

**SOUTH SULAWESI REGIONAL  
OFFICE OF THE MINISTRY  
OF AGRICULTURE**

**JAPAN INTERNATIONAL  
COOPERATION AGENCY/JICA**

**SOUTH SULAWESI  
REGIONAL AGRICULTURAL DEVELOPMENT  
PLANNING / ATA - 140 PROJECT**

**ANNUAL REPORT / 1977  
VOLUME I**

**RESULTS OF THE STUDIES ON THE  
REGIONAL AGRICULTURAL DEVELOPMENTS IN  
SOUTH SULAWESI PROVINCE**

**MARCH 1978**

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

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国際協力事業団

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## P R E F A C E

The activity of technical cooperation on planning of regional agricultural development between Japan and Indonesia, which is implemented through the Project on RADP/ATA-140 South Sulawesi, based on the Record of Discussion (R/D), will run during a period of 30 months, starting on arrival of the Team of Japanese Experts at JAKARTA on December 25th, 1976.

The results to be achieved by the 30 months' study of this technical cooperation are:

1. The formulation of a regional agricultural development plan of the South Sulawesi Province, which will be completed in 18 months during the first phase according to the plan of operation. Thus it is expected to be completed by the end of June 1978.
2. The formulation of the regional agricultural development plan of the Kabupaten-s Jeneponto and Enrekang as a document of pre-feasibility, and the formulation of documents of feasibility studies for the rural sites to be established in those two Kabupaten-s, which will be completed within 12 months' period of the second phase according to the plan of operation. Thus it is expected to be completed by the end of June 1979.

This annual report has been materialized by means of a joint study by the Team of Japanese Experts and the Team of Indonesian Counterparts during the 12 months of the first phase, which included data collection, several kinds of surveys, researches and data processing on the collected data covering three aspects of approach, namely the fields of regional agricultural planning, agronomy and agro-economy. Whereas the data analysis and planning will take place in the period of January through June 1978. The result achieved during one year of the first phase of this study are described in the Annual Report, which is expected to constitute the material for the formulation of a regional agricultural development plan of South Sulawesi Province and two specific Kabupaten-s, Jeneponto and Enrekang.



Through the course of the joint study to obtain these formulations mentioned above, the team of Indonesian Counterparts obtained experience and training from the Team of Japanese Experts; transfer of knowledge is expected to increase the skill of the Indonesian counterparts on planning of agricultural development.

In accomplishing the tasks of the Short-term Experts, part-time Counterparts have also been assigned to each their field, from agencies concerned during the period of assignment of the short-term Experts in South Sulawesi.

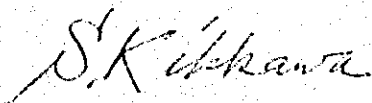
The contents of the Annual Report is the results of activities of the Team, which will be submitted as a material for the formulation of regional agricultural development plan of South Sulawesi, and the evaluation of the Team's activities during last one year.

Closing this passage we wish to extend our gratitude to Ir. Syamsuddin Abbas who has acted as supervisor to the implementation of the cooperation Project during the time of his position as acting Chief of the South Sulawesi Regional Office of the Ministry of Agriculture.

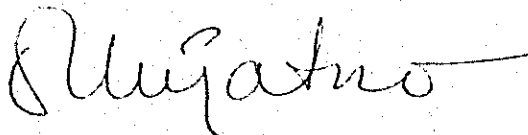
Ujung Pandang, March 31st, 1978.

Leader of Team of  
Japanese Experts,

Chief of South Sulawesi Regional  
Office of the Ministry of  
Agriculture,



( Setsuzo KIKKAWA ).



(Drs. Djoko Sujatno).

Member List of the Team

Djoko Sujatno	Supervisor/Coordinator Chief of the South Sulawesi Regional Office of Ministry of Agriculture.
Setsuzo Kikkawa	Leader of the Experts Team/ Expert on regional agricultural planning.
Mono Syamsuddin	Co-Manager of the Team
Azis Lahiya	Secretary of the Team
Koji Tanabe	Liaison Officer/Coordinator of the Experts Team.
Andi Makasau	Counterpart on regional agricultural planning.
Azis Mattola	Counterpart on agro-economy.
Dahlan Noor	Counterpart on agro-economy.
Enos Tambing	Counterpart on agronomy
Kiyooki Kubo	Expert on agronomy
Nazaruddin L.	Counterpart on regional agricultural planning.
Onggeng Bachtiar	Counterpart on agronomy
Kunihiro Ozaki	Expert on agro-economy.
Siregar	Counterpart on agronomy/mapping.
M. Sampe	Counterpart on regional agricultural planning.
Tajuddin Dullah	Counterpart on agro-economy.
Uno	Part-time counterpart on forestry/ Forestry Service of South Sulawesi.
Zainuddin	Part-time Counterpart on water re- sources/DPUP of South Sulawesi.
Masaaki Funada	Short term Expert on soil and vegetation.
Takeichiro Kafuku	Short term Expert on fishery .
Hiroshi Murai	Short term Expert on forestry
Hiroyuki Nishimura	Short term Expert on survey of farmers needs/socio-economic.
Iwao Nishiyama	Short term Expert on marketing & processing of farm products.
Yoshihika Ogawa	Short term Expert on regional planning/computer.
Ryuichi Tatsumi	Short term Expert on water resour- ces.

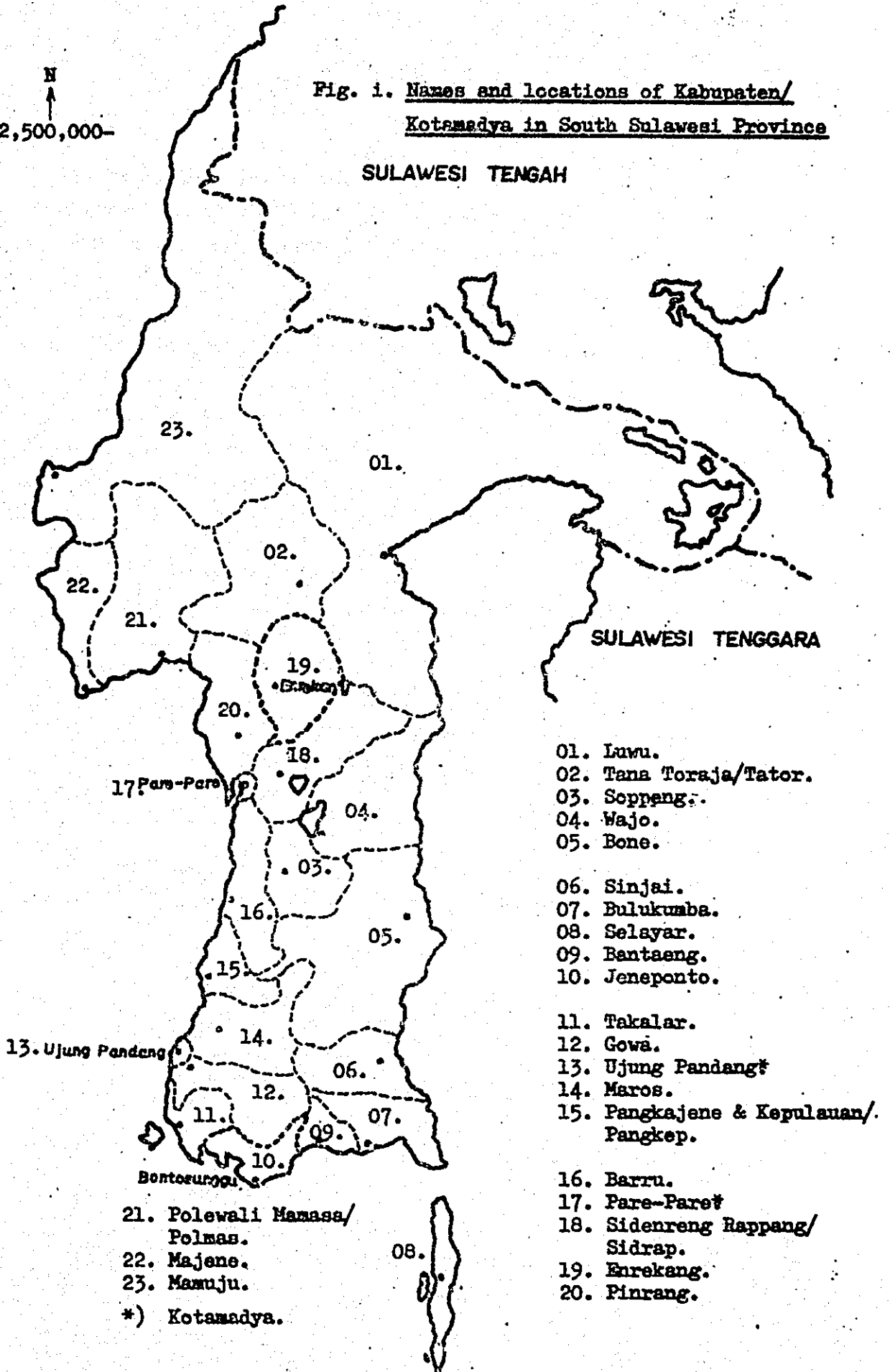
List of Persons on duty for the Reporting

1. Supervisors: Setsuzo Kikkawa  
Mono Syamsuddin
2. Edditors: Azis Lahiya  
Koji Tanabe
3. Reporters for each chapter/article :  
(Chapter/Article)
  1. 1.1. & 1.2. Setsuzo Kikkawa.  
1.3 Azis Lahiya & Koji Tanabe.
  2. Setsuzo Kikkawa
  3. Azis Mattola
  4. Kiyooki Kubo
  5. 5.1. - 5.3. Nazaruddin L.  
5.4 Azis Mattola
  6. Kunihiro Ozaki.
  7. Mono Syamsuddin
  8. Setsuzo Kikkawa
  9. 9.1. Onggeng Bachtiar.  
9.2. Dahlan Noor  
9.3. M. Sampe  
9.4. Tajuddin Dullah  
9.5. Uno  
9.6. Zainuddin
- Mapping \* Andi Makassar
4. Translator: Mrs. Yasin Rachman.
5. Assistant/Typist: Fien Latuihamallo  
Mansye Soeli  
Syahrullah Naim.  
M. Saïd. HS.  
Seniwati

-----  
\* Maps are not included, but those maps  
will be shown at Seminar II.

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Fig. i. Names and locations of Kabupaten/ Kotamadya in South Sulawesi Province



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1. Introduction and project conception

1.1. Introduction

The Project on Regional Agricultural Development Planning/ATA-140 in South Sulawesi Province is a "Joint Project" for transferring of technic based on the Technical Cooperation Programs between the Government of Republic of Indonesia and Japan. Therefore, this Project is sponsored by Bureau of Planning, Ministry of Agriculture/Deptan, in Jakarta and South Sulawesi Regional Office of Ministry of Agriculture/Kanwil Deptan in Ujung Pandang for the side of Indonesia, and by Japan International Cooperation Agency/JICA in Tokyo for the side of Japan. And the Project is being undertaken by a Team of Indonesian Experts (Counterparts of Japanese Experts) actively assisted by a Team of Japanese Experts (Counterparts of Indonesian Experts).

The objectives of the Project is determined by the R/D (Record of Discussion) as follows:

This Project, with a view of contributing to promotion of regional agriculture, is intended to make over all view of the plans for the development of agriculture in the South Sulawesi Province, to give advisory guidance on them, to possibly improve methods and technics of planning for the development of regional agriculture and thereby to improve the planning capabilities of the officials in charge.

The study has been divided two phases:

Phase I: 18 months, master plan of regional agricultural development in South Sulawesi Province.

Phase II: 12 months, implementation plans in two specific Kabupaten-s, Enrekang and Jeneponto.

This report is provided as an annual report (January 1977 - December 1977) at the midst of data collection and analysing. It is scheduled that the study and analysis should be finished until the end of December 1977 in the original schedule, and the formulation of a regional agricultural development plan is to be done during the rest period (6 months) of the first phase. However the real progress is about 3 months delay at this moment, even though three short term Experts had finished their subjects and three short term Experts have studied on the specific aspects respectively and the Team (Indo-

nesian Counterparts and Japanese Experts) also has analysed the collected data and cooperated with the short term Experts. Consequently the results of the progress (analysis and supplementary survey) from now on is to be compiled as a supplementary volume of this main report or coming quarterly report after it is completed.

The analysis of remaining items mentioned above and formulation of regional development plan is intended to be done simultaneously in the coming several months in order to overcome the delay and to finish all items as scheduled in time, i.e. during the 18 months until the end of June 1978, hoping for all the endeavours of assistance for the Team by the agencies concerned in Indonesia and Japan.

In all steps of study, attention is being paid to the transfer of knowledge by close association with the Indonesian Counterparts by the way of on-the-job training.

#### 1.2. Project conceptions

There may be some difference between two ways of approach on the planning of regional agricultural development; one is a case in which targets are already given by an authority and targets are not fixed yet in another case. The commencement of the planning in the both ways mentioned above, however, will start from the point of view of effective utilization of the resources and localities. There are plenty of basic resources such as water, lands, labor forces and so forth in South Sulawesi Province. First of all, the most effective utilization of those resources has to be studied aiming not only at the development of socio-economic conditions of the Province but also for D zone of Indonesia and how to contribute the economic development of whole Indonesia. It is needless to say that the welfare and well-being of farmers in the Province have to be taken into consideration as the first priority when the resources utilization is planned. A plan of the utmost utilization of resources is the target to be studied in activities of the ATA-140 Project. Consequently if some urgency by political viewpoint occurred, the target studied will be divided into short term project, medium term project according to the available budgets and necessary urgency, based on the same method transferred in this ATA-140 Project.

From this concept necessary data are collected and under analysing. However, the available data are not

enough, having some inconsistency among them. Under this condition, it would be allowed that some intrepid estimation based on the learning and experience of the Experts should be transferred to the Counterparts. This way of approach will be developed by the Counterparts themselves in the future in accordance with accumulation of the necessary data for the planning of regional agricultural development.

In order to attain the effective materialization of plans, it is quite essential that the Kanwil Deptan has to study the real conditions and evaluations consecutively after commencement of the project implementation. The characteristic of the master plan is to be amended based on changes of the surrounding internal and international conditions for which Kanwil Deptan has to continue the study and data collection in the future.

1.3. Operations of the Project on RADP/ATA-140  
South Sulawesi

It is quite clear that the four points of operations as described in the Record of Discussion (R/D) have to be succeeded within the period of 30 months of operations of the Project, mainly on the objectives of:

1. Survey and analysis concerning agriculture in the 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 said plans.

And another main objective of the Project is the transferring of knowledge of planning to the Indonesian Officials concerned by training, consisting of:

1. On the job training (in Kantor/field),
2. Lecture by Experts (long and short term), and
3. Study/observation tour in Japan.

The activities of the Team based on the R/D are as follows:

1.3.1. General activities

During the last one year, Joint Committee was held twice in Jakarta. The first was held on December 1976, just after the arrival of the Japanese Experts Team in Indonesia. In the Committee, the Committee members and Japanese Experts have introduced each other and the draft of the document of the cooperation plan for this Project which has been prepared by JICA and the Japanese Team, was explained by the Japanese Team to the Indonesian side. The committee has taken a decision that in the meantime this Project will be operated by the cooperation plan, based on the R/D of the Project on RADP/ATA-140 South Sulawesi.

The second was held on 24th June 1977. The Agenda of the Committee are as follows:

(a) opening and introduction, (b) discussion about the First Quarterly Report which was submitted by the Japanese Experts Team in Ujung Pandang, (c) the second quarterly report, (d) seminars, (e) comparative study to East Java and (f) others.

Besides, Steering Committee was held 8 times in Ujung Pandang for the last 15 months until now. In those Committee also, the contents of the three Quarterly Reports which have been submitted by the Team for result of activities of the Team was discussed, and some decisions/orientations have been taken.

On 12 - 13 August 1977, the First Seminar which has the purpose to inform widely and evaluate the activities of this Project was held, with getting a lecturer from Japan.

### 1.3.2. Activities for the collection of data/informations

There are two ways which have been taken and practice in the activities of collecting data/informations, one is indicated by the term of secondary data collection by way of visiting the agencies, basic survey, field reconnaissance/observation and straight discussion with responsible persons of officials and rural leaders of regions, among the Provincial Kabupaten's, Kecamatan's and Desa's levels, and the other is indicated by the collecting primary, also secondary data, with basic surveys, sampling surveys in depth and supplementary surveys in South Sulawesi Province.

Those activities have just begin at the middle of February 1977, one and a half months after the arrival of Japanese Team in Ujung Pandang. It has been recognized that at the first stage of operation hindrances and difficulties has been found caused mainly of shortage of transportation facilities and heavy rainfall at the wet season, besides the activities for the General Election. By this events most 2 months of the time schedule has been carried out by collecting data and informations in Ujung Pandang, by visiting 28 agencies which have close connection directly or indirectly with development of agriculture in South Sulawesi Province.

From those visiting and surveys mentioned below, various data and informations have been collected and obtained as an amount of books and papers valuable for the materials of planning.

### 1.3.3. Activities for surveys

The surveys mentioned here that is implemented for the preparation of the research of the agricultural condition and analysis of data, besides the collecting data, consists of:

- a) Field reconnaissance and observation which has been done mainly by short term consultants, i.e. members of missions from Japan, lecturer for the seminar and visitors concerning the Project, has an objective to observe the facts and the conditions of the agricultural and other sectors in the Province, including formal consultation with officials concerned such as Bupati-s and collecting data and informations,
- b) Basic survey which has been done mainly by the Team (Japanese and Indonesian) has an objective to grasp the existing general conditions of agriculture and farming by ways of survey in the field, collecting data and informations, discussion/interview with officials concerned or farmers and consultation with officials, and
- c) Sampling survey in depth and supplementary survey which has been done mainly by the Team and short-term Experts with the Counterparts, sometimes only the Counterparts Team, has an objective to deep the understanding of the conditions of agriculture and farming in selected Kabupaten-s generally, and to survey in depth on certain matters or the specific sub-sectors especially, by ways of field survey, collecting specific data, discussion/interview etc., and to recognize and supplement the results of the basic survey.

Although, according to the original schedule, the first the basic survey in all 23 Kabupaten-s and Kotamadya-s has been planned to be finished until August 1977, actually the basic survey has been begun with survey in Kabupaten-s Jeneponto and Enrekang in the middle of April 1977, after finish the heavy rainfall in the last wet season. After the basic survey in Kabupaten Jeneponto, a series of the basic surveys has been done by the Team in other 20 Kabupaten-s and Kotamadya-s within delay of about three months. As in those 21 Kabupaten-s and Kotamadya-s the survey has been finished, it was planned that the survey in the remaining two Kabupaten-s, Kabupaten Mamuju and Selayar, will be done in the year 1978, if necessary.



During the implementation of the basic survey, that schedule delayed for about three months, so the next stages, i.e. the sampling surveys, the supplementary surveys and data processing has been done parallel with the basic survey.

Field reconnaissance and observation has been done several times, when the Consultation Team from JICA, the Technical Guidance Team from JICA, the Lecturer from Tokyo, and visitors from Jakarta visited the Project area/site.

Sampling survey in depth has been finished until October 1977 in 7 Kabupaten-s which has been selected based on the economic conditions of the blocs, i.e. Luwu, Wajo, Sidrap, Polmas, Sinjai, Jeneponto and Enrekang.

The series of the supplementary surveys has just begun with the arrival of short term Experts in the middle of November 1977. The first one has been done by a short-term Expert with a Counterpart on marketing systems, thereafter supplementary surveys on water resources, regional planning, socio-economic, soil and vegetation, forestry, fishery and agricultural organization have been done continuously by each short-term Expert with a/few Counterpart(s) until now (March 1978).

During last one year (January - December 1977), for the surveys an amount of 154 days and an amount of 418 participants have been expended.

#### 1.3.4. Activities of the training

It is the main objective of the Project to practise the training on transfer of knowledge of techniques of planning on regional agricultural development to the Indonesian officials/Counterparts. It takes the wellknown method to mention "learning by doing" which means training on the job, the most effective way of education for a developing country.

Almost on all activities this system has been practised not any opportunity has been neglected. To this concerned all activities as follows:

- a) The internal meeting and discussion among the Counterparts and Experts, urging Counterparts to put their ideas on how to find the facts, focus the facts and to solve problems of developments on agricultural matters.

- b) The meeting of the Steering Committee in which lead to straight discussion among the members and proceed guidance for the better orientation of the operation of the project.
- c) Visiting agencies and institutions on the Provincial level to get more acquainted and to learn about the relationship of the agencies with agricultural development efforts.
- d) Making quarterly reports, which contents integrated matters on the activities of agricultural developments condition.
- e) Preparing the reports for Seminar as a material for discussion on matters and objectives in the sense of agricultural development in the broad sense.
- f) Making back to office report and processing of the data by making tables and graphics.
- g) Cooperative study with the Team of SRDS (Canadian Team) by attending meetings of foreign donors regularly once in two months (exchange of experiences).

Those activities mentioned above take merely the form of a classroom training which takes almost 1724 hours and involved almost 2433 participants.

Besides that kind of classroom training a short course has been established on the topic of Estimation of Population Growth using the "Method of Cohort Share Trend" conducted by Mr. T. Egashira, a short-term Consultant/lecturer for Seminar, directly after the Seminar I has been finished.

