rainy season. Since all irrigable area is about 54.4% of total paddy yield area, suitable area for Gadu is about a half of irrigable area. It indicates that water supply which is available in the dry season for the area planted with Gadu, is about 25% of irrigable area in the rainy season.

8035. There is not so big difference between yield per planted area of BIMAS/IRMAS and traditional cultivation in recent years because traditional technique also raised to high level, the same as that of BIMAS/IRMAS. This means the expansion of the area of BIMAS/IRMAS already reaches some marginal point. Traditional areas occupy 71% in the rainy season and 55% in the dry season of total cultivated areas respectively. The endeavor should be concentrated not in the expansion of the dry season area of BIMAS/IRMAS. Because as shown in the Chapter 10.1 the yield per hectare of BIMAS/IRMAS in the dry season is quite higher than that of traditional cultivation (152% in the dry season) and attained more than 5 tons/ha. It is only 116% in the rainy season.

8036. Again this shows the importance of water supply and needs of expansion of irrigation area, especially water available in the dry season. In order to materialize promptly the irrigation area in the dry season, small scale irrigation projects should be promoted involving all farmers who need irrigation water and all agencies concerned. In order to promote cooperation between DPU workers and agricultural extension workers in the field, some training on

agricultural engineering including the survey of land for PPL is quite essential. Under the cooperated guidance of the two agencies, farmers will work for the construction of weirs and canals by dotong-royong and willingly do the maintenance and operation of facilities which were built by themselves.

v) Urgency of small scale development

3037. There would be many new large projects technically feasible and national economically sound in the Province such as North Lusa (105,700 ha.), Tempe Lake (141,000 ha) and other development projects and also rehabilitation projects under the water supply system of free water charge, without considering improvement of the socio-economic conditions in the region except transmigration areas.

3038. First of all water charge should be levied and next the land reform in the national irrigation project area should be studied and recommended. Even in the U.S.A. under the free economy and free competition system, if landowners accept water supply by the project performed by the Department of Interior, they have to divide their land to the settlers by the homestead law. This way of development and land reform is quite meaningful in the arid zone of the western part of the U.S.A.; thus the technical development and big costs are supported as a philosophy of social justice and equity by the nation. This historical fact should be studied carefully and how to solve the Sadding River irrigation project area, should be clarified. However it will take a lot of time to solve socio-economic conditions and implementation of construction works; consequently those big projects cannot catch up with the rapid increase of food demand in this country.

3039. On the other hand, small scale projects have not such serious problems and technical difficulties. In order to meet the urgent demand of rice in the province and farmers in those areas, stress should be put on the development of small scale irrigation projects. In this case, civil engineering knowledge and technique are necessary, of course, however, the most important thing is the agronomic aspects especially water management for the highest harvesting. From this points view, the Ministry of Agriculture should have more emphasis on this quick return aspects promptly.

8040. In general, historically, small-scale weirs and canals had been developed at first and then in the course of time, owing to the change of river bed or water flow, improved weirs had to be built at the upstream of the rivers. Repeating this way of improvement for a long period and after establishing the modern technology of civil works, fixed wire, taking water from both side of the river bank, have been built in the 20th century. Judging from the shortage of basic data of hydrology for the modern technology in the Province, the step-by step development in small-scale irrigation plans should be taken up first and then integration of those small projects by modern technology should be followed in the future for the stabilization of the paddy cultivation and economy in the Province.

8.2.3. Fishery resources development

i) Rational utilization of Brackish water fish ponds/tambak.

8041. In South Sulawesi Province, the area utilized for coastal aquaculture is enormous and these areas having possibilities for future development are the most abundant through the island of Indonesia. Moreover, the production of fry catching, especially shrimp is also the largest here through out Indonesia. Therefore it can be said that the brackish water pond culture is the most prosperous industry in South Sulawesi Province. Since 1974/1975, a credit from the World Bank loan has been given to fish farmers in Kabupaten Maros and Pangkep in order to help with intensification and made their production in double compared with that of previous years. Accordingly, high prices and good market demands of shrimp are attracting many fish farmer's interests. Under such circumstance, it seems that rational utilization of tambak is an urgent business.

8042. In order to get high yield of ikan bandeng and shrimp in tambak, at first fishermen must take care about control of pests and predator which come through sluice gate. Accordingly, before stocking fry, it is necessary to eliminate these enemy fishes through draining and drying of tambak 2-3 times and spread any of pesticides uniformly on the bottom of tambak. Adding these procedure of enemy control, if fishermen adopt spreading fertilizer on the bottom of tambak, they can get double of production easily. Such a method in South Sulawesi is called intensification.

8043. If there is a pond which can not get high production through the procedure said above, it might be due to high salinity (40-60%) in the dry season which cause retardation of growth of ikan bandeng and shrimp. In order to get high yields in such ponds, there is only one way which bring down density of salinity by pumping water from the river. But generally, such ponds are distributed far from rivers. Therefore, in order to get high yields from all-tambak-s in a certain area, the introduction of canal system and readjustment of tambak-s are necessary. A canal system, not ideal but come from the same idea can be seen in Tupabiring, Maros which was a constructed by the credit of the World Bank,

8044. By the bye, an optimim salinity of ikan bandeng and shrimp is 0-4%, 15-35% respectively. Thus, in the dry and the rainy season, checking salinity in each tambak and writing down each data on the map of tambak will became a very important business for making a plan of canal system in near future and also it will become a good guidance of rational fish culture indicating the site which can culture twice in a year.