The arrival of additional equipments in Ujung Pandang, sent by JICA-Tokyo, which consists of various kinds of equipments for the training on the project, gives more opportunities to the counterparts for training on the job. As an example the computer for analyzing and processing data collected, equipment for mapping, equipment for soil survey, movie and slide projector for audio visual aids, etc.

During the period of 1977 the activities of the project could be divided as follows those concerning the training according to the stage of transfer of knowledge to mention the first semester more emphasized on collecting data, making tables and figures on graphics and then followed by the second semester by the series of surveys and at the end

of the year making the Third Quarterly Report and the Annual Report of 1977, a deeper activity concentrated on analyzing and evaluation of collected data, as a step to the following program of activities like preparing the necessary items/ topics for the next Seminar beside having the material as a starting point for a well established "Master Plan" of South Sulawesi Province by using the well completed annual reporting system.

To give the opportunity to the Team either the Experts or the Counterparts of refreshing of minds, a comparative study to East Java has been scheduled in the earliest of October. The Team consisting of 12 members of Counterpart and Experts, headed by a staff member of BAPPEDA of South Sulawesi, Drs. Ambar Indang, has made the comparative study on the practices of the Taiwan Project of Agricultural Demonstration located in the Desa of Lagu and Pujon in East Java. A part of the Team continued their observation in Yogyakarta. The study was successful, but the results might be doubtful for South Sulawesi, from the point of view of the stage of agricultural structure practice in both province, to mention the aims of the two project, on the other hand The Regional Agricultural Development Planning of South Sulawesi and the other side the Agricultural Demonstration project of East Java,

Anyhow it can be said that some matters could be utilized after the 18 month period has been passed, to say at the beginning of the phase for the designated Kabupaten, which means reaching the stage of making demonstration plot on both kabupaten. Another opportunity on the training system of the ARDP - 140 Project of South Sulawesi is the observation tour and training in Japan.

In the earliest of October 1977, according to the schedule 2 high ranking officials of the Indonesian Government was dispatched to Japan, namely Mr. A.H. Malaka SH, Chairman of BAPPEDA of South Sulawesi and Mr. Hendro Suwarno, the Project Leader of ARDP/140 - 140 South Sulawesi also assistant to the Chief of Bureau of Planning, Ministry of Agriculture, for the time of two weeks' observation. The Counterpart supposed to be dispatched in September for 2 months' training in Japan, because of some reasons was postponed until next year (1978).

In brief to say, that the whole operations of the project in 1977, has provided training opportunities for the

Counterparts, by way of training on the job likes Classroom training 1724 hours and Field training 154 day's.

It is also recognized that the time schedule was shortened by the events of some emergencies like the scarcity of transportation, the rainy season, the election activities in the earliest period of 1977 besides this the late dispatch of the Short Term Experts and the postponed Seminar II of the AEL - 140 Project in the second semester of 1977.

#### 1.3.5. Activities for reporting:

Before the publishing this annual report, three quarterly Reports has been published at each end of quarterly in 1977. The First and Second quarterly Reports published at the end of March and June 1977. Most activities of publishing the two quarterly reports were depended on the Japanese experts Team in Ujung Pandang. This fact is based on the comprehension/appreciation of the Experts Team as follows:

- a) Planning is practiced based on certain objective/target and time-limit, so that a planner has to recognized the "punctuality" according to the original schedule.
- b) There are many ways for training. Doing by self is also a kind of way for training, as making a model which will be able to influence to the others, because the purpose of the training interests and arouse the object persons into doing something themselves.
- c) There was a communication gap among the team, though the gap has been almost overcome at present. So at the first stage, the Experts Team has been obliged to do that activities.

On the contrary, most activities for reporting of the Third quarterly Report has been done by the Counterparts Team. It is owing to our consideration that the purpose of the training arouse the Counterparts into doing the reporting themselves, to show the fruits of their activities on few kinds of survey and data processing, yet that consideration has brought a confusion among the members of Steering Committee against the activities of the Team.

Therefore, the activities for reporting of this annual report has been done by the equal cooperation works among the members of the Team, not only proper members of the Team, but also members from some agencies concerned such as DPUP South Sulawesi, Forest Service of South Sulawesi e.t.c. and from Japan

as short term experts.

In regard to the comments against the reports submitted by the Team, it can be said that those reports is a fruits of activities of the Team. The fruits of the activities should be esteemed by the officials concerned, though there are some problems in the description of the reports. Therefore those problems should be solved by discussion or consultation with officials concerned after the submit of reports aiming at the success of the operations of the Project.

#### 1.3.6 Annual result of the Project in 1977.

For 1977 there was some goals to be note like the following items:

- 1) The aims of the project to establish an integrated master Plan for the South Sulawesi Province, on the first phase has been succeeded 60 % of the total activity program.
- 2) The transfer of knowledge to the Counterparts has been reaching the stage of selfhelp on making conclusions and recommendations of each field of activities of the proposed plan.
- 3) The establishing of reports, was mainly given to the responsibility of the Counterpart, by using a good and systematical-ly editing system by items correlating to each others.
- 4) The record on making field surveys for basic data has been finished for a great deal except for the two Kabupaten of Mamuju and Belayan. (21 Kabupaten from the 23 in total for South Sulawesi)
- 5) The surveys by 8 short term experts and their Counterparts supplement of the results of the basic survey was already done (see chart 1.2.)
- 6) Dispatch of short term experts for the AM - 140 Project, South Sulawesi was already realized 8 persons from the 10 person as schedule before.
- 7) Arrival of equipment necessary for carrying out the project activities was already 60 % in realization of the total scheduled equipment aid.

The more detailed of the activities on the Project can be seen on the appendix 1.



Chart 1.2. Implemented Time Schedule of Project on RADP/ATA-140

Note: 1) ---: Original schedule, 2) ---: Implemented, 3) ....: Schedule (Draft)

	1977												1978				
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
Classification																	
1. Data collection & surveys/data processing																	
1.1. Collection of existing data																	
1.2. Field reconnaissance & observation																	
1.3. Pilot survey																	
1.4. Sampling survey & supplementary survey																	
1.5. Data processing																	
2. Research & analysis																	
2.1. Review of the existing projects																	
2.2. Classification of problems & recommendations																	
3. Formulation of a regional agricultural development plan/Master Plan																	
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																	

(Continue)





List 1.1. Dispatch of Experts/Consultants from Japan for the  
Project on RADP/ATA-140 South Sulawesi

<u>Classification</u>	<u>Person</u>	<u>Term</u>	<u>Month</u>
1. Long term Consultants.			
1.1. Advisor (in Jakarta)	1.	1976.12.-1979.06.	30.
1.2. Leader/Expert on regional planning	1.	1976.12.-1979.06.	30.
1.3. Expert on agronomy	1.	1976.12.-1979.06.	30.
1.4. Expert on Agro-economy	1.	1977.01.-1979.06.	29.
1.5. Coordinator/Liaison-Officer	1.	1976.12.-1979.06.	30.
2. Short term Consultants.			
2.1. Short term Experts.			
1) on Processing & marketing for farm products	1.	1977.10.-1977.12.	2.
2) on Water resources	1.	1977.10.-1977.12.	2.
3) on Regional agricultural planning/Computer	1.	1977.12.	1.
4) on Fishery	1.	1977.12.-1978.01.	2.
5) on Soil and vegetation	1.	1977.12.-1978.01.	1.5.
6) on Socio-economic condition & farmers needs	1.	1977.12.-1978.02.	2.
7) on Reforestation & afforestation	1.	1978.01.-1978.02.	1.
8) on Organization for agriculture development	1.	1978.02.-1978.03.	1.
9) on Grassland improvement	1.	(did not dispatch )	2.
2.2. Short term Consultants.			
1) Lecturers for the Seminar	1.	1977.08.	0.5.
2) Members of consultation team	3.	1977.06.-1977.07.	0.5.
3) Members of technical guidance team	3.	1978.02.-1978.03.	0.3.
4) Members of other teams	8.	-	-

1.3.7. Activity of mapping.

Mapping and reading map are necessary ways to research, analysis of collected data for the planning. About 30 kinds of maps will be necessary for the planning of agricultural regional development (see map 1.) but among them several kinds of maps will be regarded as indispensable maps for the planning (see map list 1.).

Based on the consideration, mapping activity has been begun by the team, as a step of planning. The maps in the following map list 2, are indispensable maps. According to the list, mapping activity has been done by the Team. After finishing the mapping, those maps as the fruits of mapping activity, will avail the planning, and some maps will be a kind of plan by themselves.

Map list 1. The necessary maps

(1) Necessary Maps

1. Situation of Irrigation requirement (Damage for drought or flood)
2. Irrigation network on each system (Technic, Semi Technic and Desa)
3. Observation network and covered area
4. Planted area for each commodities (Food crops and estate crops)
5. Natural grassland ecology (Soil texture and water permeability)
6. Location of facilities for fish ponds
7. Monthly rainfall
8. Amount of evapotranspiration
9. Continuous drought days
10. Rainy day and rainfall intensity
11. Damage for Meteorological Disasters
12. Danger Zone for Erosion
13. Temperature (Maximum and minimum)
14. Wind Direction and Velocity
15. Direction Angle of slope
16. Damage for Erosion
17. Slope Failure and Protection

(2) Indispensable Maps

1. Irrigation Project Area (Technical and Semi Technical)
2. Catchment Area
3. Present Land-Use
4. Annual Rainfall
5. Contour (Elevation)
6. Slope

- 18. Soil Texture
  - 19. Soil Acidity
  - 20. Soil Fertility
  - 21. Soil Horizon
  - 22. Gravel
  - 23. Water Permeability
  - 24. Organic phosphoric Acid
  - 25. Humus
  - 26. Present Land Utilization Plan
  - 27. Marketing Facilities (Market, Storehouse)
  - 28. Transportation Capacities (Road condition)
  - 29. Transportation Cost (Economic condition of Villages)
  - 30. Social Facilities (School, Hospital)
  - 31. Farm Labour
- 7. Soil Type
    - Soil Texture
    - Soil Fertility
    - Soil Acidity
  - 8. Present Land Utilization Plan

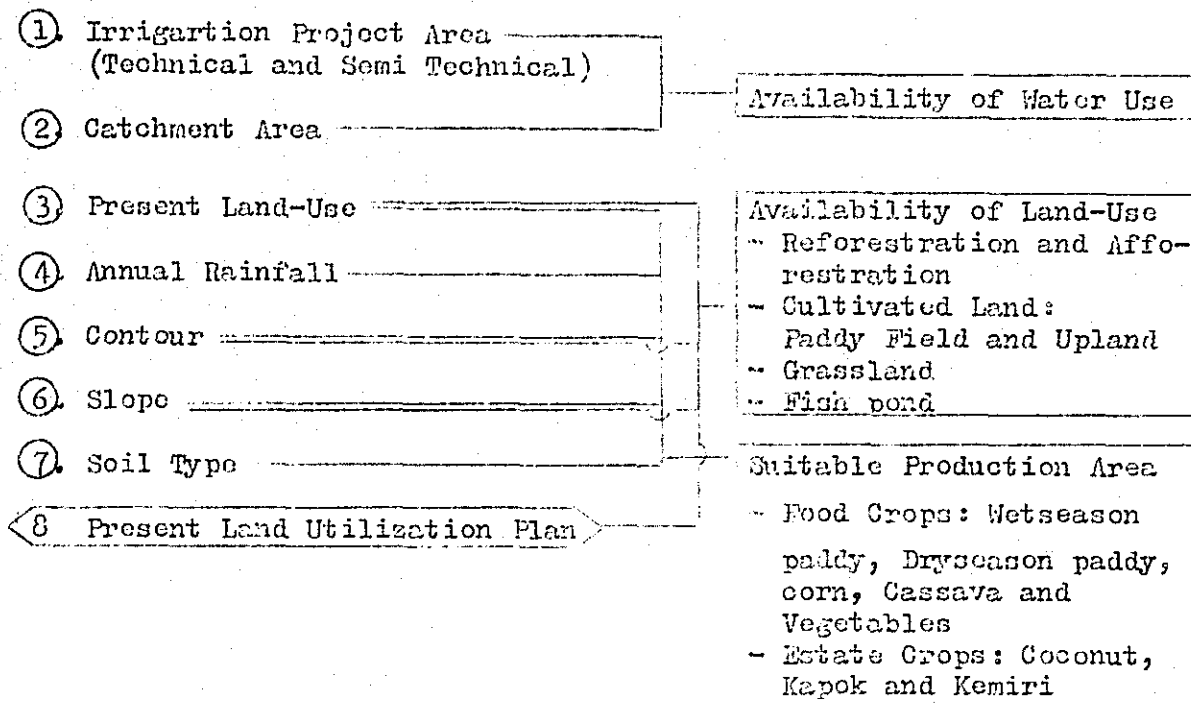
Time Schedule for Mapping (Original)

Nov. 1977				Dec. 1977				Jan. 1978				Feb. 1978		
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
----- Irrigation Project Area.														
----- Catchment Area														
----- Availability of Water Use														
----- Formulation of Working Method														
----- Land -Use														
----- Contour														
----- Slope														
----- Annual Rainfall														
----- Suitable Production Area														
----- Present Land Utilization Plan														
----- Soil Type														
----- Reporting														

Map list 2. The indispensable maps

Maps for Present Condition

Maps for Analysis & Planning



Note: ①-⑦ : These maps had been prepared by each authorities in several scales, then it have to be drawn in the same scale (1/500,000) by the Team.

⑧ : This map will have to be rearranged by the Team based on the Plan made by related authorities.

[ ] : These maps must be done in detail by the Team.

2. Recommendations  
 2.1. Population growth and labor forces outflow  
 2.1.1. General tendency in the Province

The most remarkable characteristic in South Sulawesi Province is the low population growth because of labor force outflow, as shown in table 2.1. Both crude birth rate and crude death rate in South Sulawesi Province are approximately the same as in other regions. Yearly real increase rate in South Sulawesi Province is, however, quite low, showing annual growth rate of 1.6 % compared to more than 2.0 % in other regions in 1971 Census. The reason is the social decrease owing to the outflow of young labor forces outside of the South Sulawesi Province.

Table 2.1. Population Growth

	CBR	CDR	Natural increase 1)	Annual growth rate 2)
South Sulawesi	45	20	25	1.6 %
Middle Sulawesi	50	18	32	3.9 %
South-east Sulawesi	49	18	31	2.9
North Sulawesi	45	18	27	2.6
Sulawesi	-	-		2.1
Indonesia	42	18	24	2.2

Source: 1) 1971 Census; p.35, SRDS Report Vol. II

2) 1971 Census and 1976 Election Enumeration; p.6, ditto.

The outflow of population per year has been estimated about 58,000 persons by the Team of Sulawesi Regional Development Study/SRDS, but the number registered (10 years' average 1967 - 1976) in each Harbour Office in Ujung Pandang and Pare-pare are 5,512 and 5,298 respectively. Therefore the rest of outflow (about 45,000 persons) would be by small sailing boats.

- 2.1.2. Problems in selected Kabupaten-s

There are some different tendencies by Kabupaten in the South Sulawesi Province, for instance:

- 1) The most important rice producing areas, Kabupaten Pinrang and Sidrap, have quite scarce population increase compared with the average of the whole Province. In Pinrang and Sidrap the big weir was constructed in the Saddang River

by the Dutch regime and recently rehabilitation works have been implemented by the DPUP of South Sulawesi; thus stabilized five crops two years of paddy will be available in the near future and introduction of mini-tractors is prevailing in these areas. However, the total number of population is not increased, showing tremendous outflow of population from these areas.

2) In Kabupaten Jeneponto and Enrekang, the population in 1976 was still smaller than that in 1961, even though there were plenty of natural resources in those areas. However, population growth rates during 1971 to 1976 in these Kabupaten-s are bigger than those of the Kabupaten-s Pinrang and Sidrap.

3) On the other hand, in the Kabupaten Luwu, the number of increased population during 1971-1976 reached 99,776 even though there were 28,729 transmigrants from Java during 1969-1976, and the development of the INCO (about 10,000 persons); therefore, the rest is the spontaneous movement of people from other Kabupaten-s in South Sulawesi Province.

Table 2.2. Different tendencies in population movement in selected Kabupaten-s.

	1961	1971	1976	76/71 (%)
S.S. Province	4,516,544	5,189,445	5,654,802	109.0
Pinrang	213,876	258,114	269,837	104.5
Sidrap	140,728	181,621	193,084	106.3
Enrekang	154,310	121,101	129,797	107.2
Jeneponto	227,613	200,513	220,732	110.1
Luwu	300,499	325,980	425,756	130.6

Source: Population Census.

### 2.1.3. Reclamation policy

Comparative study about the instance of (1), (2) and (3) mentioned above should be carefully done and the reasons why those outmigrations are still large under such big amounts of investments for infra-structure in Kabupaten Sidrap, Pinrang area and plenty of natural resources in Kabupaten Jeneponto and Enrekang. It is considered that there would be some constraints in socio-economic conditions such as land-ownerships and tenancies in cases (1), (2), and new socio-economic conditions (3) created by the Government policy in the transmigration and resettlement areas have attracted those people

who flow into this area.

A policy reclamation for arable lands and resettlement of small holdings and landless farmers should be emphasized and integrated in South Sulawesi Province in order to improve the stabilization of regional economy and settlement of human resources. There is a possibility of expansion of expansion of cultivated land in South Sulawesi Province as described in detail in the next paragraph.

Challenge the difficulties on reclamation which is free from the aristocracy in a conservative society. Don't escape from South Sulawesi Province, the native land where you were born.

2.2. Improvement of land use

2.2.1. New reclamation areas

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 is strongly being implemented, aiming at the erosion prevention. However, careless forest fires always have put those efforts in vain,

According to the statistics available, the acreage of shifting cultivation is about 258,000 ha., and arable land in the forest area is nearly 500,000 ha., and existing grass land is about 590,000 ha. The number of cultivations 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.

In addition to the resettlement of those people, some feeder roads and trunk roads are developed (for instance from Singjai to Malino), the area along the roads will be converted into the estate crops area and thus cash 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 to the development plan of reclamation at the very beginning stage is the most effective and meaningful way for the success of regional planning.

Among 500,000 ha. of arable land a half of it will be used for the 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 should be commenced for the future development of the new reclamation area.

2.2.2. Grass land improvement.

It is estimated that an area of 590,000 ha. has been used for animal husbandry. Among it, 18 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 the large scale ranches at the end of 1977, showing about 10.5% of total grass land area. Other areas' utilization is not available to make clear, but those areas may be utilized for small farmers grazing. According to the necessary amount of pasture for present number of livestocks calculated based on the daily needs are about 2 times of available grass production. In addition, as the result of improvement of cow body by the artificial insemination, necessary grass per head is about two times that of local cattle at present (2.4 head/ha. for local cattle; 1.2 head/ha. for improved cattle in improved grass land) (Refer to p.51; Third Quarterly Report).

In one year, 590,000 ha. of grass land will produce about 4,307,000 ton of grass (590,000 ha. x 7.3 ton = 4,307,000 ton). On the other hand, all cattle will need about 9,214,600 ton of grass in one year. Therefore more than a half of the needs are not available for livestocks, thus deficient feedings are prevailing in South Sulawesi Province (Refer to Chap. 9.3.).

2.2.3. Fish ponds improvements.

Areas available for coastal aquaculture in South Sulawesi Province are about 120,000 ha. occupying more than 43 % of the whole areas of brackish water fish ponds in Indonesia. Since shrimp cultivation is the most economical for export at present, milk fish, 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 Mataram 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.

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 lower production costs compared with that of sea shrimp by boat.

Taking into consideration those conditions mentioned above in 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.

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

### 2.3. Water resources development

#### 2.3.1. Water conservation

As stated already in land use developments, the erosion protection by reforestation is the most fundamental countermeasure for 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 and 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, constructions 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 season 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 endeavor for integrated water conservation plans should made by all agencies concerned including education system for young generation for prevention of prevailing forest. Thus water conservation and new reclamation may co-exist without any conflicts between two ways of implementation.

#### 2.3.2. 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. consists 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 field 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.

There is not so big difference between yield per planted area of BIMAS/INMAS and traditional cultivation in recent years because traditional technic also raise to high level just as same as that of BIMAS/INMAS. This means the expansion of the area of BIMAS/INMAS 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 BIMAS/INMAS but the expansion of the dry season area of BIMAS/INMAS. Because as shown in the Chapter 10.1. the yield per hectare of BIMAS/INMAS 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.

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 Gotong-Royong and willingly do the maintenance and operation of facilities which were built by themselves.

### 2.3.3. Urgency of small scale development

There would be many new large projects technically feasible and national economically sound in the Province such as North Luwu (105,700 ha.), Tompe Lake (141,000 ha.) and other development projects, and also many 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.

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 present socio-economic condition and agricultural technic level in the Saddang 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 project cannot catch up with the rapid increase of food demands in this country.

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 point view, the Ministry of Agriculture should have more emphasis on this quick return aspect promptly.

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 weirs, 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.

## 2.4. Forest lands managements for soil and water conservation

### 2.4.1. Analysis of the present situation

The total area of state's forest is 3,222,111 ha., which covers over 50 % of all land area of the Province. According to their function, the forest of South Sulawesi de-  
vide into:

- 1) Absolute protection forest (1,408,689 ha.:  
44 %)
- 2) Productive protection forest (1,418,290 ha.:  
44 %)
- 3) Production forest (394,114 ha.:  
12 %) and
- 4) Reservation forest ( 1,018 ha.:  
0.03 %)

The felling methods of respective forest are as follow: absolute protection and reservation forest area prohibited to cut, productive protection forest are of selective cutting with limited condition, and production forest are generally selective cutting.

Bare lands and denuded forest lands are distributed throughout the region of South Sulawesi Province and a part of this area have been greening since the pre-REPLITA times. Acreages of these area are estimated at about 1,557,000 ha., which account for 25 % of all lands areas. Since the conditions of these are little known it must be ascertained by field survey or interpretation of aerial photograph.

The works of greening and soil and water conservation are divided two groups, one is reforestation imple-  
mented in the forest regions and another is greening (affor-  
restation) and soil conservation done outside the forest re-  
gions. The executed areas of these works annually during the period of 1969 - 1977 are as follows: reforestation is 7,078 ha., afforestation is 6,617 ha. and soil conservation is 1,503 ha. These plans and executed areas are rapidly increasing from 1974, the first year of REPLITA II.

### 2.4.2. Forest managements in water reservation area

In South Sulawesi Province, rainfall condition is full of variety.

Under such circumstance, the treatments of the forest lands in water reservation area for flood control, water resources conservation and soil conservation has been studied. The function of soil and water conservation by forest are subject to soil covering and infiltration capacity of soil. Therefore, the first of all good forest should be made and to maintain it in stabilized conditions for long years.

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

Step 1: The all area of South Sulawesi Province are divided two zones (I, II) by the mean annual rainfall. Namely, zone I is the area of more than 2,500 m.m. and zone II is the area of less than 2,500 m.m. The scale of map used for this work is 1/500,000.

Step 2: The map is subdivides by mesh of  $1 \text{ cm}^2$ . Soil conditions (fertility and depth) and elevation in each mesh are classified by some categories as follows:

Table 2.3. Categories of soil condition and elevation

Division	Annual rainfall (m.m.)	Soil condition (fertility and depth)			Elevation (m.)		
		A	B	C	>500	500-1,000	1,000<
I	>2,500	0	△	X	0	△	X
II	2,500<	0	△	X	0	△	X

Note: if data of soil depth are not available, the judgement of soil conditions could be conducted by only soil fertility.

Step 3: As the results of combination by evaluated physical factors, a management guide is determined by the following table 2.4.2. (Refer to next page).

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



Owing to the difficulties in measuring the natural conditions, reliable data on transpiration of tree-species are a few up to now. Pinus merkusii which widely planted in the region is a -daptable to dry fields, however, interception and transpiration losses of this tree-species are considered to be middle de degree.

Table 2.4. A Management guide of each condition

Division	Combination of physical factors		Sub-Division	Method of regeneration	Planting density	Management guide
	Soil condition	Elevation				
I	0	0	I <sub>1</sub>	Artificial reproduction	2,500/ha	Economical tree-species (only) (mixed more than 2 kinds in belts)
	0	Δ				
	Δ	0				
I	Δ	Δ	I <sub>2</sub>	idem	idem	Economical tree-species (70%). Soil improving tree-species (30%) (mixed in belt)
	Δ	Δ				
	X	0				
	X	Δ				
I	0	X	I <sub>3</sub>	Natural regeneration		Raise natural useful trees to good forest
	Δ	X				
	X	X				
II	0	0	II <sub>1</sub>	Artificial reproduction	400/ha	Economical tree-species (70%) Soil improving tree-species (30%)
	0	Δ				
	Δ	0				
II	Δ	Δ	II <sub>2</sub>	idem	idem	Economical tree-species (50%) Soil improving tree-species (50%)
	Δ	Δ				
	X	0				
	X	Δ				
II	0	X	II <sub>3</sub>	Natural regeneration		Raise natural useful trees to good forest
	Δ	X				
	X	X				

2.4.3. A countermeasure of restoration on denuded forest lands

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

Step 1: Judgement by potential factors. Map of scale 1/500,000 is subdivided by mesh of 1 cm<sup>2</sup> and each physical factor in meshes is read and potential erodible degree is classified by the scores of each category as follows:

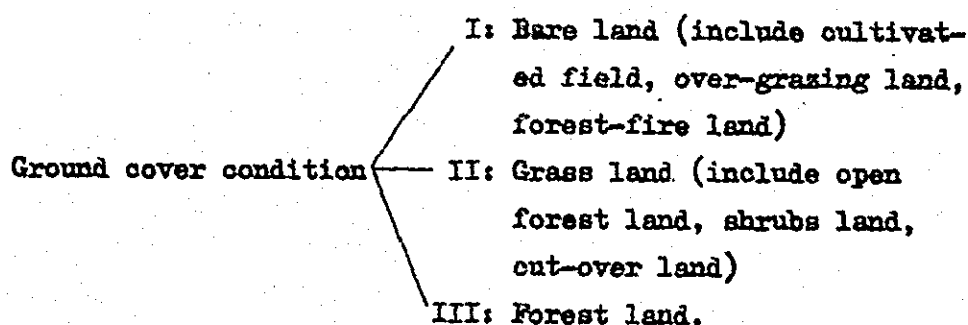
Table 2.5. Category and score of each physical factor

Item	1 Annual rainfall (m.m.)	2 Inclination (%)	3 Soil structure	4 Geological structure	Count of score
Category	>2,000 2,000-3,000 3,000 <	>15 15 - 40 40 <	Clay Loamy Sandy	The others Tertiary Quaternary	1 + 2 + 3 + 4
Score	1 2 3	1 2 3	1 2 3	1 2 3	Range (3 - 12)

Note: Classify by total score as follows:

12, 11, 10, 9, 8, 7, 6, 5, 4, 3  
I > II > III

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



Step 3: Synthetic judgement by combination of the potential and actualized factors is to be made as follows:

(Step - 1)	(Step - 2)	(Erodible degree)	(Probability of erosion development)
I	I	→ HH	Accelerately spread
I	II	→ H	Newly occure or danger of spread
I	III	→ M	Little occure so long as not disturbs
II	I	→ H	Danger of spread
II	II	→ M	Little occure so long as not disturbs
II	III	→ L	No accurence so long as not disturbs
III	I	→ M	Possible to regreening in natural
III	II	→ L	Keep stable even if some disturbs
III	III	→ L	Keep stable even if some disturbs

Note: HH > H > M > L

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

The methods of restoration should be selected and decided according to the denuded conditions. Grassed have the function of erosion control suitable for the introducing plants at the first stage of the bare land improvements.

#### 2.4.4. Necessity of the partial disaster prevention forest and methods of the forestation

There are windswept condition and soil drying at open field near seaside and high land of inland area.

In such areas, new establishment of wind break forest are necessary. For the planning of establishment of those forest, a basic standard limited with flat configuration of the ground are proposed as follows:

the tree high is 15 - 20 m., the width is approximately 50 m., the effectual range is approximately 250 m. and the use trees are some species of Podocarpus and Acacia.

There are small and big areas of damaged forest by fire. In accordance with the expansion of pine planting lands, forest fire will enlarge annually, and will increase remarkably in the future. In order to prevent the forest fire, fire break and break tree belt must be made in forest areas. It is recommended that a trial plan of approximately 60 m. width for both fire break and management road to which fire prevention forest and each work are attached.

#### 2.4.5. Conversion of land utilization to agricultural lands from forest lands.

In order to attain the usefull utilization on mountain land, unexploited forests have to be developed. However, specially fixed areas, i.e. devastated lands, highly erodible land, water reservoir area and good planting land have to be excluded from the development area.

In case of conversion to agricultural lands from forest lands, peak discharge and sediment run off are increased with few exception especially, the influences of development are remarkable in steep slope area.

It is recommended that in the planning area of development for agricultural lands, about 30 percent of the development area are desirable to be kept as forest lands on the area near by streams and mountain sides.

Unplanned grazing on forest lands give damages lightly planted trees and bring devastation of land. Therefore, grazing utilization of forest land should be appropriately used by rotation system which fix area and duration of grazing. The lands to be used for pasturage should be on a gentle slope less than  $20^{\circ}$ . Because it is known previously that when it is more than the angle of  $20^{\circ}$ , the appearance of the bare land is increased abruptly by the behavior of livestock.

2.4.6. Others

It is necessary to make many pilot planting forest by the indigenous and foreign species. The experiment areas are desirable to be selected on different habitats.

In order to clarify the quantity of forest condition and the actual circumstances of devastated land, the aerial photographic surveying and mapping in Kabupaten Enrekang and Jeneponto are desirable at the least.

2.5. Fishery resources development

2.5.1. Rational utilization of Brackish water fish ponds/tambak

In South Sulawesi Province, the area utilized for coastal aquaculture is enormous and those areas having possibilities for future development are the most abundant throughout the island of Indonesia. Moreover, the production of fry catching, especially shrimp is also the largest here throughout Indonesia. Therefore it can be said that the brackish water pond culture is the most prosperous industry in South Sulawesi Province. Since 1974/75, 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 circumstances, it seems that rational utilization of tambak is an urgent business.

In order to get high yield of ikan bandeng and shrimp in tambak, at first fishermen must take care about control of pests and predators for 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.

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 causes 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 constructed by the credit of the World Bank.

By the bye, an optimum 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 become 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.

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* etc.) are able to culture only in rather high salinity of the dry season. Fishermen in Kabupaten Sinjai has already cultured it spontaneously.

In Kabupaten Jeneponto, there are many tambak-s which yield high production of shrimp. Observing precisely on each tambak, however, there are many high salinity areas which suffered from dryness. Therefore it is necessary to consider about classifying of tambak as described above in order to manage whole tambak-s rationally.

The inlet, Tambarangkeke, near the estuary of the Jene Allu river, has an area of 700 ha. of entrophicated shallow water. It is advisable to introduce bamboo pen culture which is very popular in Laguna de Bay, Philippines, as a new method of brackish water fish culture.

#### 2.5.2. Improvement of fishery productivity in Tempe Lake

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 upper streams of the rivers which flow in 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 following two species and one new method of cultivation would be recommendable :

1) Grass carp (*Stenopharyngodon idellus*)

The fish belongs to cyprinidae. The characteristics of this fish is herbivorous. Namely, it eats terrestrial plant such as grasses, legumes, cattail and aquatic plants. This, 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. per one piece.

In confined water such as pond it can not spawn without hormon injection but if the condition of the rivers are suitable for spawning, it can spawn in the rainy season. In the case of Tone River in Japan, its spawning take place after heavy rain in June and July when water level of river suddenly raise. Since the condition of the Walance 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 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.

2) Gengoro-Buna (*Carassius auratus* var.)

This is an endemic species of Biwa Lake in Japan. The appearance is similar to that of tawes. The characteristic of this fish is phytoplankton feeder. That means it can grow about 25 cm. long only eating phytoplankton in the water. Consequently it may grow rapidly and easily spawn if the water condition of Tempe Lake is entrophicated in the dry season. This species was already introduced in the Institute of Bogor in 1976 by the recommendation of Dr. T. KAFUKU.

3) Method of bamboo pen culture

The method of bamboo pen culture which is recently practiced 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 gengoro-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 technic of hormone injection on grass carp should be mastered first consequently (2) and (3) should be taken up promptly.

### 2.5.3. Fish cultivation in paddy field

Technical aspects which should be urgently improved in hatcheries which provide fry to the farmers in Kabupaten Enrekang and adjacent area are as follow :

- 1) There are not enough feeding from hatch out to fingerling. It means high mortality of fry.
- 2) Mortality of fry is high because of inadequate prevention for invaders such as water insects and other animals in the nursery pond.

Fortunately there is a modern hatchery facilities 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 steps, 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.

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.

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.

The damages of fish caused by insecticides run-offs have killed an increasing number of fish in paddy field. It is a severer problem for farmers but there is no way to solve 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.

#### 2.5.4. Rivoline fishery

In South Sulawesi Province, there are many large rivers such as Jeneberang in Kabupaten Gowa, Saddang in Pinrang and Enrekang, Walanae in Bone, Cenrana and Bila in Wajo, Kalaena in Luwu and Mapili in Polmas.

Judging from the observations on some rivers, river fisheries are not so thriving owing to (1) no proper fishing gears and (2) no proper fish to catch. Actually, catching amount of each river might be not so abundant. According to Myers (1951), he referred to the section of Wallace's 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 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/Gabus), both probably introduced by men. Accordingly, almost of all important freshwater species in South Sulawesi were introduced from mainland Java.

Under such circumstances, 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.

#### 2.5.5. Sea fisheries

South Sulawesi surrounded by sea has many fishermen who operate almost non-motorized fishing boats and their operations are limited within few miles from coastal line. Moreover, fishing gears are mostly traditional types, therefore the production of sea fisheries seems not so abundant.

In this survey there are not enough time to check several technical point on seafisheries activities, following are only impressions observing on sea products :

1) Fish market and its facilities

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 be sold fresh locally or dried or salted for transport to other parts of the Kabupaten. Owing to these poor facilities, fishermen always annoyed in low prices and spoilage of fish products.

a) Under such condition processing method are only limited to pindang, traditional salt fish and sun dried salt fish which can be preserved long. Thus, it is desirable to introduce modern processing technics such as fish cake, smoked fish and fish sauce.

b) Ice making facilities is desirable in the center part of fisheries activities but this facilities need much amount of water, therefore survey of water must be done before making this facilities.

2) Shell culture

Though not in daily menu of South Sulawesi people, some amount of Mollusca are likely to be consumed as local consumption except Kabupaten Pangkep where tiram (pufostrea), Simping (Amusium) and Kerang dara (Tegillarea) has been catching by fishermen in commercially. But recently large amount of giant cockle are being caught by fishermen in Kabupaten Maros in order to export to Japan.

There is no doubt that in South Sulawesi with its extensive coastline capture fishing may still offer great. However, 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 technics of shell culture were introduced here, probably hundreds of tons of shell could be harvested annually as an important animal protein for the people.

3) Ornamental sea fish

According to the report of F.A.O./1975, recently ornamental fishes including salt water fish are becoming important exporting item of developing countries. Although ornamental fish imports into U.S.A., the biggest importer (1973) consist of almost 99 % 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.

Under such circumstances, a salt water fish fauna of potential interest to the trade are focused on (i) Caribbean Sea (ii) Indo-pacific (iii) Red Sea. According to the potential of price list supplied by the dealers in salt water fish, 23 families or greatest potential interest to the hobyst are pointed out.

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 Dwiponggo'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 an 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 become increasing fishermen's income.

Therefore, if the government provide proper guidance to fishermen concerning ornamental sea fish under such favorable situation, its industry will be spread 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 regulate improper fishing method, fishing places and time for protecting

natural resources of the said fish on the other hand, has to teach fishermen about technics of proper catching and transportation method for decreasing mortality of fish.

3. Outline of the 5 Bloc/Wilayah for development of South Sulawesi

3.1. Bloc I; South development bloc

3.1.1. Agriculture

1) Food crop

The products of food crop in this bloc consist of rice, corn, beans, cassava, sweet potato, vegetable and fruit. These commodities are produced by every area in this bloc but each area has its important commodities. The important area of the following food crops are respectively:

Rice/paddy : Gowa, Bulukumba, Pangkep and Maros,

C o r n : Bulukumba, Jeneponto and Bantaeng,

B e a n s : Pangkep, Gowa and Jeneponto,

Cassava : Gowa, Bulukumba, Jeneponto and Ujung Pandang,

Vegetables : Jeneponto and Gowa, and

Fruits : Jeneponto and Bulukumba.

The amount of production of each crop are shown in table 3.1.

2) Estate crop

The products of estate crop in this bloc are coconut, candlenut, nutmeg, coffee, clove, kapok, sesame seeds, tobacco, Gnetum gnemon, Canarium commune, pepper, sugar cane, cotton and rubber. But the outstanding and significant products are coconut, candlenut, coffee, kapok, sesame seeds, cotton and tobacco; clove is found in two kabupaten-s, only i.e. Gowa and Bulukumba. The producing areas of estate crops are as follows:

Coconut : Selayar, Pangkep and Bulukumba,

Candlenut : Gowa, Bantaeng and Bulukumba,

Coffee : Bulukumba and Bantaeng,

Kapok : Bulukumba, Bantaeng and Jeneponto,

Sesame seeds: Gowa,

Tobacco : Gowa and Maros,

Sugar cane : Jeneponto and Takalar, and

Cotton : Jeneponto.

Following table 3.2. will show the production of each crop.

3) F i s h e r y

The products of the fishery in this bloc are: marine fish, river fish, brackish water fish, and fish cultivated in marshes and paddy-fields. The most outstanding production is from the sea, brackish water fish ponds and marshes.

The biggest production belongs to the following fishery areas (Refer to the table 3.3.):

Marine fish : Takalar, Bulukumba and Ujung Pandang,  
Brackish water fish : Pangkep, Takalar and Bulukumba, and  
Marsh water fish : Gowa, Bulukumba and Takalar.

4) Animal Husbandry

The potential livestock population in this bloc consists of bulls, cows, horses, goats/sheep, pigs and fowls. These animals are distributed throughout the bloc excluding

Ujung Pandang where only two kinds of them are present, i.e. bulls and pigs. Further it is also seen that pigs are only found in three areas Ujung Pandang, Gowa and Bantaeng. The areas have the largest number of livestock of each kind are respectively:

Bulls : Gowa, Maros and Takalar,  
Cows : Bulukumba, Maros and Pangkep,  
Horses : Bulukumba, Bantaeng and Jeneponto,  
Goats/sheep : Jeneponto, Bulukumba, Selayar, Bantaeng and Gowa,  
Pigs : Ujung Pandang and  
Fowls : Gowa, Bulukumba and Maros.

The number of livestock population in this bloc in 1974 is shown in the table 3.4.

5) Forestry

The products of forestry in this bloc, according to the data obtained in 1974 are respectively as follows: peeled candlenut wood only of the poor quality, mixed woods, fire wood, rattan, palm fibre, bamboo and palm sugar (brown sugar). Other products originated from main forest, and those are fire wood, timber and spinach wood. The products, both of the cultivated and of the main forests, can be specified according to the biggest producing areas as follows: the biggest producing area of cultivated products is the kabupaten Maros, while that of main forest products is kabupaten Takalar, and the biggest cultivated products are wood and bamboo, while those of main forests are also wood; thus the entire wood products in this bloc in 1974 amounted to 3,702,747 cubic meters, consisting of 3,670,200 cubic meters products of cultivated forests and 32,547 cubic meters those of main forests (refer to table 3.5.).

### 3.1.2. Mining

The bloc has quite a potentiality in minerals, and mostly they are uncultivated and only to the extent of survey. The areas possessing minerals according to the surveys undertaken are: Kabupaten Maros - nickel ores, copper ores, coal, petroleum, gypsum, marble, cobalt, aluminium and lead, Kabupaten Pangkep - coal and earth oils, and Kabupaten Gowa - sand and limestone.

### 3.1.3. Industry

The number of undertakings of various industries in this bloc in 1974 is as follows:

Ujung Pandang	1,347
Kabupaten Maros	103
Kabupaten Pangkep	131
Kabupaten Gowa	362
Kabupaten Takalar	40
Kabupaten Jeneponto	45
Kabupaten Bantaeng	20
Kabupaten Bulukumba	50
Kabupaten Selayar	12

The biggest productive kinds of industries are: industries of food and beverages, ready-to-wear clothes, wood and rattan furniture, construction material and earthenware, printing and publication, and handicrafts and ornaments.



3.2. Bloc II: West development bloc

3.2.1. Agriculture.

1) Food crop

The products of food crops in this bloc are rice, corn, peanuts, soy beans, green peas and cassava. All these commodities are produced in each of the areas within this bloc. The outstanding and most productive ones are paddy (rice), corn and cassava. The biggest rice producer is Kabupaten Pinrang and Sidrap. Their average rice product in amount to 341,950 tons each year, while corn and cassava are respectively 14,875 tons and 26,765 tons each year. This indicates that the main products of this area is rice (refer to table 3.6.).

2) Estate crop

The product of estate crops in this bloc are coconut, coffee and candlenuts. The biggest producing area of these commodities is the kabupaten Pinrang for coconut, Enrekang for coffee and candlenuts.

3) Fishery

The outstanding fishery products of this bloc are marine fish, brackish water fish and lake fish. There are also fish from the marshes, the paddy fields and the rivers but they are insignificant in number. The fishery production of the bloc in 1974 are:

Marine fish	: 18,730.2 tons
Brackish water fish	: 6,874.2 tons
Lake fish	: 876.9 tons

The biggest producing areas of each kind of fish are: Kabupaten Sidrap: lake fish, Kabupaten Pinrang: marine fish, Kabupaten Pinrang, Barru and Pare-Pare: brackish water fish.

4) Animal Husbandry

The livestock population which is quite potential in this bloc consists of cows, bulls, horses, goats, pigs, and fowls. The population undergoing a fast growth in the period 1971-1974 are respectively bulls, cows and goats. The areas having the largest population of livestock are Kabupaten Sidrap: bulls, Kabupaten Barru: cows and goats, and Kabupaten Pinrang: fowls (refer to tabel 3.7.).

5) Forestry

The forestry products in this bloc are wood, rattan, natural silk, brown sugar and resin.