8045. Generally, in high salinity tambak-s (40-60%), almost all fish can not grow normally. Ikan bandeng is also retarded their growth by this unproper condition, but some of rabbit fish or ikan baronang (*Siganus vermiculatus*) are able to culture only in rather high salinity of the dry season. Fishermen in Kabupaten Sinjai has already cultured it spontaneously.

8046. In Kabupaten Jeneponto, there are many tambaks which yield high production of shrimp. Observing precisely on each tambak, however, there are many high salinity areas which suffered from drought. Therefore it is necessary to consider about classifying of tambak as decribed above in order to manage whole tambak-s rationally.

8047. The inlet, Tambarangkeke, near the est ary of the Jene-Allu River, has an area of 700 ha of entrophicated shallow water. It is advisable to introduce bamboo penculture which is very popular in Laguna de Bayu Philippines, as a new method of brackish water fish culture.

ii) Improvement of fishery productivity in Tempe Lake

8048. All fishermen in surrounding area of Tempe Lake are anxious for the improvement of fishery products. The problems is so urgent and severe that they can not afford to wait the most effective way of erosion prevention works in the upperstreams of the rivers which flow into the Lake. It is a quick return way to stock most suitable fish for the environment of Tempe Lake. At present the survey of biological environment in both the rainy and the dry season is not yet undertaken, it is difficult to reach a conclusion but according to the long experience of ourselves, introduction of the following two species and one new method of cultivation would be recommendable:

Grass carp (Stenopharyngodon idellus)

8049. The fish belongs to Cyprinidae. The characteristics of this fish is herbivorous. Namely, it eats terrestrial plant such a grasses, legumes, cattail and aquatic plants. Thus, it may be suitable for the environment of the Tempe Lake where many kinds of aquatic plants are prevailing at present. It can grow rapidly reaching 0.7 - 1.5 Kg. in one year, 2.5-3.3. kg. in the second year and gravid female weighs, 3-10 kg. perone piece,

8050. In confined water such as pond it can not spawn without hormon injection but if the condition of the rivers is suitable for spawning, it can spawn in the rainy season. In the case of Tone river in Japan, its spawning takes place after heavy rain in June and July when the river water level suddenly raises. Since the condition of the Walanae River in the rainy season is not yet clear at present, it is difficult to assert whether spawning is available or not. It is recommended to continue the survey on the condition of the rainy season. In any case, in order to meet the needs of fishermen each Kabupaten around the Tempe Lake have to expand the hatchery facilities.

8051. Method of bamboo pen culture

The method of bamboo pen culture which is recently practised in the Laguna de Bay, Philippines, will be available to introduce to the lake utilizing the season of stabilized water level. The species should be selected from phytoplankton feeder such as Cengoro-buna. But milk fish as in Laguna de Bay would be available in the Tempe Lake. The experiment in suitable location selected is valuable for the development of fishery in this area.

For the implementation of (1) the technique of hormon injection on grass carp should be mastered first consequently (2) and (3) should be taken up promptly.

iii) Fish cultivation in paddy field

8052. Technical aspects which should be urgently improved in hatcheries which provide fry to the farmers in Kabupaten Enrekang and adjacent area as follows:

- a) There is not enough feeding from hatch out to fingerling; it means high mortality of fry.
- b) Mortality of fry is high because of inadequate prevention for invaders such as water insects and other animals in the nursery pond.

8053. Fortunately there is a modern hatchery facility in Kabupaten Enrekang and the item (2) will be improved in the near future. In order to improve the item (1) first zooplankton should be raised in hatchery pond by fertilizer given in ponds before hatching out, and as the second step, silk worm pupae which is a by-product of sericulture in the adjacent area, would be suitable for the period of fingerling as well as adult.

8054. The feeding is also necessary in paddy field. In the case of Japan, the feeding is started about 10 days after stocking when the existing natural food has been eaten up by fish and it is continued until the time of harvest. In this case, also silk worm pupae meal with or without cereal brans are given. Thus, by proper feeding, mortality will decrease and production of fingerling will be raised exactly.

8055. Paddy cum fish culture should be changed and developed according to the environmental conditions. Further study should be continued in the future based on the data and information on the paddy cum fish culture in Japan and other Southeast Asian Countries.

8056. The damages of fish caused by insecticides run-offs have killed an increasing number of fish in paddy field. It is a severe problem for farmers but there is no way to solve it except consulting with the chief of BIMAS/INMAS Program concerning about insecticides such as name of drug, time of spreading, amount of drug per ha., and so forth. In case of Japan, almost all paddy cum fish culture was destroyed radically by introduction of insecticides around 1964. Judging from the past experience in Japan, it may be advisable to be developed toward fish pond cultivation step by step.

iv) Riverine fishery

8057. In South Sulawesi Province, there are many large rivers such Jeneberang in Kabupaten Gowa, Saddang in Pinrang and Enrekang, Walanae in Bone, Cendrana and Bila in Wajo, Kalaena in Luwu and Mapili in Polmas.