According to the data from 1971-1974, the products which are quite potential are wood, rattan and candlenuts; natural silk, brown sugar and resin are not significant yet but they have quite a promising future. The biggest producing area of each of these forest products are Kabupaten Sidrap and Barru: wood, Kabupaten Enrekang and Barru: candlenuts, Kabupaten Sidrap and Enrekang: rattan, and Kabupaten Enrekang: natural silk (refer to table 3.8.).

3.3. Bloc III; East development bloc

3.3.1. Agriculture

1) Food crop

The commodities which are quite potential in this bloc are rice, corn, peanuts, soy beans, green peas, cassava, sweet potato and a kind of long beans. Rice, corn and cassava are the main product in this bloc. A decrease is seen in the production amount of rice and corn, while in that of cassava an increase is seen in the table 3.9.

2) Estate crop

The estate crops within this bloc occupy an acreage of about 34,628.52 ha., and their products are coffee, tobacco, kapok, candlenuts and coconuts. The biggest producing areas of each of these commodities are Kabupaten Sinjai: coffee, Kabupaten Wajo: coconut, Kabupaten Soppeng: tobacco, and Kabupaten Bone: kapok (refer to table 3.10.).

3) Fishery

The fishery potential of this bloc is quite big, especially for fish. A very sharp increase is seen in the growth of production from 1971 to 1974, namely, the rate was 12,802.20 tons in 1971 and it became 30,279.07 tons in 1974. These products are obtained from sea, lakes, rivers, fish ponds, marshes and paddy fields. The biggest fish producing areas are respectively Kabupaten Bone and Sinjai for marine fish, Wajo for lake fish and Bone for brackish water fish. No data is obtained on other fishery products (refer to table 3.11.).

4) Animal husbandry

This bloc has quite big husbandries, and there is also a large number of livestock population in the various kinds of husbandry. The potential livestock population consists of bulls, cows, horses, goats and fowls. All of the kinds of livestock have had an increase during the period 1971-1974 except for bulls and chickens which had a decrease, i.e. bulls from 106,824 heads in 1971 to 97,693 heads in 1974 and chickens from 3,933,759 heads in 1971 to 1,188,169 heads in 1974. The population of livestock that has an outstanding increase is the cow, with an increase from 101,026 heads in 1971 to 190,493 heads in 1974 (refer to table 3.1.2.

5) Forestry

The potential forest product in this bloc are wood, rattan and candlenuts. The outstanding producing areas are

Kabupaten Bone and Sinjai for wood, Wajo for rattan and Bone for candlenut. The forest production in 1974 are 427,121.348 cubic meters of wood, 54.3 tons of rattan and 9.5 tons of candlenuts.

3.3.2. Mining

No activity is apparent in this bloc as mining is still in the stage of surveys. Survey findings show the presence of copper ores in the kabupaten Bone.

3.3.3. Industry

The industry in this bloc consists of industries of food and beverages, tobacco, textile and ready-to-wear clothes, wood, rattan and furniture, printing and publishing, non-metal manufacturing industries, metalwork industries, processing industries, and handicraft industries. The greatest ones among these are tobacco and handicraft industries.

3.4. Bloc IV; North development bloc

3.4.1. Agriculture

1) Food crop

The product of food crops in this bloc are rice, corn, peanuts, soy beans, green peas, cassava, sweet potato, vegetables and fruit. The most outstanding and quite important ones are rice, corn, cassava, sweet potato, vegetables and fruit. The biggest producing areas are Kabupaten Luwu: rice, vegetables and fruit, and Kabupaten Tana Toraja: cassava and sweet potato. The production of each commodity shows a desirable increase from 1971 to 1974 (refer to table 3.13.).

2) Estate crop

The products of estate crops in this bloc are coffee, tobacco, candlenut, clove and pepper. The productive and quite significant commodities are coconut, coffee, kapok, clove and pepper. Kabupaten Luwu is the biggest producing area of coconut, kapok, clove and pepper, while Kabupaten Tana Toraja produces coffee. A decrease in production occurs for coffee and pepper, but other commodities increased (refer to table 3.14.).

3) Fishery

Fishery in this bloc includes marine fishery and inland fishery. Marine fishery is only found in the Kabupaten Luwu. The greatest fishery products are those of marine fishery; so Luwu had the greatest products. The smallest amount of fishery products occurs in river fishery. In 1974 a decrease was seen in the production of marine fishery compared to that in 1971. The same decrease is seen on the production of fish pond fishery. For other fisheries an increase is still to be seen (refer to table 3.15.).

4) Animal husbandry

The most important products of animal husbandry in this bloc are bulls, cows, horses, goats, pigs and fowls. The kinds having big potentiality are bulls, cows and pigs. Kabupaten Tana Toraja is the biggest producer of bulls, pigs and horses, while Luwu produces the other kinds of livestock. The largest number of livestock population occurs in Kabupaten Luwu, yet in 1974 a decrease was apparent compared to 1971. This is due to a decrease in the number of pigs occurring each year since 1971; the number of chickens has also decreased in 1972 (refer to table 3.16.).

## 5) Forestry

The main products of forestry in this bloc are wood, rattan and resin. As for the manufactured products, there are two kinds craftsmanship and export manufacture. About 80,657 cubic meters has been manufactured for export in 1971 and about 130,840 cubic meters in 1974. This shows quite a big increase; where as the craftsmanship products are 60,900 cubic meters in 1971 and 138,467 cubic meters in 1974. Export woods and resin are only produced in Kabupaten Luwu. Other products, i.e. those of craftsmanship, are mostly found in Kabupaten Tana Toraja. Rattan products are found in Kabupaten Luwu (refer to table 3.17.).

### 3.4.2 Mining

This bloc is quite potential in minerals; some of them have been exploited or surveyed and some have not. The kinds of mineral found in this bloc, especially in Kabupaten Luwu, are nickel, copper, kerosene, gold, iron, coal and gypsum. Besides nickel, which has been processed, other mines have been surveyed by the Bandung Technological Institute and the PERTAMINA. Gold, copper and sulphur mines are found in Kabupaten Tana Toraja.

### 3.4.3 Industry

The industry which are quite potential in this bloc are industries of food and beverages, wood and rattan furniture, earthen construction materials, gold and silver jewelries, wood handicrafts, wood sawyers, china and earthen potteries, weavery, and others (e.g. bamboo and mat plaiting).

3.5. Bloc V; Mandar Development Bloc

3.5.1. Agriculture

1) Food crop

The products of food crops in this bloc are rice, corn, peanuts, soy beans, green peas, cassava, sweet potato, vegetables and fruit. Among those mentioned above, the outstanding ones are rice, corn, cassava, vegetable and fruit. The greatest producing area of each kind of those crops is Kabupaten Polmas: rice and cassava, Kabupaten Majene: fruit and vegetables, and Kabupaten Mamuju: corn (refer to table 3.18).

2) Estate crop

The products of estate crops in this bloc are coconut/copra, coffee, kapok, candlenuts, nutmeg, pepper and cocoa. The largest production among the those estate crops in this bloc is the coconuts and also that is the largest one among the all blocs, occupying an acreage of 24,429 ha. And coconuts also constitute very important estate crop in this bloc. The amount of coconut production in this bloc in 1971 was 23,431.2 tons and in 1974, 24,162.1 tons. The biggest coconut supplying area is Kabupaten Mamuju, and next ones Majene and Polmas.

3) Fishery

Just the way it is with other blocs, this bloc has quite a great potentiality in fishery, both inland and marine. Almost of the fishery products originated in the sea, where the average annual rate of production from 1971 to 1974 is about 9,800 tons, while that of inland fishery is 1,500 tons. The biggest amount of inland fishery products is that of fish ponds and paddy fields. The greatest sea fish producing area is Kabupaten Polmas, and this area is also the greatest producer of inland fishery (refer to table 3.19.).

4) Husbandry

The potential livestock population consists of bulls, cows, horses, goats, pigs, ducks, chickens and fowls, but the most outstanding ones are cows, bulls, goats and pigs. The biggest producer of livestock is Kabupaten Polmas, and it is estimated that 75 % of the livestock population of this bloc occupy this Kabupaten.

5) Forestry

The forestry products of this bloc consists of products of cultivated forests: black wood, fire wood, rattan, copal and cinnamon wood, and products of main forests/reserved forests: resin and brown sugar. The biggest producing area of forestry products in this bloc is Kabupaten Mamuju, followed by Polmas and Majene, while the biggest forestry products are rattan and black wood.

3.5.2. Mining

According to informations obtained, this bloc has quite a big potential in mining, and several kinds of minerals are found, with the following location of each Kabupaten, Mamuju: gold, copper, steel, mica, kerosene and coal, and Polmas: gold, copper, iron, mica and zinc. No information is obtained concerning kabupaten Majene. Exclusively in Kabupaten Mamuju, three kinds of minerals are most outstanding, i.e. gold, copper and kerosene, which have been surveyed by the P.T. ISSA and the PERMINA in 1975.

3.5.3. Industry

The same way as in the other blocs, there is a big potentiality in industry within this bloc. The most outstanding industries are industry of textile, tobacco, manufacturing, wood, rattan and bamboo furniture, metalwork, handicrafts, and non-metal.



Table 3.1. Production of food crops in Bloc I (1974)

Products	Unit : tons.				
	U.Pandang	Maros	Pangkep	Gowa	Takalar
1. Rice	5,663.96	73,854.20	74,344.41	101,516.59	56,097.29
2. Corn	35.17	407.80	806.28	5,124.96	2,913.70
3. Peanut	9.6	136.93	72.	66.	37.90
4. Soy beans	-	41.90	225.93	56.20	-
5. Green gram	299.93	349.80	9,360.	2,315.65	1,181.95
6. Cassava	8,375.	5,308.20	306.60	24,204.69	4,636.50
7. Sweet potato	138.60	941.45	1,396	2,323.35	2,040
8. Vegetables	-	699.	647.50	723.40	-
9. Fruit	68.64	1,202.52	1,617.71	867.68	-

Products	Jeneponto	Bantaeng	Bulukumba	Selayar	Total
1. Rice	29,561.84	19,496.28	100,716.42	1,005.14	462,256.13
2. Corn	12,424.52	8,033.50	13,562.16	6,571.24	49,879.33
3. Peanut	344.06	2,182.05	2,590.05	43.64	5,482.23
4. Soy beans	-	3.-	129.49	-	519.52
5. Green gram	1,423.82	59	72.63	43.64	15,106.42
6. Cassava	10,744.42	964.50	14,307.29	2,260.6	71,107.80
7. Sweet potato	457.84	1,047.50	3,574.20	533.5	12,455.44
8. Vegetables	2,037.34	621.20	699.30	581.7	6,059.52
9. Fruit	7,092.5	358.32	5,071.50	1,118	17,325.23

Source : BAPPEDA Sul-Sel.

Table 3.2. Production of estate crops in Bloc I (1974)

Units : tons

Products	U.Pandang	Maros	Pangkep	G o w a	Takalar
1. Coconut	92.00	115.45	2,992.54	243.05	164.53
2. Candlenut	0.75	-	-	877.95	-
3. Nutmeg	-	-	-	-	-
4. Coffee	-	3.32	3.31	482.88	-
5. Clove	-	-	-	0.01	-
6. Kapok	7.20	12.43	6.85	29.25	8.60
7. Sesame seeds	4.90	-	-	532.50	64.30
8. Gustum guemon	-	-	-	-	-
9. Tobacco	0.45	156.35	11.20	475.30	109.00
10. Canarium commune	-	-	-	-	-
11. P e p p e r	-	-	-	-	-
12. Sugar cane	20.00	-	-	-	60.00
13. Cotton	-	-	-	-	0.48
14. Rubber	-	-	-	-	-

( Continue - )

Source : BAPPEDA, Sul - Sel.

(Table 3.2.)

Unit : tons.

Jenepono	Bantaeng	Bulukumba	Selayar	T o t a l
937.19	144.80	2,080.20	7,859.99	14,629.75
19.75	540.20	515.00	205.00	2,159.50
-	-	-	3.20	3.29
16.76	528.65	980.65	0.45	2,016.02
-	-	0.15	-	0.16
93.20	286.55	150.00	13.90	607.98
19.20	-	2.40	20.43	643.73
-	-	-	3.00	3.00
111.90	-	5.01	20.45	889.66
-	-	-	23.90	23.00
-	-	1.90	-	1.90
639.50	-	-	0.72	700.22
313.11	-	-	-	313.59
-	-	-	-	476.12

Table 3.3. Fishery production in Bloc I (1974)

Unit : tons.

Products	U, Pandang	Maros	Pangkep	Gowa	Takalar
1. Sea	11,700.0	270.0	1,459.0	-	15,276.0
2. Lake	-	-	-	-	-
3. River	4.0	32.0	72.5	92.5	24,500.0
4. Fish ponds	898.0	391.5	3,579.0	22.0	3,150.0
5. Marshes	-	4.0	12.9	91.0	15,500.0
6. Paddy field	-	8.0	1.6	12.5	-

Products	Joneponto	Bantaeng	Bulukumba	Selayar	T o t a l
1. Sea	680.5	4,440.58	9,908.99	3,788	47,703.5
2. Lake	-	-	-	-	-
3. River	49.6	6.75	25.19	1.1	308.1
4. Fish ponds	725.5	14.27	1,053.25	17.8	9,851.6
5. Marshes	-	4.05	22.50	-	178.9
6. Paddy field	-	-	11.63	-	33.7

Source : BAPPEDA, Sul - Sel.

Table 3.4. Population of livestock in Bloc I (1974)

Unit : heads.

Products	U.Pandang	Maros	Pangkep	Gowa	Takalar
1. Buffaloes	2,121	29,696	16,853	32,739	24,153
2. C o w s	-	25,287	22,319	12,688	183
3. Horses	-	5,171	3,202	7,640	1,499
4. Goats/sheep	-	7,589	6,203	12,534	4,896
5. P i g s	14,551	-	-	1,987	-
6. Poultry	-	328,488	281,344	641,941	185,763

Products	Jenepono	Bantaeng	Bulukumba	Selayar	Total
1. Buffaloes	17,252	8,726	15,596	4,221	151,357
2. C o w s	5,558	10,775	26,320	171	103,301
3. Horses	10,620	14,061	23,720	3,457	69,370
4. Goats/sheep	35,032	12,789	23,657	17,417	116,137
5. P i g s	-	545	-	-	17,083
6. Poultry	144,127	128,025	357,615	87,661	2.156,964

Source : BAPPEDA, Sul - Sel.

Table 3.5. Forestry production in Bloc I (1974)

Products	Maros	Pangkep	Gowa	Bantaeng
<u>Cultivated forest:</u>				
1. Peeled candlenut wood	142,651	-	-	567
2. III <sup>rd</sup> /IV <sup>th</sup> grade wood	2,851,974	-	477,638	-
3. Mixed forest woods	-	195,721	-	-
4. Fire wood	900	-	120	-
5. Rattan	629	-	-	-
6. Palm-fibres	-	-	30	-
7. B a m b o o	75,189	-	-	-
8. Brown Sugar	44,021	-	-	-

Products	Takalar	Bulukumba	Selayar
<u>Main Forest :</u>			
1. Fire wood	30,358	-	-
2. T i m b e r	1,489	350	-
3. Spinach wood	-	-	350

Unit : Wood = m<sup>3</sup>                      Rattan = bunch  
           Bamboo = trunks                Brown sugar = piece

Source : BAPPEDA, Sul - Sel.

Table 3.6. Production of food in Bloc II by commodities (1971-1974)

Commodities	Unit : tons			
	1971	1972	1973	1974
1. Rice	371,780	366,490	339,380	290,160
2. Corn	12,800	14,970	27,110	4,620
3. Cassava	21,800	19,520	18,930	46,810
4. Peanut	3,260	1,810	3,600	4,570

Table 3.7. Livestock population in Bloc II (1971 - 1974)

Commodity	Unit : 1,000 heads.			
	1971	1972	1973	1974
1. Cows	108.87	115.08	121.82	136.71
2. Buffaloes	29.22	35.35	37.11	36.96
3. Goats	22.27	24.97	30.49	29.72
4. Poultry	644.14	1,048.89	828.42	892.71

Table 3.8. Forestry production in Bloc II (1971 - 1974)

Products	1971	1972	1973	1974
1. Wood	2,111.8 m <sup>3</sup>	1,757.5 m <sup>3</sup>	1,581.9 m <sup>3</sup>	1,259.7 m <sup>3</sup>
2. Retan	2,483.5 ton	12,931.9 ton	3,992.3 ton	7,280.3 ton
3. Candlenut	595.4 ton	388.2 ton	680.1 ton	583.3 ton
4. Natural Silk	6 ton	5 ton	0.5 ton	0.6 ton
5. Brown Sugar	395 ton	437 ton	3.5 ton	399 ton

Source : BAPPEDA, Sul - Sel.



Table 3.9. Food production in Bloc III (1971 - 1974)

Unit : tons.

Commodity	1971	1974	Remarks:
1. Rice	57,276.53	201,792.60	1. x) no data obtained
2. Corn	55,930.96	15,222.16	2. in 1974, Kabupaten Soppeng not include
3. Peanut	6,965.13	2,471.11	
4. Soy bean	505.70	6,873.15	
5. Green gram	2,673.15	76.47	
6. Cassava	24,813.65	37,997.73	
7. Sweet potato	10,584.90	8,309.44	
8. Long beans	1,754.50	x	

Source : BAPPEDA, Sul - Sel.

Table 3.10. Production of estate crops in Bloc III (1971 - 1974)

Unit : tons

Commodity	1971	1974
1. Coffee	879.82	423.58
2. Tobacco	2,312.30	3,304.15
3. Kapok	1,166.89	1,443.1
4. Candlenut	1,383.74	2,034.09
5. Coconut	36,810.80	15,765.91

Source : BAPPEDA, Sul - Sel.

Table 3.11. Fishery production in Bloc III (1971 - 1974)

Unit : tons.

Products	1971	1974
Marine fish	7,920.29	16,985.96
Lake fish	2,703.57	9,477.14
River fish	223.07	323.85
Pond fish	1,210.85	2,160.29
Marsh fish	559.11	1,259.98
Paddy field	147.30	72.85
T o t a l	12,802. 2	30,279.07

Source : BAPPEDA, Sul - Sel.

Table 3.12. Livestock population in Bloc III (1971 - 1974)

Unit : heads.

Commodity	1 9 7 1	1 9 7 4
1. Buffaloes	106,824	97,693
2. C o w s	341,026	190,493
3. H o r s e s	58,729	61,587
4. G o a t s	37,758	42,312
5. S h e e p	1,083	1,277
6. Chicken	3,933,759	1,188,169
7. D u c k s	69,258	103,026
8. Poultry (other)	89,581	140,841

Source : BAPPEDA , Sul - Sel.

Table 3.13. Production of food crops in Bloc IV (1971 / 1974)

Unit : tons.

Products	1 9 7 1		1 9 7 4	
	L u w u	T a t o r	L u w u	T a t o r
1. R i c e	93,743	49,341	86,344	61,349
2. C o r n	939	2,816	2,552	1,331
3. Cassava	2,744	23,072	14,693	29,729
4. Sweet potato	1,547	18,390	4,839	14,947
5. Vegetables	19,558	3,082	18,360	1,627
6. Fruit	127,849	118	9,280	3,071

Source : BAPPEDA, Sul - Sel.

Table 3.14. Production of estate crops in Bloc IV (1971/1974)

Unit : tons.

Commodity	1 9 7 1		1 9 7 4	
	L u w u	T a t o r	L u w u	T a t o r
1. Coconut	4,677.0	74.62	5,676.9	26.7
2. Coffee	413.7	712.0	334.3	573.2
3. Clove	0.3	0.3	7.1	2.7
4. Kapok	98.8	18.6	108.3	20.0
5. Pepper	47.6	-	37.3	-

Source : BAPPEDA, Sul - Sel.

Table 3.15. Fishery production in Bloc IV (1971/1974)

Products	1 9 7 1		1 9 7 4	
	L u w u	T a t o r	L u w u	T a t o r
1. Marine fish	6,560.0	-	5,092.0	-
2. Pond fish	272.5	-	180.5	6.9
3. River fish	70.5	88.2	116.0	116.0
4. Larisk fish	100.0	0.5	236.5	0.3
5. Rice field fish	152.5	478.0	235.5	845.58
T o t a l	7,155.5	575.7	5,860.5	968.8

Source : BAPPEDA, Sul - Sel.

Table 3.16. Forestry production in Bloc IV (1971/1974)

Products	1971		1974	
	Luwu	Tator	Luwu	Tator
1. Timber	1,703 m <sup>3</sup>	60,900	2,355	138,467
2. Rattan	631 tons	662	1,060	415
3. Damar	433 tons	-	347	-
4. Exported wood	80,657 m <sup>3</sup>	-	130,840	-

Source: BAPPEDA, Sulsel.

Table 3.17. Production of food crops in Bloc V (1971/1974)

Products	Unit: tons					
	1971			1974		
	Majene	Mamuju	Polmas	Majene	Mamuju	Polmas
1. Rice	6,399.6	7,099	62,400.5	6,365	7,064	74,665.4
2. Corn	499.5	1,735	4,196.8	153	4,701	2,209.9
3. Cassava	53,532.0	528	38,880.0	14,268	5,044	33,580.0
4. Vegetables	1,852.0	27	-	3,935	64	-
5. Fruit	13,016.0	368	-	7,719	283	-

Source : BAPPEDA, Sul-Sel.

Table 3.18. Production of food crops in Bloc V (1971 & 1974)

C r o p s	1 9 7 1				1 9 7 4				Unit: tons
	Majene	Marruju	Polmas	Majene	Marruju	Polmas	Majene	Polmas	
1. R i c e	6,400	7,099	62,401	6,365	7,064	74,665			
2. C o r n	500	1,755	4,197	153	4,701	2,210			
3. C a s s a v a	55,532	528	38,880	14,268	5,044	33,580			
4. V e g e t a b l e s	1,852	27	-	3,935	64	-			
5. F r u i t	13,016	369	-	7,719	283	-			

Source: BAPPEDA, SulSel.

Table 3.19. Production of fishery in Bloc V (1971 & 1974)

Unit: tons

Products	1971	1974
1. Marine Fishery	9,645.1	9,817.9
2. River Fishery	63.9	66.8
3. Fish pond Fishery	532.9	831.7
4. Marshes Fishery	24.3	31.7
5. Paddy field Fishery	538.5	654.0

3.6. Production of food stuffs

Viewing the general potentiality of the blocs in South Sulawesi discussed above, the specific potentiality concerning production of food crops in each of those blocs in 1974 are as follows in table 3.20.

Table 3.20 Production of food stuffs by Bloc (1974)

Bloc	Rice and corn	Secondary crops	Products of Horticulture
I	512,135	104,671	23,385
II	294,780	51,380	(no data)
III	217,015	55,728	(no record)
IV	154,577	64,208	32,338
V	95,158	52,892	12,001
Total	1,273,665	328,879	-

Source: BAPPEDA, Sulsel.

When those potentialities in the production of food stuffs are compared to the number of population in each bloc, productions of food stuffs per capita are as following table 3.21.

Table 3.21. Production of food stuffs per capita by Bloc (1974)

Bloc	Rice and corn	Secondary crops	Horticulture
I	243	50	11
II	387	68	(no data)
III	165	43	(no data)
IV	224	95	47
V	198	102	25
Average	243.4	71.6	-

Source: BAPPEDA, SULSEL.

The production of food stuffs per capita in South Sulawesi Province in 1974 was recorded to be 313 Kg/capita, which consists of rice/paddy 238 kg per capita, secondary crops 62 kg per capita, and horticulture 13 kg per capita.

A detailed description will be found on the following table 3.22..

Table 3.22. Food stuffs Production and the production per capita in South Sulawesi, by Bloc (1974).

Bloc	I	II	III	IV	V	South Sulawesi
1. Population	2,104,791	761,618	1,311,858	677,156	477,956	5,333,379
2. Food stuffs (tons)	640,191	346,160	272,743	248,123	160,051	1,667,268
2.1 Rice and corn	512,135	294,780	217,015	151,577	95,158	1,270,665
2.2. Secondary crops	104,671	51,380	55,728	64,208	52,892	328,879
2.3. Horticulture	23,385	x	x	32,338	12,001	67,724
3. Production of food stuffs per capita	304	455	208	366	355	313
3.1. Rice and corn	243	387	165	224	198	238
3.2. Secondary crops	50	68	43	95	102	62
3.3. Horticulture	11	x	x	47	25	13

Note: x - no data obtained

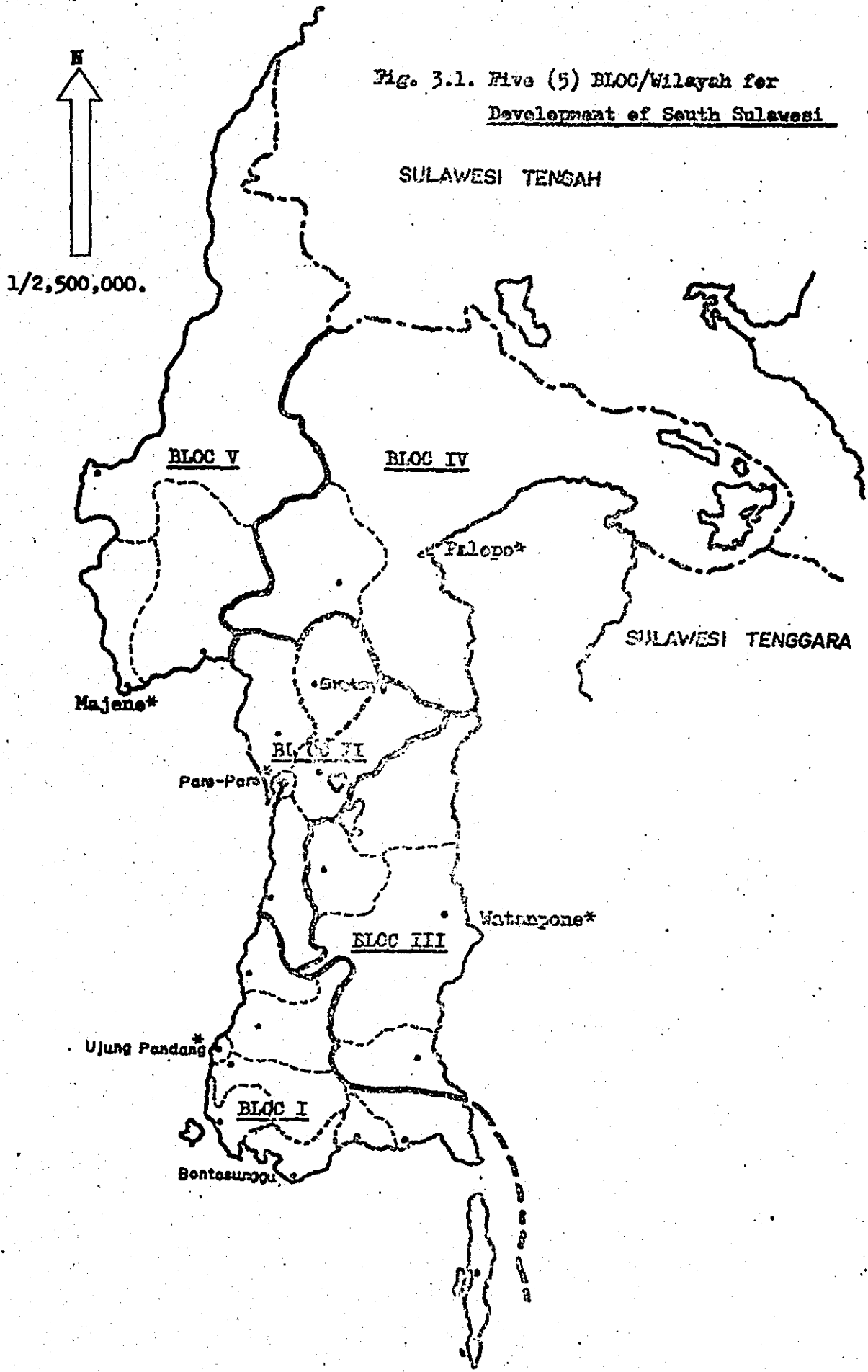
Secondary crops : tubers and beans

Horticulture : fruit and vegetables.

Sources: BAPPEDA SULSEL.



Fig. 3.1. Five (5) BLOC/Wilayah for Development of South Sulawesi



- 4. Physical feature
- 4.1. Climate
- 4.1.1. Rainfall

A meteorological observation station in South Sulawesi Province has been established in 1930, and monthly rainfall data were published as official reports. At present the meteorological observation for rainfall are carried out by more than 200 stations, controlled by several agencies such as the meteorological Agency, Agricultural Extension Service and DPUP; as shown in table 4.1.

Table 4.1. Number of observation stations in South Sulawesi (1976)

Operation System	Meteorological Agencies	Agril. Extension Service	DPUP	Total
Automatic	8	5	6	19
Ordinary	10	47	140	197
Total	18	52	146	216

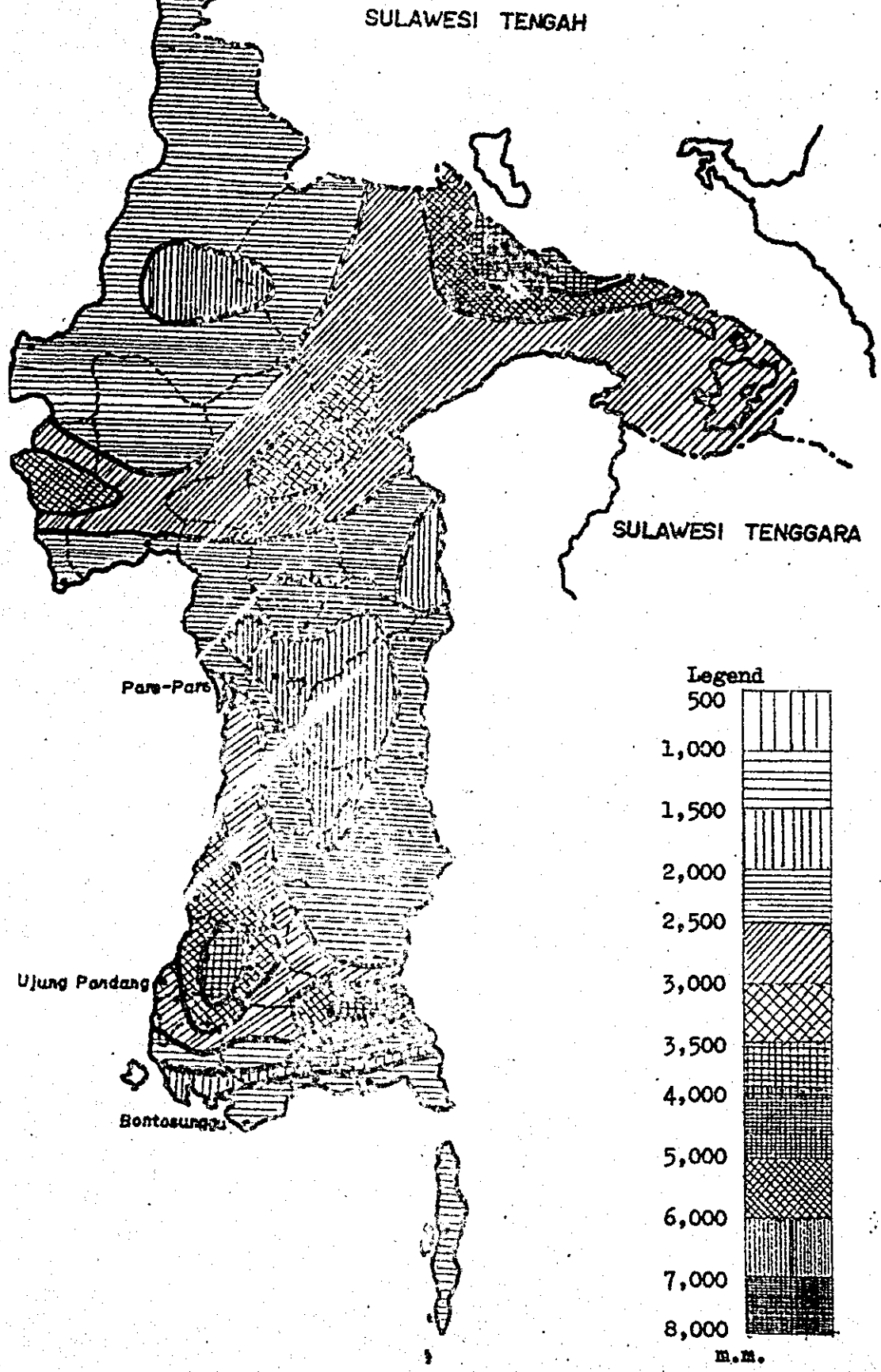
These observation data figured the monthly of precipitation and the number of rainfall days only.

There are many usefull documents on the rainfall condition recorded by Institute of Meteorological and Geophysical, Ministry of Communication. In those documents, the map of annual rainfall distribution (in millimeters) is shown on figure 4.1. (see next page).

The characteristics of rainfall in South Sulawesi is not cause by cyclone or complicated rainy front, therefore the range of rainfall is not so extensive and the continous rainfall condition differs caused by effect of the geographycal features.

In general, it is classified to two seasons, because the wind comes from the east side or west side of Sulawesi Island, and it will be decided by the geographycal features such as mountainous area and the length of merine areas which supply water vapour. Certainly when the west wind begins to blow loaded with the water vapour of the Java Sea, there are heavy rains on the east side of South Sulawesi.

Fig. 4.1. Annual rainfall in South Sulawesi



Generally the monsoon is divided by the mountain range, then the arc of the rainy season and the dry season are shown as opposite direction either the west side or the east side, i.e. from November to April (next year) is the rainy season in the west side, on the other hand it is the dry season in east side.

The amount of precipitation and rainfall intensity during the rainy season, is quite different caused by the geographical features, therefore the rainfall period and the amount of precipitation by each catchment area show the complicated differences.

The rainfall conditions for each bloc (divided in Pelita II by BAPPEDA refer to the figure 3.1.) are as follows :

Bloc I : It is divided into the southern coastal area and the western coastal area, based on the total amount of annual rainfall. The southern coastal area is one of the driest area, having only 1,000 m.m. - 2,000 m.m. of the total amount of annual rainfall. On the other hand, in the western coastal area, it is counted about 2,000 m.m. - 3,000 m.m. aspected.

Bloc II : This bloc consist of three kinds of area. Kabupaten Barru which include the western coastal area, where the total amount of annual precipitation is 2,500 m.m. - 3,000 m.m. per year. The northwestern coastal area covers Kabupaten - Pinrang and Kotamadya Pare-Pare, which has about 2,000 m.m. per year. The last one is located in the inland area, which has about 2,500 m.m. per year.

Bloc III : This bloc consists of the coastal area and the inland plain area surrounding Tempe Lake. The coastal area is one of the most scarce rainfall area not only the annual amount of precipitation but also duration of the rainy season. In this coastal area the total amount of annual rainfall is less than 1,500 m.m. per year, the paddy field are damaged by drought very often. The inland area developed centering around the Tempe Lake has the annual rainfall of 1,500 m.m.- 2,000 m.m.

Bloc IV : Mainly it covers an area of matured forest and is under the condition of heavy rainfall which is estimated as more than 2,500 m.m. annually. Especially 4,000 m.m. of precipitation can be observed in the border area on other provinces. In the southeast part comparatively smaller rainfall about 1,000m.m. - 2,000m.m. yearly are observed.

Bloc V : This bloc located in the northwestern coastal area, the amount of annual rainfall of about 1,500 m.m. But there is not so much difference concerning the monthly rainfall, the rainy season and the dry season, that enough water resources are available.

Table 4.2. Acreage of paddy field by annual rainfall condition and by bloc (1975)

Annual Rainfall Condition (m.m.)	Acreage of paddy field (ha.)					Total
	Bloc I.	Bloc II.	Bloc III.	Bloc IV.	Bloc V.	
1,000 - 1,500	19,910 (14 %)	39,579 (35 %)	122,454 (75 %)	6,820 (11 %)	20,416 (89 %)	209,179 (41 %)
1,500 - 2,000	16,847 (12 %)	73,743 (65 %)	41,693 (25 %)	4,540 (7 %)	-	136,823 (27 %)
2,000 - 2,500	14,894 (10 %)	-	-	-	-	14,894 (3 %)
2,500 - 3,000	48,563 (33 %)	-	-	39,125 (62 %)	2,425 (11 %)	90,113 (18 %)
3,000 - 3,500	41,087 (28 %)	-	-	12,269 (20 %)	-	53,356 (10 %)
3,500 - 4,000	4,000 (3 %)	-	-	-	-	4,000 (1 %)
T o t a l	145,301 (100 %)	113,322 (100 %)	164,147 (100 %)	62,754 (100 %)	22,841 (100 %)	508, 65 (100 %)

... Table 4.2. Shows that the paddy field area could be divided into two parts, one is the area in annual rainfall of 1,000 - 2,500 m.m. and the other is 2,500 - 3,500 m.m. The acreage of paddy field in the area of 1,000 - 2,500 m.m. rainfall is estimated as 346,000 ha. and is about 70 % of the whole paddy field. This area mainly covers the area of alluvial soil, and is the suitable area for the improvement of paddy production. Therefore the land improvement works such as the rehabilitation works of irrigation facilities, the efficiency of water management systems by the farmers themselves should be carried out. On the other hand, the rainfall area of 2,500 - 3,500 m.m. covers an area of 143,000 ha., and is about 30 % of the total paddy fields.

The situation of each bloc are as follows :

Bloc I : This bloc is divided into two areas based on the annual rainfall, one is the area of 1,000 - 2,000 m.m. and the other is 2,500 - 3,500 m.m. The former is located in the southern part of the coastal area, where it is necessary to carry out various improvement works. The latter is located in the western part of the coastal area and there are irrigation facilities which have been established already.

Bloc II : In this bloc, the amount of annual rainfall is more than 2,000 m.m., and is not considered to be enough for paddy cultivation. But in some part of this bloc, the net work of irrigation facilities covered many paddy fields which contribute to the increasing of production.

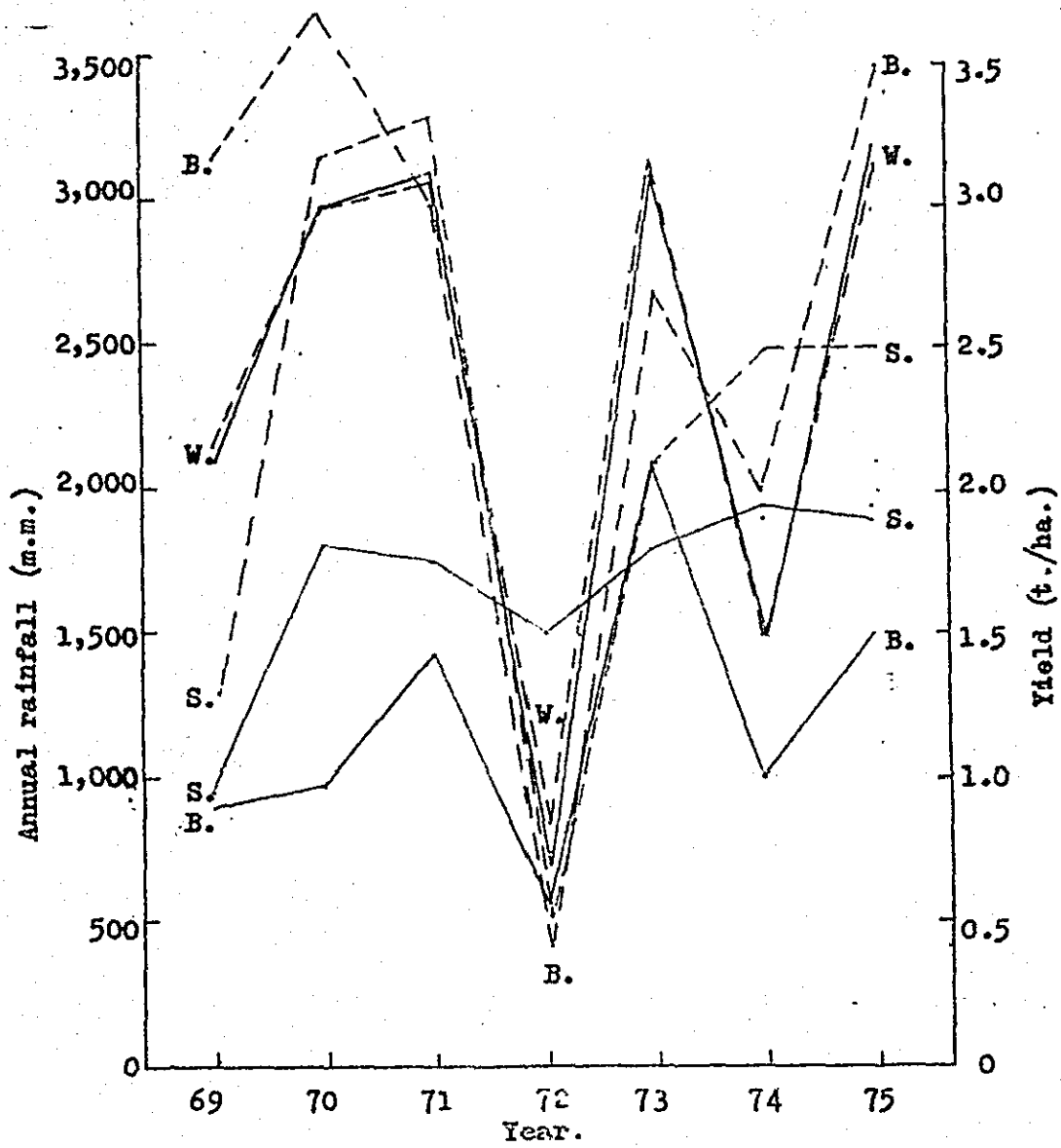
Bloc III : The amount of annual rainfall for this bloc is estimated more than 2,000 m.m. as same as bloc II. But in this bloc land improvement works are not yet carried out in almost of the area. Therefore, whenever the weather condition is not so suitable, the paddy production is damaged by drought in this bloc.

Bloc IV : According to the special feature of this bloc, an area of about 80 % of the fields in this bloc is located in the area of 2,500 - 3,500 m.m. of annual rainfall. But in the south east coastal side as one of the main producing district of rice, the amount of annual rainfall is only 1,000 - 2,000 m.m. Therefore the improvement of irrigation facilities is urgently necessary for the area.

Bloc V : The almost area of this bloc is in the area of annual rainfall 1,000 - 2,000 m.m. But the water utilization is not suitable, despite many forest reservation are located in the catchment area.