8058. Judging from the observations on some rivers, river fisheries are not so thriving due to (1) no proper fishing gears and (3) no proper fish to catch. Actually, the amount of catch in each river might not be so abundant. According to Myers (1951), he referred to the section of Wallace' Line down the Makassar Straits between Kalimantan and Sulawesi as the most spectacular zoogeographical boundary to be found among the world's fresh water faunas. He referred also to the west Kalimantan where there are more than 300 species of primary (real) freshwater fish (17 families) but only 140 km to the east Sulawesi has, but two species of primary freshwater fish, (Anabus (oseng) and Channa (sometimes it is called Ophiocephalus), both probably introduced by men. Accordingly, almost of the important freshwater species in South Sulawesi were introduced from mainland Java.

8059. Under such circumstance, we must consider once more about desirable species to introduce into the river and also expansion of stocking project. Before going it is necessary to make regulations for the control of illegal fishery such as putting poison in the river.

It is recommended that introduction of some species such as jelawat (Leptobarbus) from Kalimantan after comparing river condition with that of South Sulawesi.

v) Sea fisheries

8060. South Sulawesi, surrounded by sea, has many fishermen who operate almost non-motorized fishing boats and their operations are limited within a few miles from the coastal line. Moreover, fishing gears are mostly traditional types, therefore the production of sea fisheries seems not so abundant. In this survey there is not enough time to check several technical point on sea fishery activities, the following are only impressions observing on sea products:

Fish market and its facilities

8061. In many places the fish catch is traditionally sold through auction at numerous landing points or at collection station. There are few cold or cool storage facilities and transportation facilities from fishing villages to adequate fishmarket. Thus, fish product are either sold fresh locally or dried or salted for transport to other parts of the Kabupaten. Because of these poor facilities, fishermen are disadvantaged by low prices and spoilage of fish products.

a) Under such condition, processing methods are:

to pindang, traditional salt fish and sun dried salt fish which can be preserved long. Thus, it is desirable to introduce modern processing techniques such as fish cake, smoked fish and fish souce.

b) Ice making facility is derirable in the central part of fishery activities but this facility needs a large amount of Water; therefore survey of water must be done before making this facility.

Shell culture

8062. Though not in daily menu of South Sulawesi people, some amount of Mollusca are likely to be consumed as local consumption except in Kabupaten Pangkep where tiram (pfeostrea), Siaping (Amusium) and Kerang dara (Tegillarea) have been caught by fishermen for commercial purpose. But recently large amount of giant cockle is captured by fishermen in Kabupaten Maros to be exported to Japan.

8063. There is no doubt that in South Sulawesi with its extensive coast line fish capture may still offer greatly. However in aquaculture not only milk fish and shrimp but also shell culture may become more and more important in the future. Fortunately, according to our observation trip, there are some suitable places of shell culture and also many important species are present in Southern parts of South Sulawesi. Therefore if technique shell culture were introduced here, probably hundreds of tons of shell could be harvested annually as an important animal proteine for people.

Ornamental sea fish

8064. According to the report of F.A.O./1975, recently ornamental fish including salt water fish are becoming important exporting items of developing countries. Although ornamental fish imports into U.S.A., the biggest importer (1973) consist of almost 90% of fresh water fish and 1% of wild caught salt water fish in total, recently aquaculturists have a tendency to show an interest about sea ornamental fishes owing to the development and spread of sea fish aquarium equipments.

8065. Under such circumstances, a salt water fish fauna of potential interest to the trade are focused on: a) Caribbean Sea, b) Indo-pacific, c) Red Sea. According to the potential of price list supplied by the dealers in salt water fish, 23 families of greatest potential interest to the hobbyist are pointed out.

8066. Fortunately, South Sulawesi has many good conditions for these ornamental fish industry as follows:

- a) A wide area of coral reef surrounded along the coast line of South Sulawesi. Especially Kecamatan Labakkang which lies off-shore of Kabupaten Pangkep is famous.
- b) After checking Dwipongo's Report (1974), it was convinced that more than half of that 23 families live in intertidal zones up to a depth of approximately 30 m. of Indonesian coast.
- c) Hasanuddin Airport at Mandai (Ujung Pandang) will become a very convenient place for international trading of ornamental sea fish.
- d) In South Sulawesi, there are a lot of skillful divers who have accustomed to the behavior of ornamental sea fish. Moreover, through the experience of ornamental shell export, it is informed

that international trade becomes a source of increase of fishermen's income.

8067. Therefore, if the government provide proper guidance to fishermen concerning ornamental sea fish under such favorable situation its industry will be psread all in the South Sulawesi province and will provide a new field of income to fishermen as well a provinces.

In order to promote this industry, the government also has to make an office which regulates unproper fishing method, fishing places and time for protecting natural resources of the said fish on the other hand, has to teach fishermen about techniques of proper catching and transportation method for decreasing mortality of fish.

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