Figure 4.2. shows the relativity of yield with the amount of annual rainfall. The most sensitively responded area for above mentioned factors, is the extensive region of rainfed. In case of Kabupaten Tajo, the rate of irrigable area is estimated at only 3 %, including all irrigation systems, and had been damaged in the drought year in 1972 and 1974. On the other hand, in Kabupaten Bulukumba, many irrigation facilities have been established and the irrigable area covers about 93 % of the whole paddy field.

**Fig. 4.2. The Relativity of yield with annual rainfall**  
**In Kabupaten Wajo, Bulukumba and Sidrap**  
**(1969 - 1976)**



Note: 1)           : Rainfall.           W. = Wajo  
2)           : Yield.                    B. = Bulukumba  
  S. = Sidrap

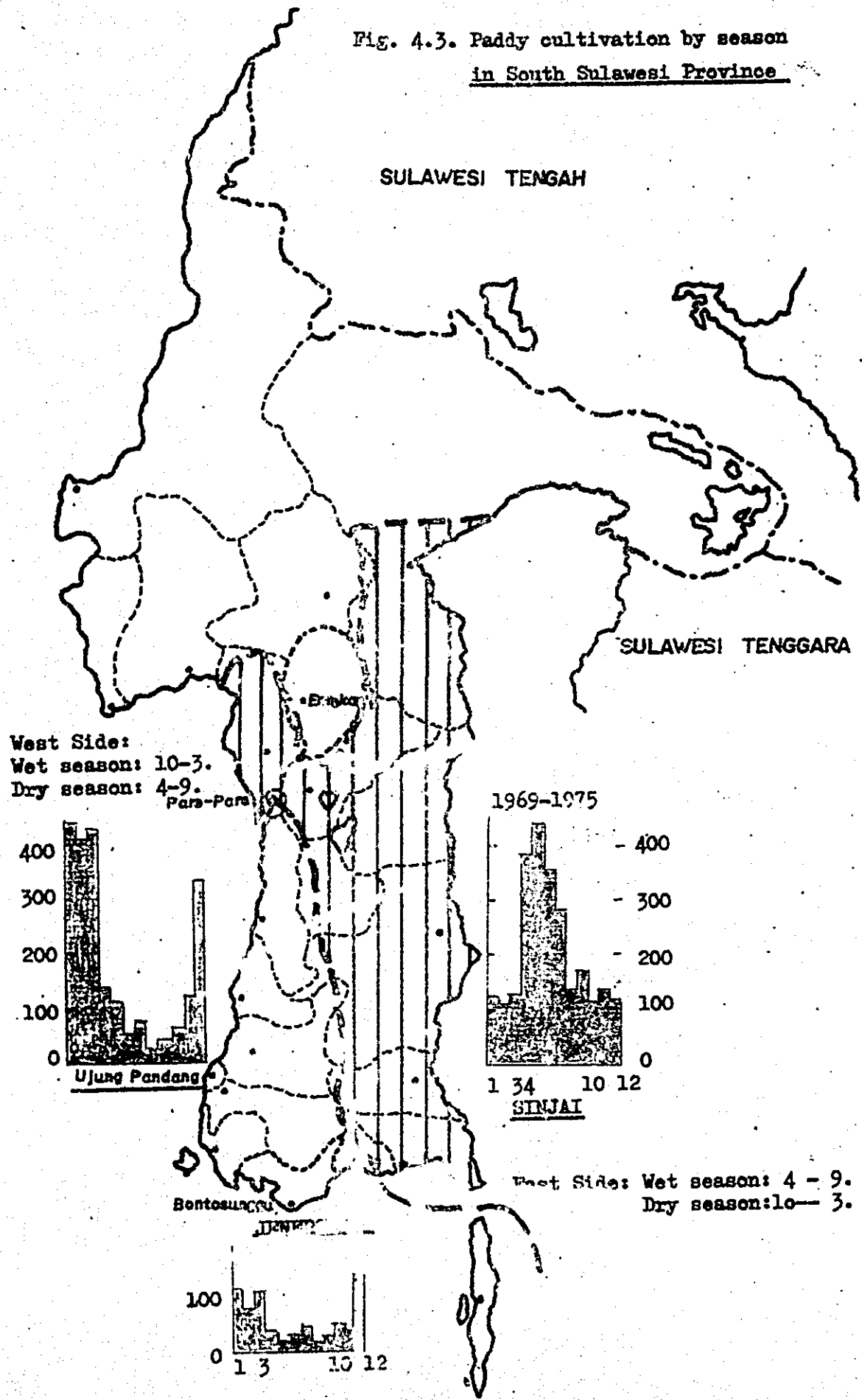


But the growing behaviour of paddy shows much cultivation in the drought year because they have not enough catchment area for water resources.

Comparatively slight damage area could be found in the area with high irrigable rate which has forests in the hinterland. Naturally the improvement and management of irrigation facilities is one of the most effects in each bloc. The case of Kabupaten Sidrap about 72 % of the whole paddy field is supplied by irrigation systems, therefore they have the stabilized production without connection with the rainfall conditions,

Figure 4.3. shows the cultivation season for paddy field which is divided into two areas, the west part and the east part of South Sulawesi the rainfall condition for both areas are separated by the wind direction of each monsoon. On the east side area the wet season begins from April to September/October the year that follows, while the other months belongs to the dry season. On the west side zone the wet season begins from October to March the year that follows while the other months are include in the dry season.

Fig. 4.3. Paddy cultivation by season  
in South Sulawesi Province

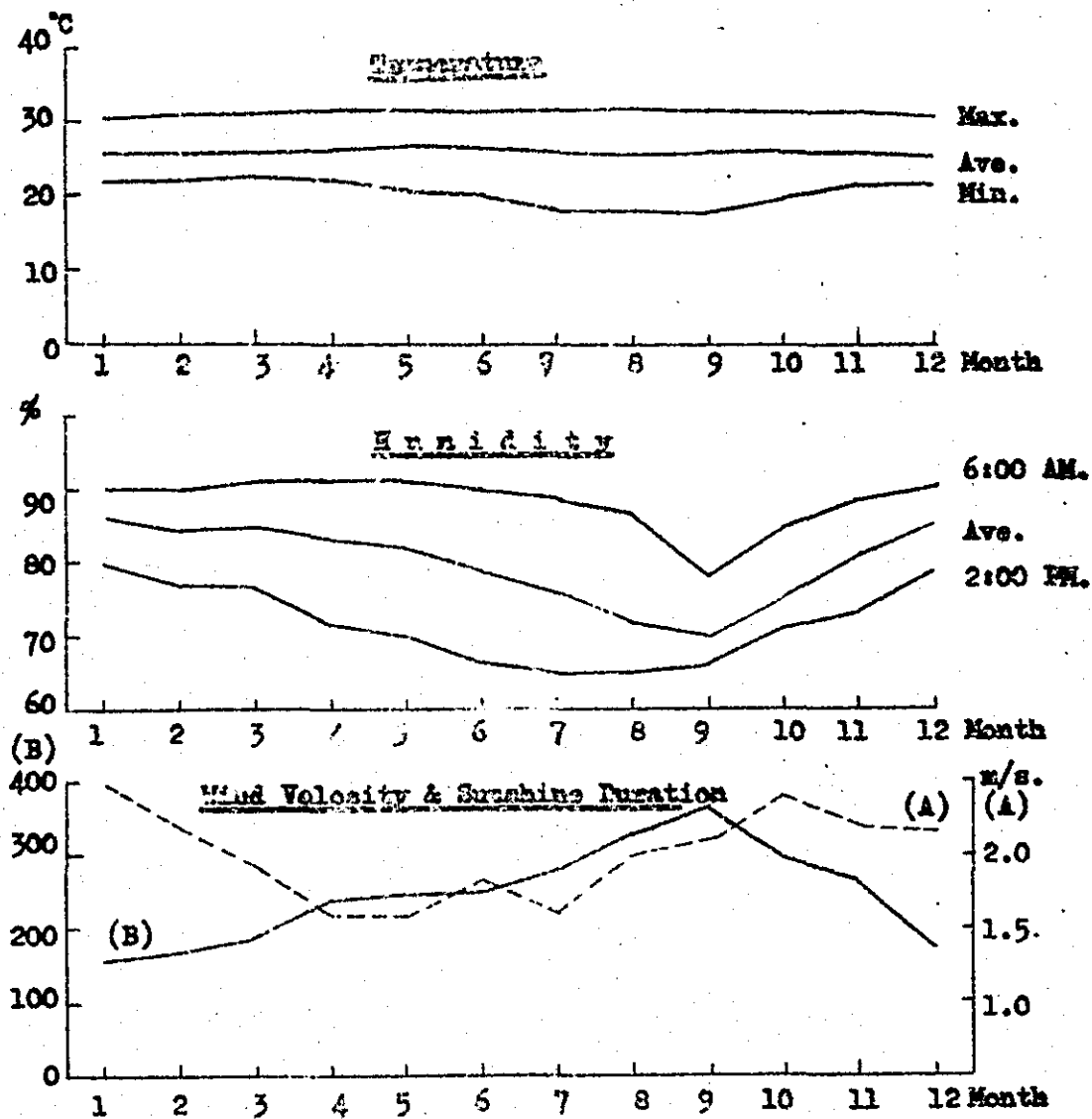


4.1.2. Others

At present the observed records concerned are mainly the rainfall data, and the other observation has not been carried out just like the meteorological station in the area of the Hasanuddin Airport. Recently, several stations are established under the operation of DPUP of South Sulawesi. After few years, those observed records will be used as the basic data for various planning.

A observed record at Ujung Pandang, is shown in figure 4.4.

Fig. 4.4. Observed record at Ujung Pandang



Note: (A) Wind velocity: m./sec.  
 (B) Sunshine duration: Hour/Month.

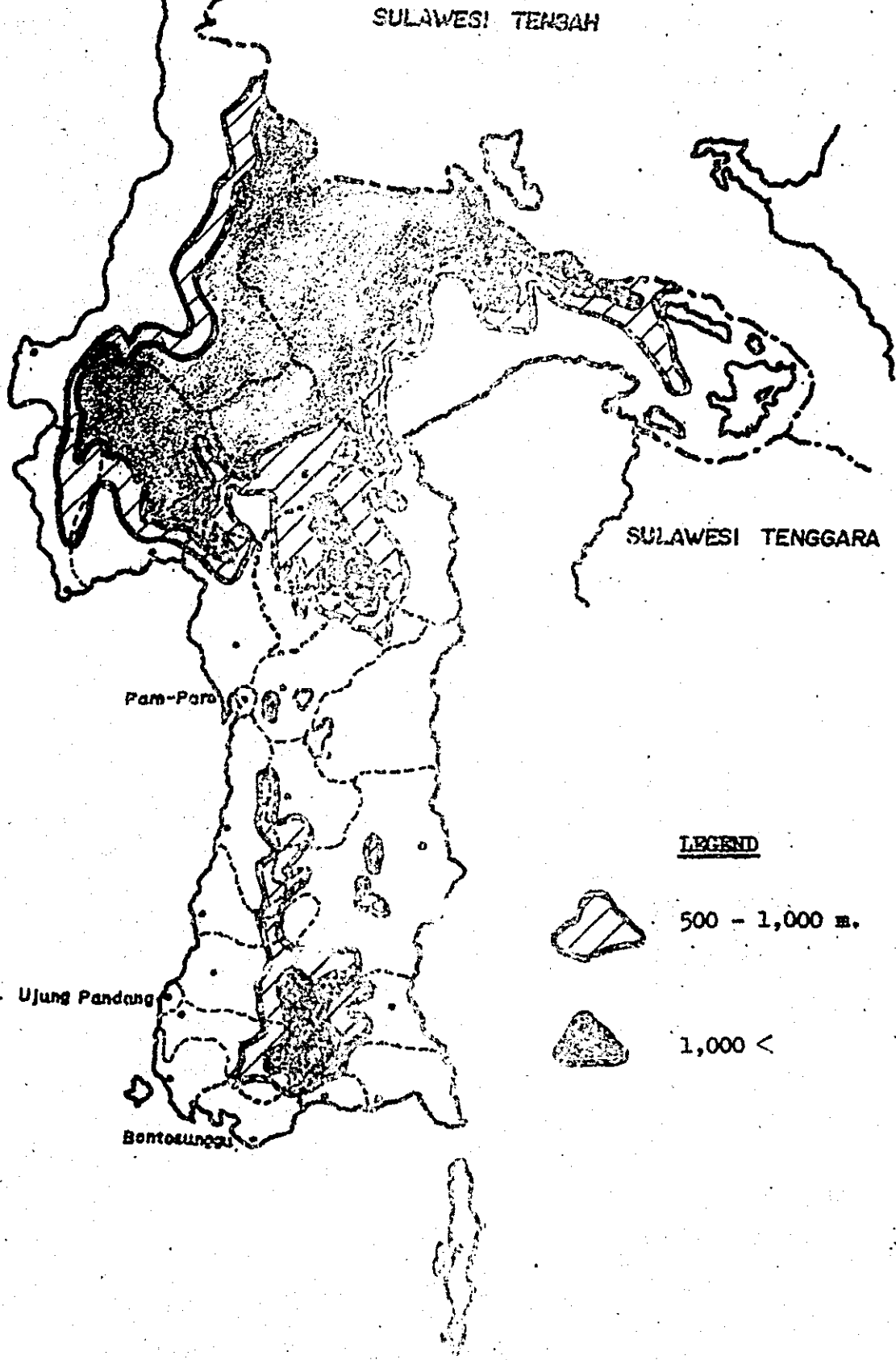
According to the observed record of Meteorological Station at Mandai, the annual average temperature is about  $27^{\circ}\text{C}$ , and the maximum temperature is  $29 - 32^{\circ}\text{C}$ , on the other hand the minimum is observed  $22 - 23^{\circ}\text{C}$ . In South Sulawesi, the condition of climate is observed comparatively high in temperature and humidity because the monsoon comes across the hot Java Sea. The humidity is observed about 70 - 80 %. The most drought period comes out in October in the southern coastal area caused by the monsoon from the southeast. Generally, the average wind velocity is not so strong, but the local wind, for example, the strong wind are quite frequent in Kabupaten Jeneponto.

The annual sunshine duration is recorded about 2,850 hours at Ujung Pandang, and they have not so much sunshine hours during the rainy season, but in the dry season it is observed the opposite condition. According to the relation between weather condition and agricultural production it is not so much important subject, except the rainfall condition. Generally, the rice cultivation which is carried out at the high land with more than 500 meters above sea level, without any specific disposition of control by using pesticide. On the other hand, some upland crops are taking advantage of the climate condition, such as the vegetable farming and the coffee growing. In case of the vegetable cultivation especially the leaf vegetables, they get the effect of the climate condition that they need control against disease injury. Therefore the main producing areas of cabbages or chinese cabbages are expanded because of the cool temperature by the high altitude of the mountainous areas, more than 500 meters above sea level, in Kabupaten Jeneponto, Gowa, Marakng and Tator. There is a same tendency in coffee cultivation which is planted in the high elevation areas. Coffee arabica should be cultivated in area of 500 - 2,000 meters above sea level, the coffee robusta is planted less than 700 meters above sea level in the normal places.

The altitude of those areas are shown on the contour map in Fig. 4.5.

Fig.4.5. Contour Map of South Sulawesi

N  
1/2,500,000-



LEGEND



500 - 1,000 m.



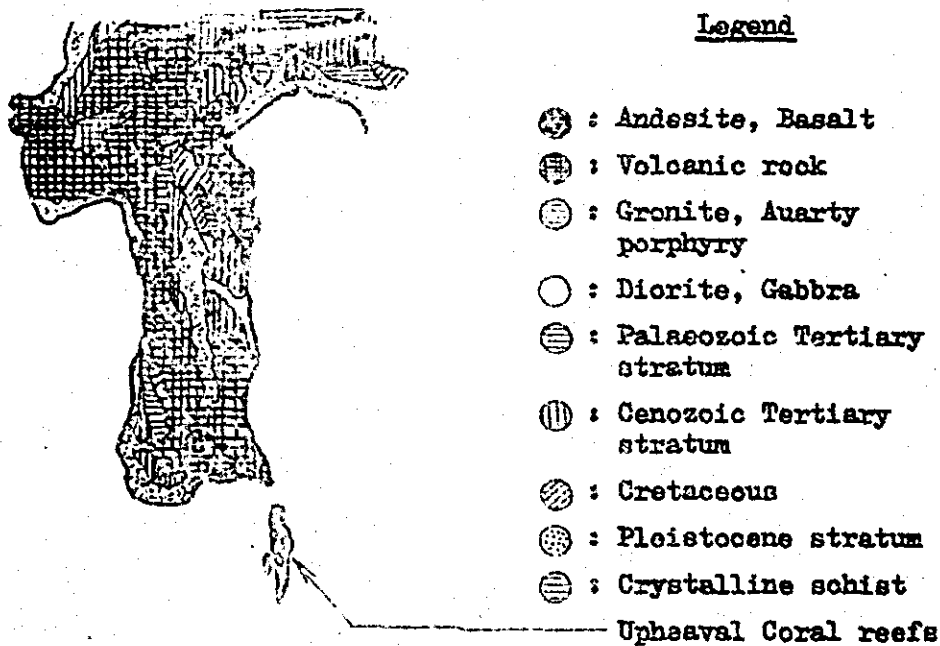
1,000 <

4.2. Geology, soil and topography.

4.2.1. Geological condition

The Sulawesi Island shows the complex of geological condition, because it belongs to the same volcanic chain of the Philippines. In the northern part of South Sulawesi, the volcanic activities had been done there and volcanic soil is discovered in some fertile soil area of agricultural production. And the area is covered by mountainous area with forest productions. The parent rock of southern coastal mountain ranges is mainly one kind of volcanic rock, contained many quantities of potassium. The plain areas are extended such as the island basin, like Kabupaten Bone in the southeast part of the Province. The soil fertility is less than that of Java island.

Fig. 4.6. Geological condition in South Sulawesi



Latimojong mountain range is located in the central part of the Province, which is covered by many eruptive rocks to the acidic rock. The Mount Lompobattang is an extinct volcano located in the corner of southern part, and this parent rock is the basicity andesite or basalt. The quaternary stratum covers the catchment area for Tempe Lake and Sidenreng Lake and along side the coastal line.

The outside of the quaternary stratum, especially the eastern side and inland area, are covered by the tertiary stratum. The mesozoic cretaceous are discovered in the eastern side of Maros, the northeast of Tempe Lake and others. On the other hand the crystalline schist, the granite and others are dotted in various parts. The coral reefs are shown on coastal side.

The geological land condition in South Sulawesi is expected to be normal in comparison with the other areas, because there are no new sending from volcanoes and the weathering of quaternary stratum is not so active.

#### 4.2.2. Soil condition

The northern part and the southern part of the Province are covered by the mountain areas, on the other hand Pinrang, Tempe and Bone plains are located spanning from the northwest side to the southeast side. In the central part, there are two lakes which is called the Tempe and the Sidenreng. Another vast plain is discovered in Kabupaten Luwu along the coast of the Bay of Bone.

According to the soil condition of the plains mentioned above, the alluvial soil spreads and discovered like gley soil on the part of plains area. The most part of these area are used as paddy field. The volcanic rock and aquaous rock are in the mountain area of the northern part, and consist of podsollic soil with some mediteran soil. In the area mentioned above, the shifting cultivation are carried out at present and some barren soil are discovered in those areas. The mountain area of the southern part are covered with volcanic rock and the soil condition of high elevation area is shown the andosol. In the hill side of the lowland, the soil condition namely latosol and grumusol is distributed on the coastal area. The mediteran soil covers the foot of the mountains.

In the central hill land side, the aqueous rock could be seen along the plains, outside of those area along the western coastal area are covered by the volcanic rock. Therefore, the soil condition is the podsol in the northern part of the central lowland, and the mediteran soil is seen on the southern part.

The phenomenon of leaching is discovered only a few parts and is only a very little amount, but comparatively the soil condition will be suitable for farming. There are a problem for the possibility of development because of the alkali soil except the area of grumusol or latosol on southern part.

#### 4.2.3. Topography

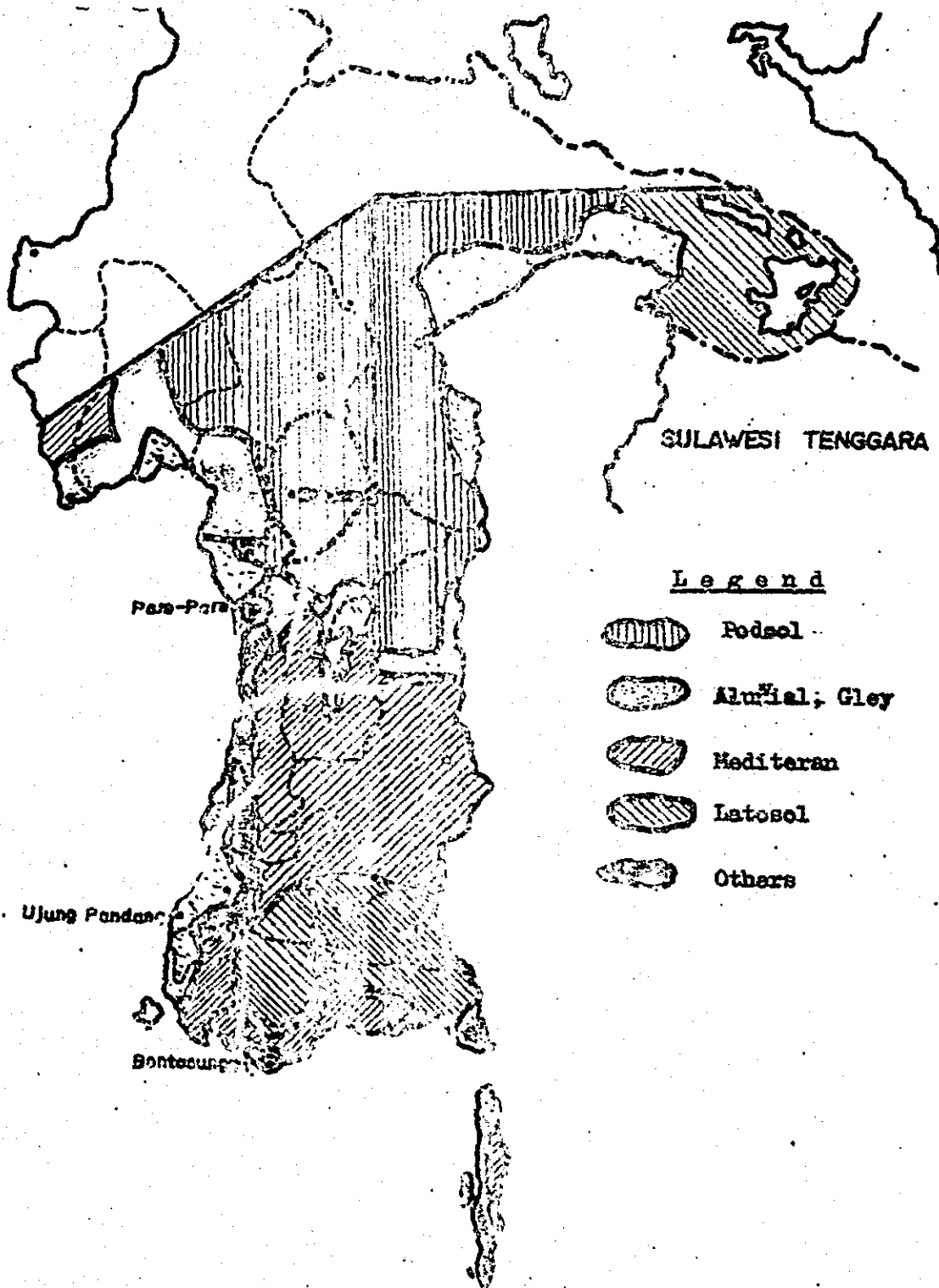
In South Sulawesi, many mountain ranges are found from north to south. The Mount Waoekara 3,127 m, Kasintunu 2,855 m, Kanboeno 2,950 m and other mounthens are predominant including the Molengraaf ranges in the northern part of the Province. The Quarles ranges are rising on the western part of Molengraaf ranges and is covered with the tableland of volcanic tuff. The Saddang River one of the most important river for irrigation, is flowing out from the Quarles or the Latimjong ranges. The Pennema ranges in the eastern part of the Molengraaf ranges, included the Mount Sidole 2,199 m, and Nokilalaki 3,311 m, in the topographical condition of a tableland of more than 1,500 m. above the sea level. In the direction from north to south, the Latimjong ranges shows the Mount Lompobattang 2,871 m. in the southern part of the Province.

The Tempe and Sidenreng Lakes are following into the Walanco River, and both lakes are located on the central inland basin. In South Sulawesi, there are vast mountain areas, so that the flats are not enough. Usually, the drift soil and sand of rivers are not so much and the slope of river bed shows a high angle, therefore water resources can be used from those rivers without improved irrigation facilities. Since the forests not covers so much in the mountain areas, adequate forest improvements such as the forest conservation works to prevent of erosion, the afforestation works for water conservation and others are necessary. The length of Saddang River is 175 km. and the Karone River is 195 km.



In this Province, there are four main lakes, i.e. Towuti 578 Km<sup>2</sup>, Matana 156 Km<sup>2</sup>, Tempe 46 Km<sup>2</sup> and Sidenreng 31 Km<sup>2</sup>. The Tempe Lake unites with the Sidenreng Lake during the wet season.

Fig. 4.7. Map of soil condition in South Sulawesi Province



#### 4.3. Water Resources and drainage

##### 4.3.1. Estimation of the total amount of the water

An integrated utilization of the observation systems is one of the most important basic factor for development of the water resources. The Agricultural Extension Service, the DPUPL of South Sulawesi and other agencies concerned have several observation facilities respectively. For instance, some agro-meteorological observatories, are now beginning to serve under the control of the Extension Service, and beside then the DPUPL of South Sulawesi have established a few all-round observatories, which used some equipments, such as the maximum & minimum thermometers, the wind vane & anemometers, the sunshine recorders, the hygrometers, the evaporation pans, the automatic rain gauges and so on.

The analysis of run-off of catchment area is most urgently necessary. The observatories have been established with the automatic type in some station. In addition, the 23 investigation check points were established with the automatic water level indicator for observation of water level on principal rivers. While those recorded data have been collected by DPUPL South Sulawesi. After several years, those data will be used for hydrological analysis not only to steady the present condition but also for investigation of development planning.

It is difficult to analyze the drift soil of because of shortage of the recording data at present, however, the estimation method by specific drift soil will be suitable for the present condition. Naturally the estimated specific drift soil is not always accurate because the basic data have not enough authenticity at present. The following specific drift soil was analyzed by the short term Expert Mr. R. Tatsumi in connection with the river natural current which come from about 100 - 300 km<sup>2</sup> of the catchment area. The available amount of water use will be able to estimated through the following table:

Table 4.3. Specific discharge in South Sulawesi

Item	Unit : m <sup>3</sup> /Sec./Km <sup>2</sup>	
	Long term of rainy season (Kab. Luwu)	Short term of rainy season (Kab. Jeneponto).
Rainy season's one	0.10 - 0.15	0.15 - 0.25
Dry season's one	0.025 - 0.035	0.010 - 0.015

4.3.2. Irrigation system and areas.

The irrigation systems are divided into three classes; i.e. the technical irrigation system, the semi technical irrigation system and the Desa village irrigation system. Each irrigation system may changing into the upper class, after carrying out some needed improvement works. The present situation of irrigation system are shown in the table 4.4.

Table 4.4. Irrigation System in South Sulawesi 1976

Block	Plan			Total	Potentiality		
	(1)	(2)	(3)		(1)	(2)	Total
I	52.768	39.591	69.813	162.392	42.392	29.265	71.657
II	74.537	5.024	11.437	91.018	61.537	5.024	66.561
LII	16.900	21.502	23.703	62.105	13.978	16.227	30.205
IV	-	65.565	26.261	91.826	-	26.672	26.672
V	9.000	3.728	12.455	25.183	9.000	3.728	12.728
Total:	153.205	135.410	143.699	432.304	126.907	80.916	207.823

Note : (1) : Technical irrigation systems.

(2) : Semi-technical irrigation system.

(3) : Desa irrigation system

Source : D.P.U.P. S.S.

The situation of irrigated paddy fields are made clear by Agricultural Extension Service deviding each irrigation irrigation system and rainfed by bloc (refer to table 4.5).

Table 4.5. Situation of Paddy Field in South Sulawesi(1975)

Bloc	Irrigated area			1+2+3	Rain fed	Total
	(1)	(2)	(3)		(4)	
I	16.302	10.529	40.237	67.068	78.239	145.307
	11.2 %	7.2 %	27.7 %	46.1 %	53.9 %	100 %
II	49.002	12.330	14.611	75.943	37.458	113.401
	43.2 %	10.9 %	12.9 %	67.0 %	33.0 %	100 %
III	6.880	5.705	19.070	31.655	132.492	164.147
	4.2 %	3.5 %	11.6 %	19.3 %	80.7 %	100 %
IV	1.305	1.565	37.782	40.652	22.468	63.120
	2.1 %	2.5 %	59.8 %	64.4 %	35.6 %	100 %
V	5.700	2.377	4.241	12.318	10.523	22.841
	25.0 %	10.4 %	18.6 %	54.0 %	46.0 %	100 %
Total	79.189	32.506	115.941	227.636	281.180	508.816
	15.6 %	6.4 %	22.8 %	44.8 %	55.2 %	100 %

Note : (1) : Technical irrigation system  
 (2) : Semi technical irrigation system  
 (3) : Village irrigation system  
 (4) : Rainfed

Source :

Bloc I : The irrigable area is estimated at about 46 % of the whole paddy fields, which means very important as the main production area of paddy. In the western coastal area, the irrigation farming were expanded by the irrigation facilities and the situation of the rice production have been established steady. On the other hand, in the southern coastal area, the amount of rainfall is not so much and the acreage of catchment area have not a wide range. Consequently the land improvement is necessary for both area.

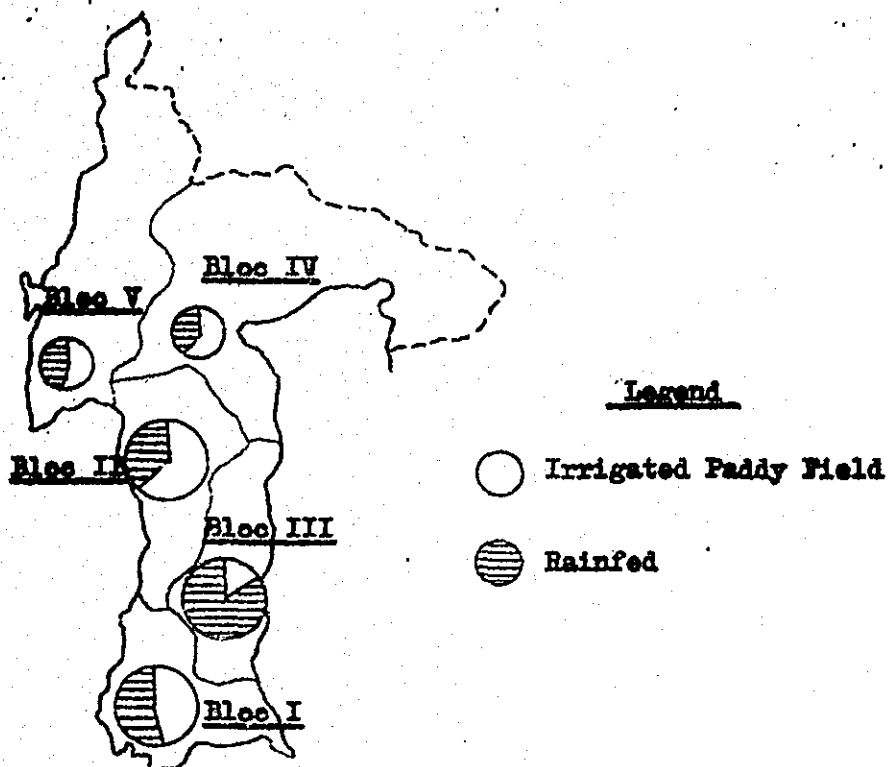
Bloc II : This bloc has given comparatively a normal rainfall condition, and is mainly paddy production area in Province. The irrigation facilities have been constructed and the irrigated area are estimated as about 67 % of the area of paddy field. In addition the systematic techniques of five crops per two year begin to extend in this bloc, the most basic reason expected to have been done was the development of irrigation farming with suitable facilities. If it is possible to invest on land improvement works, construction of branch canals, farm roads and land consolidation are necessary,

Bloc III : The rate of irrigable area has shown the lowest, but this bloc have the most widest acreage of paddy fields in South Sulawesi Province. Therefore, the total amount of paddy production fluctuate, because of drought damage caused by shortage of rainfall. At present the survey of Central South Sulawesi Water Resource Development Project has been carried out aiming at the affect for the stability of production.

Bloc IV : This bloc is located in the northeast part of hte Province, where are enough acreage of suitable area for irrigable area. At present the Luwa Project have been carried out by the cooperation of foreign country, it will have a good effect to expand the acreage for settlements. In the southern part of this bloc, the rate of irrigable area shows no small percentage because this part including the main production area for paddy, has brought the many efforts for land improvement.

Bloc V : There is enough catchment area compared with others, and the irrigable area is estimated for more than 50 % of all paddy fields. Truly, the many irrigation facilities has been constructed and on practical use according the profitable geographycal features.

**Fig. 4.8. Condition of irrigated area by Bloc in South Sulawesi Province**



**4.3.3. Availability of agricultural water**

The characteristics of rainfall condition in South Sulawesi is analyzed as follows:

- 1) The beginning period of the wet season is changeable every year,
- 2) the term of the wet season is fluctuating,
- 3) the duration of drought always happened during the wet season, and
- 4) the annual amount of precipitation is usually having a differences.

The rainfall condition mentioned above cause the fluctuation of paddy production because of the damage by drought. The water supply for the paddy field is one of the most important factors for success of the development of agriculture in South Sulawesi. In other words the water supply and expanding of irrigation area are necessary to improve the paddy cultivation in the rainy season, which covered the majority of all paddy fields. In the dry season, availability of water resources is prerequisite for paddy cultivation.

The effective way for water supply will be described as the following ideas :

1) The control of main rivers flow ; it is necessary to make effective use of the river discharge, because there are a lot of annual rainfall and flow of main rivers. The construction of dams are the most fundamental ideas which could keep enough reserved capacity for water supply. But this idea is still premature in the Province because the basic hydrological data is not enough at present.

2) The improvement of main works; it is better to increase the effective use of water by this idea, because the surface water must be used effectively. For instance, the construction of diversion weir is one of the most important way for prevention of invalid discharge.

3) The rehabilitation for existing facilities; almost of irrigation facilities had been constructed in the Dutch regime. Some of them are not keeping the good condition for water supply, because of lands slide on depression. Especially the improvement of canal is one of the most effective measures, and if possible it is desirable to carry out the rehabilitation for the main works. As a result, the various kinds of conveyance loss will be decreased and the irrigable area will be expanded. In case of "Desa irrigation system, the rehabilitation works are expected to carry out by DPUP South Sulawesi, like the "Sederhana Project" and others.

4) The water management; the water management is very significance for effective use of supplied irrigation water. At present, the effective use of river discharge is one of the general way to maintain the water supply, therefore the construction of simple main works will be necessary. On the other hand it is important to make a cut down of water losses in the driving channel, which is estimated as follows:

Water loss in main canal	:	5 - 7 %
Water loss in secondary canal	:	7 - 12 %
Water loss in tertiary canal	:	10 - 11 %
(for the system of repeating use of water)		
Total	:	about 22 - 30 %.



The unit duty of water estimated by DPU South Sulawesi is used for project finding. This data are classified with the scale of irrigable area, and it shows as follows :

	Scale of irrigable area	Unit duty of water
>	200 ha.	1.5 e/ha./Sec.
	200 - 300 ha.	1.4 e/ha./Sec.
	300 - 500 ha.	1.3 e/ha./Sec.
<	500 ha.	1.2 e/ha./Sec.

The improvement of irrigation facilities and water management is most important way to stabilize the irrigable area, and it will be available to be done by the farmers themselves.

#### 4.3.4. Drainage

The drainage in cultivated land is important as same as irrigation, because it is able to keep suitable soil moisture for crops. Mainly the drainage are carried out to help the suitable condition such as the surface water, ground water and soil water. In other words, it would not be able to separate the irrigation and drainage, however the drainage systems are not enough at present in South Sulawesi. Because of the supply of water under the gravity from plot to plot on some irrigation systems, in which water running out over the border, could be used for repeating irrigation system in the land area.

In case of extensive cultivation by using local varieties, there is not so much experienced damage under the drainage systems. This reason is why the development of drainage facilities are negative in comparison with irrigation. But drainage is necessary for the cultivation of new high yielding varieties with improved techniques. The lowland area of around Tempe Lake have been damage quite frequently by the inundation and the flood. In this case the normal growing are disturbed and can not be expected good production of paddy. On the other hand at some part of alluvium area, the glei horizon has been discovered under the top soil, thus the growing of rootlet is not enough.

Those phenomena mentioned above are necessity of the improvement of the drainage systems for agricultural development. It is not so easy to carry out this aspect at present however the drainage development also should taken into consideration as a series of the development of water utilization.

4.4. Availabilities of land use and land utilization in the future

4.4.1. Present condition of land use

The estimation of present condition of the land use is one of the most important aspects for the regional agricultural planning. The following items are estimated based on the statistical data by each agencies concerned. The estimated total acreage of the land use is about 6,293,000 ha. and the forest area covers more than 50 % and cultivated area by farming activities is about 30 % more of the total acreage.

Table 4.6. Present condition of land use in South Sulawesi (1976)

Items	Average (ha.)	Percent tage (%)	Authorized by the agencies concerned
Shifting cultivation area	258,000	4.1	Extension Serv.
Forest area	3,222,000	51.2	Forestry Serv.
Grassland	590,000	9.4	Animal Husbandry
Estate crops area	324,000	5.1	Agrarian Serv.
Rice field area	509,000	8.1	Extension Serv./ Agrarian Serv.
Swamp forest area	50,000	0.8	Forestry Serv.
Fish pond area	46,000	0.7	Fishery Serv.
Salt farm area	2,000	0.0	Fishery Serv.
Remaining area	707,000	11.3	Agrarian Serv.
Total:	6,293,000	100.0	Agrarian Serv./ Bappeda

The present land use for each bloc are estimated as in table 4.7. and the condition of each bloc as follows:

Bloc I There are many lands for cultivation of estate crops, upland crops and paddy. The shifting cultivation areas are the highest but there are only quite small acreage of the forest areas in this bloc.

Bloc II There are many paddy fields in the coastal side and it is the most important rice production area. On the other hand, vast grass land is located in the central part of this bloc.

Bloc III: In this bloc, the widest land is the paddy field, but irrigable areas are limited. In the inland area of this bloc, the vast grassland is seen.

Bloc IV: This bloc is widest bloc among the five bloc, and about 70 % of the bloc covers with forest areas. The cultivated land is scarcely limited, but the availability of the water resources development is very big.

Bloc V: Almost of the northern part of this bloc covers with forest area which has the possibilities for development. And the other part of this bloc, vast grasslands are found.

Table 4.1. Present condition of land use in South Sulawesi (1976)

Unit: ha. and %

Bloc	I	II	III	IV	V	Total
1. Shifting cultivation area	112,488 (11.4)	39,718 (4.9)	39,968 (4.1)	27,539 (1.8)	38,055 (2.7)	257,768 (4.1)
2. Forest area	264,380 (26.6)	283,800 (35.8)	259,209 (26.9)	1491,722 (69.7)	918,000 (66.0)	322,111 (51.2)
3. Grassland area	70,452 (7.1)	104,876 (13.0)	182,247 (18.9)	79,088 (3.7)	153,337 (11.0)	590,000 (9.6)
4. Estate crops area	99,821 (10.1)	35,455 (4.4)	65,801 (6.8)	65,915 (3.1)	57,447 (4.1)	324,439 (5.1)
5. Upland	190,716 (19.2)	81,968 (10.2)	129,249 (13.4)	120,236 (3.6)	62,539 (4.5)	584,708 (9.3)
6. Low land/newall	145,310 (14.7)	113,402 (14.1)	164,147 (17.0)	63,119 (3.0)	2,841 (1.6)	508,819 (8.1)
7. Swamp forest area	2,520 (0.3)	2,254 (0.3)	29,068 (3.0)	10,907 (0.5)	5,351 (0.4)	50,000 (0.8)
8. Fish pond area	19,614 (2.0)	8,595 (1.1)	11,486 (1.2)	3,128 (0.1)	3,531 (0.3)	46,354 (0.7)
9. Salt farm area	2,000 (0.2)	-	-	-	-	2,000 (0.0)
10. Remaining area	83,734 (8.4)	130,846 (16.2)	83,906 (8.7)	277,150 (13.0)	131,160 (9.4)	706,796 (11.3)
Total:	991,035 (100)	805,914 (100)	965,081 (100)	2138,704 (100)	1392,261 (100)	6292,995 (100)

Table 4.8. Estimation of land use by Kabupaten  
in South Sulawesi Province

No.	Kabupaten	Shifting cultivation	Forest	Crossland	Estate crops
<u>Bloc I</u>					
13.	U. Pandang				180
14.	Maros	8.513	24.528	1.559	7.383
15.	Pangkep	3.652	17.450	1.797	5.245
12.	Gowa	14.438	70.323	12.847	23.001
11.	Takalar	1.864	17.449	14.107	3.155
10.	Jeneponto	425	15.916	21.107	4.426
09.	Bantaeng		8.535	1.572	7.553
07.	Bulukumba	43.574	67.291	1.438	26.247
08.	Selayar	19.084	18.000	3.390	13.573
06.	Sinjai	20.938	22.938	12.655	9.058
	Total	112.488	264.380	70.452	99.821
<u>Bloc II</u>					
16.	Barru	6.561	89.385		4.006
17.	Pare-Pare		4.300		971
20.	Pinrang	5.694	63.640	19.978	10.153
18.	Sidrap	13.469	71.145	50.622	13.944
19.	Enrekang	13.994	60.130	34.276	6.381
	Total	39.718	288.800	104.876	35.455
<u>Bloc III</u>					
05.	Bone	36.286	162.995	95.522	34.394
04.	Wajo	3.682	47.214	80.473	16.712
03.	Soppeng		47.000	6.252	14.695
	Total	39.968	259.209	182.247	65.801
<u>Bloc IV</u>					
02.	Tator	9.934	154.595	48.545	5.801
01.	Luwu	17.605	1.337.127	30.543	60.114
	Total	27.537	1.491.722	79.088	65.915
<u>Bloc V</u>					
21.	Polmas	29.605	248.000	48.072	19.068
22.	Majene	2.636	70.000	58.883	7.183
23.	Mamuju	5.814	600.000	46.382	31.196
	Total	38.055	918.000	153.337	59.447
	G. Total	257.468	3.222.111	590.000	324.439

Table 4.8. Estimation of land use by Kabupaten in South Sulawesi Province (continued)

No.	Upland	Paddy Field	Marsh	Fish pond	Brackish w/ pond	others	Total
<u>Bloc I</u>							
13.	1,111	3,956	99	1,479	-	4,742	11,587
14.	16,170	21,699	76	4,356	-	5,609	89,893
15.	14,591	20,873	200	5,228	600	11,852	81,488
12.	46,565	30,223	220	235	-	13,910	211,762
11.	9,208	16,123	468	2,025	400	4,274	71,073
10.	26,527	13,743	163	1,861	1,000	12,770	97,938
09.	18,050	5,015	-	77	-	3,297	44,099
07.	46,131	22,371	355	3,782	-	15,398	226,537
08.	1,146	799	875	58	-	1,286	63,191
06.	11,217	10,508	64	493	-	5,596	93,467
T.	190,716	145,310	2,520	19,614	5,000	83,734	791,035
<u>Bloc II</u>							
16.	7,469	11,482	374	1,964	-	22,320	143,761
17.	1,527	879	89	33	-	3,278	11,077
20.	49,572	46,715	1,587	6,479	-	33,287	237,305
18.	12,528	45,126	204	37	-	35,942	243,017
19.	10,872	9,000	-	82	-	36,019	170,754
T.	81,968	113,402	2,259	8,595	-	130,846	805,914
<u>Bloc III</u>							
05.	46,085	74,166	7,932	4,885	-	50,497	512,762
04.	48,148	69,288	21,136	6,585	-	18,599	310,837
03.	35,016	21,693	-	16	-	14,810	141,482
T.	129,249	164,147	29,068	11,486	-	83,906	965,081
<u>Bloc IV</u>							
02.	91,429	17,801	-	36	-	176,769	504,910
01.	28,807	45,318	10,807	3,092	-	100,381	1,633,794
T.	120,236	63,119	10,807	3,128	-	277,150	2,138,704
<u>Bloc V</u>							
21.	37,559	20,225	1,175	2,820	-	77,253	483,777
22.	12,654	1,135	147	646	-	9,904	163,188
23.	12,326	1,481	4,029	65	-	44,003	745,296
T.	62,539	22,891	5,351	3,531	-	131,160	1,392,261
G.T.	584,708	508,319	50,000	46,354	2,000	706,796	6,292,995

Source : Agrarian Service, Sulsel and other agencies concerned.

#### 4.4.2. Land utilization in the future

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

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

- 1) To collect the standard maps from authorities concerned,
- 2) to prepare the basic maps based on the natural conditions mentioned above,
- 3) to examine the each item by each commodity using table 6.9.,
- 4) to make group using table 4.10.

According to the classification method for paddy field, the condition of water resources is not including as the item in the standard mentioned above the working plan in D.P.U.P. South Sulawesi is expected as the more realistic data instead of the hydrologic analysis at present, because the effective observation net works have been systematized quite recently in this Province. This suggestion was proposed by Mr. R. Tatumai, a short term expert for water resources. In the following table 4.11. future water resources development has been estimated based on the discussion with Ir. M. Jusuf Udding, staff of D.P.U. South Sulawesi to result of this study, the Gadu (dry season paddy) will be available about 58 % of the Rendengan (rainy season paddy) cultivation area as the target.

Table 4.9. Land/Soil Utilization Standard (A) Soil Type

Soil Type / Commodity	Aluvial	Gley	Litosol	Regosol	Grumusol	Ransina	Andosol	Mediteran	Latosol	Lateritik	Podsolik
Seasonal crops:											
Paddy	0	0	X	Δ	0	X	Δ	Δ	Δ	X	Δ
Paddy Gogo	0	X	Δ	Δ	Δ	Δ	0	Δ	Δ	X	Δ
Corn	0	X	Δ	Δ	Δ	Δ	0	Δ	Δ	X	Δ
Beans	0	X	Δ	Δ	X	Δ	0	Δ	Δ	X	Δ
Cassava	0	X	X	Δ	X	X	0	Δ	Δ	Δ	0
Estate crops: (Sugar cane, Tobacco etc.)	0	Δ	X	Δ	Δ	Δ	Δ	Δ	Δ	X	Δ
Vegetables:	0	Δ	X	Δ	Δ	X	0	Δ	Δ	X	Δ
Perennial crops:											
Coconut tree	0	X	X	0	0	X	Δ	Δ	Δ	X	Δ
Citrus fruit	Δ	X	Δ	Δ	Δ	X	Δ	0	Δ	X	Δ
Clove	Δ	X	X	X	X	X	Δ	0	0	X	0
Coffee	Δ	X	X	Δ	Δ	X	Δ	0	Δ	Δ	0

Note: 0: good for use; Δ: suite for use; X: not exactly to be use.



Table 4.10. Land/Soil Utilization Standard (B) Soil Condition

Item	Altitude (m.) 500-1,000	Gradient (%) 3-40	Soil condition * Loamy. Medium Sandy	Soil fertility** Fertile Medium	Soil acidity*** Alkali
Commodity	1,000	40	Loamy. Medium Sandy	Fertile Medium	Alkali
Seasonal crops:					
Rendengan	0	Δ	0	0	Δ
Paddy Gogo	0	Δ	0	0	Δ
Corn	0	Δ	0	0	Δ
Beans	0	Δ	0	0	Δ
Tuber crops	0	Δ	0	0	Δ
Estate crops:					
Sugar cane etc.	0	Δ	0	0	Δ
Vegetables:	0	Δ	0	0	Δ
Perennial crops:					
Coconut tree	0	Δ	0	0	Δ
Citrus fruit	Δ	0	0	0	Δ
Clove	Δ	0	0	0	Δ
Coffee	0	0	0	0	Δ

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

\*\*\*) Fertile: no deficiency of 3 main elements/Medium: less one of the 3 main elements/

Pour: deficiency of more the 2 elements.

Alkali: PH-7.5 /Medium: PH 7.5 - 6.0/Little acid: PH 6.0 - 4.5/Acid: PH 4.5.

Table 4.11. Indices for land/soil utilization

Best:	All "O" - "O" 4 + "Δ" 2
Beter:	"O" 3 + "Δ" 3 - "O" 1 + "Δ" 5
Good:	All "Δ" - "O" 2 + "Δ" 3 + "X" 1
Less Good:	"X" 2 >

Note: 1) Less good: May not to be used  
 2) Good: Have to consider for the center effects against.

5. Socio-economic features

5.1. Population and food stuffs

5.1.1. Population movement and growth

1) Density per square kilometer.

The province having the largest number of population in D zone of Indonesia is that of South Sulawesi Province, and that with the smallest number of population is Southeast Sulawesi Province. However, the most densely populated province is the West Nusa Tenggara Province and the most scarcely populated one is the Irian Jaya Province (see table 5.1.).

2) Dependency ratio.

On the table 5.2. the dependency ratio for South Sulawesi in 1971 was 0.87 and it estimated to become 0.90 in 1986. This means that the population belonging to the productive ages is more than that belonging to the not-productive-yet ages plus that of the not-productive-any-longers ages. What is referred to the productive-aged population is the people aging from 15 to 64 years. The age under 15 years is considered to be not productive yet, while that above 65 years is considered to be not productive any longer. The dependency ratio for the D zone is not able to be included within in this Report because no data is available (chiefly the data on the population's structure of age).

3) The literacy rate.

The literacy rate, both of the Latin language and of other dialects, is the highest in Kotamadya Ujung Pandang and Pare-Pare.

This may be caused among others: by the better educational facilities, the kinds of jobs and the influences of environment. The Kabupaten's where the largest number of illiteracy occurs are those of Takalar and Maros, which are relatively close to the Ujung Pandang (see table 5.3.).

4) Population growth.

The growth rate of the population of South Sulawesi Province from 1971 to 1976 is averagely 1.6 %, the lowest rate being in the periods 1972-1973 and 1973-1974, on the contrary there has been a puzzling increase of 4.271 % during the period of 1975-1976.

The reason for this occurrence is as yet unknown (see table 5.4.). For the D zone, data are only found the years 1972-1973 so that it is difficult to base an estimation of rate thereon.

5) Annual outflow of population from South Sulawesi Province.

The data concerning the number of population of South Sulawesi Province flowing in and out of the province is hard to be accumulated ; this is due to the fact that they come and go through many harbours, both by trade ships and by sailing boats (usually the Penisi boats) of their own. Thus a record is impossible, except for the ones coming and going through the harbour of Ujung Pandang and Pare-Pare. The records of the inflow and outflow of people through the harbour of Ujung Pandang and Pare-Pare can be seen in table 5.5. However, according to the estimation made by the Team of population from South Sulawesi Province is about 58,000.

6) Estimation of the population in the future.

Future population estimated by the Cohort Method is shown on table 5.6. and figure 5.1. Because of the outflow of population in young age groups, 20 - 35 years old population is rather few and male is tremendously few in these age groups. This tendency will be a cause of difficulties on labor supply for the intensive agricultural development in the future.

5.1.2. Supply and demand of food stuffs

1) Pressure of population on the cultivated area of South Sulawesi Province.

The number of population in cultivated area is 4,239,259 in 1971, consisting of 2,055,567 male and 2,183,687 female. Although there are more female than male, very few female are working in the agricultural field, i.e. 8.40 %, while the percentage of male working in this field is 73.53 % (see table 5.7.). The population working in the agricultural field are mostly at the age level of 45 - 50 years, consisting of 84 % male and 9 % female. The relation between the number of population in cultivated area and the acreage of agricultural land is :

$$\frac{1,351,293}{4,239,259} = 0.32 \text{ ha./person.}$$

- 2) Production per person by commodity in South Sulawesi Province in 1976.

The supply of rice for South Sulawesi Province seems still adequate at the present time (see table 5.8.), i.e. 168 kg. per person a year, while the normal need is only 116.2 kg. per person a year. Compared to the normal need, the other food material requirements show a tendency of deficiency.

- 3) Estimation of food stuffs demand.

Future demands of food stuffs will be able to be estimated based on the future population projection and the average requirement for normal health. According to the result of population estimation by the Cohort Method, it will reach 6,186,054 persons in South Sulawesi Province in 1981. The average per capita energy intake is clarified by the Provincial Office of Ministry of Health (see table 5.9.).

The result of the estimation by commodity in 1981 (see table 5.10.) shows that the increase of yield per ha and/or expansion of cultivated area are necessary to meet the demand of increased population even in the same level of energy intake as at present, for instance, as far as concerning the rice production for self-sufficiency in South Sulawesi Province will be available even in 1981. However, inter-island insular shipment for food deficit areas will not be able to maintain as it is.

The expansion of yield and area are quite essential from the point of view of national economy and now to accomplish the responsibility of South Sulawesi Province as a rice bowl in D zone should be examined in the planning for the regional agricultural development.

In addition to that, cassava, green bean and soy bean are not enough to meet the self-sufficiency in the Province, the increment of the products should be studied in the step of the planning. At the same time, the demands of meats estimated are far beyond the available supply at present, especially goat meat is likely very short but it is consumable alternatively by chicken meat.

Thus particular consideration should be taken into the planning for development of livestock husbandry and grassland improvement.

Fishery products also will not be enough in 1981 for self consumption in South Sulawesi Province. There more expansion of fishery product facilities and infrastructure should be studies in the stage of the planning.

Table 5.1. Density of the provinces in D zone (1971 & 1981)

No.	Province	Population *		Areaage (km <sup>2</sup> )	
		1971	1981	Geografic	Agraris
1.	North Sulawesi	1,718,155	2,188,134	19,023	3,518
2.	Central Sulawesi	913,662	1,308,529	69,726	2,832
3.	South Sulawesi	5,179,911	6,186,054	72,761	7,375
4.	South East Sula wesi	714,120	936,028	27,686	1,511
5.	West Nusa Tenggara	2,202,213	2,851,068	20,177	2,892
6.	East Nusa Tenggara	2,294,945	2,971,481	47,876	6,530
7.	M a l u k u	1,088,945	1,409,997	74,505	2,599
8.	Irian Jaya	923,440	1,196,361	421,981	-
	T o t a l	15,035,391	19,047,652	753,735	27,257

No.	Province	Density (Persons/Km <sup>2</sup> )			
		Geografic		Agraris	
		1971	1981	1971	1981
1.	North Sulawesi	90,319	115,026	488,389	621,982
2.	Central Sulawesi	13,103	18,767	322,620	462,051
3.	South Sulawesi	70,119	85,02	702,361	838,787
4.	Southeast Sulawe si	33,809	33,763	472,614	619,476
5.	West Nusa Tenggara	109,144	141,302	761,484	985,046
6.	East Nusatenggara	47,935	62,066	351,446	455,050
7.	M a l u k u	14,615	18,924	418,986	542,515
8.	Irian Jaya	2,188	2,835	-	-

Note : \* Excluded Irian Jaya, \*\* Self analysis

Remarks : a. Georafic Density =  $\frac{\text{Total Population}}{\text{Total Area}}$

b. Agraris Density =  $\frac{\text{Total Population}}{\text{Agricultural Land Area}}$

Source : From No. 1 to No. 4 : Intern Report of SRDS, and from No.5 to No.8 : Survey Agro-ekonomi, Inventarisasi Data, Survey Proyek Pembinaan Pembangunan Pertanian Regional, Wilayah Pembangunan Utama - D, 1976, page 3.7 - 3, and page 3.7-5

Table 5.2. Dependency Ratio of South Sulawesi

No.	Year	(a) Unproductive Population ( 0 - 14 )	(b) Out numbered Productive Pop. ( 65 + )	(c) Productive Population ( 15 - 64 )	Dependency Ratio $\frac{(a+b)}{c}$
1.	1971	2,283,376	130,662	2,765,873	0.87
2.	1976	2,490,555	142,570	3,021,677	0.87
3.	1981	2,729,158	155,609	3,301,287	0.87
4.	1986	3,016,473	169,854	3,535,756	0.90

Remarks : 1. Dependency Ratio is meaned ;

Number of unproductive Population + Number of outnumbered Productive  
Population divided with the number of Productive Population.

2. Dependency Ratio of D Zone, no calculated, become no data  
(Especially Age Group data ).

Source : A. From No. 1 to No. 2 : Statistic office South Sulawesi Province.

B. From No. 3 to No. 4 : Self analysis by Cohat method.



Table 5.3. Literary Population (10 years more) in South Sulawesi Province by Kabupaten (1971)

No.	Kabupaten / Kotamadya	Total Population	L i t e r a c y	
			Indonesian	%
		1	2	3
23.	Mamuju	47,611	24,552	51,568
01.	L u w u	218,621	134,298	61,430
22.	Majene	53,550	30,206	56,407
21.	Polembas	203,251	114,939	56,550
02.	Tator	195,560	100,323	51,300
19.	Enrekang	79,321	35,936	45,305
18.	Sidrap	122,523	51,328	41,893
04.	W a j o	227,314	100,317	44,131
03.	Soppeng	161,166	77,508	48,092
16.	B a r r u	91,935	50,402	54,824
15.	Pangkep	135,209	58,419	43,206
14.	Makos	127,428	40,820	32,034
12.	G d w a	255,167	121,558	47,639
06.	Sinjai	96,314	32,240	33,474
07.	Bulukumba	170,429	83,464	48,973
10.	Jeneponto	128,035	50,701	39,599
09.	Bantaeng	58,492	24,369	41,662
11.	Takalar	104,325	35,882	34,394
08.	Selayar	66,817	27,975	41,868
13.	Ujung Pandang	305,564	229,928	75,247
17.	Pate-Pare	48,510	33,287	68,619
	Tbtal	3,457,073	1,682,637	48,762

(continue)

Source : Biro Pusat Statistik, Sensus Penduduk 1971  
Seri E No.23 page 60.

Table 5.3. (continued)

No.	L i t e r a c y				
	Arabic	Chinese	Others	Total	%
	4	5	6	7	8
23.	161	12	188	24,913	52.326
01.	1,566	0	1,242	137,106	62.714
22.	639	0	830	31,675	59.150
21.	2,135	0	988	118,062	58.087
02.	6	36	849	101,214	51.756
20.	2,112	105	605	76,654	45.872
19.	510	0	307	36,753	46.335
18.	272	0	2,238	53,838	43.941
04.	315	45	965	101,642	47.714
03.	646	20	1,436	79,610	49.396
16.	95	0	271	50,768	55.222
15.	245	10	5,297	63,971	47.313
05.	1,242	45	22,557	174,197	44.345
14.	2,115	5	5,210	48,150	37.786
12.	93	119	1,276	123,046	48.222
06.	536	5	4,650	37,431	38.864
07.	1,722	5	4,231	89,422	52.469
10.	1,141	0	1,419	53,333	41.655
09.	787	0	579	25,735	43.997
11.	1,418	0	1,287	38,587	36.987
08.	62	295	3,065	31,397	46.990
13.	630	2,679	4,260	237,497	77.724
17.	132	165	322	33,906	60.895
<b>Total</b>	<b>18,580</b>	<b>3,546</b>	<b>64,144</b>	<b>1,768,907</b>	<b>51.168</b>

( continue )

Table 5.3. (Continued)

No.	Illiteracy	
	Total	o/o
	9	10
23.	22,698	47.674
01.	81,515	37.286
22.	21,875	40.850
21.	85,189	41.913
02.	94,346	48.244
20.	90,451	54.128
19.	42,568	53.665
18.	68,685	56.059
04.	125,672	55.286
03.	81,556	50.604
16.	41,167	44.778
15.	71,238	52.687
05.	218,629	55.655
14.	79,278	62.214
12.	132,121	51.778
06.	58,883	61.136
07.	81,007	47.531
10.	74,708	58.345
09.	42,757	56.003
11.	65,738	63.013
08.	35,420	53.010
13.	68,067	22.276
17.	14,604	30.105
Total	1,688,166	46.832

(Continued)

Table 5.4. Population growth in South Sulawesi and D Zone of Indonesia

Year	Total population (Persons)	Population Increase *	
		(Persons)	(%)
1971	5,179,911	112,174	2.166
1972	5,292,085		
1973	5,296,191	4,106	0.077
1974	5,339,320	43,129	0.814
1975	5,423,188	83,868	1.571
1976	5,654,802	231,614	4.271

Remark: \* Self Analysis

Source: Kantor Sensus & Statistik Prop. Sul-Sel (after analysis)

And Lowerer in 1972 and 1973 period. In this period (1972 - 1973), in South Sulawesi there are 8 Kabupatens to experience decreased population.

"D" Zone:

Province	Total (1971) Population	Estimated (1981) Population
1. North Sulawesi	1,718,155	2,188,134
2. Central Sulawesi	913,662	1,308,529
3. South Sulawesi	5,179,911	6,186,054
4. South East Sulawesi	714,120	936,028
5. West Nusatenggara	2,202,213	2,851,068
6. East Nusatenggara	2,294,945	2,971,481
7. Maluku	1,088,945	1,409,997
8. Irian Jaya	923,440	1,196,361
T o t a l	15,035,391	19,047,652

Source: a) From 1 to 4 Sulawesi Regional Development Study/ Intern Report.

b) From 5 to 8 Survey Agro Ekonomi, wilayah Pembangunan utama - D 1976, page 37 - 3

Table 5.5. Population Drain from South Sulawesi Province to pass through Ujung Pandang and Pare-Pare Harbour (1967 - 1976)

Year	Ujung Pandang		±	Pare-Pare		Total
	in	out		in	out	
1967	34.114	30.415	3.699	645	1.967	- 1.322
1968	32.341	30.791	1.550	1.654	3.719	- 2.065
1969	36.792	32.685	4.107	884	4.225	- 3.341
1970	28.363	33.160	- 4.797	934	6.539	- 5.605
1971	33.145	39.285	- 6.140	2.872	8.178	- 5.306
1972	32.995	44.860	-11.865	3.872	8.005	- 4.133
1973	30.511	44.233	-13.722	4.547	11.008	- 6.461
1974	25.968	47.505	-21.537	3.428	13.293	- 9.865
1975	23.721	27.294	- 3.573	11.045	17.924	- 6.879
1976	20.931	23.769	- 2.838	15.887	23.889	- 8.002
Total	298.881	353.997	-55.116	45.768	98.747	-52.979

ES

Source: Statistic of Harbour Office, Ujung Pandang and Pare-Pare.

Table 5.6. Estimation of population in 1981 and 1986 by sex and by age in South Sulawesi

Unit: persons

Age Group	Population (Male)			
	1971	1976	1981	1986
0 - 4	444,086	477,482	529,111	585,639
5 - 9	440,656	473,794	505,179	564,561
10 - 14	293,534	315,608	339,237	364,739
15 - 19	250,079	268,885	289,097	310,741
20 - 24	160,565	172,639	185,531	199,477
25 - 29	186,923	200,980	216,144	232,285
30 - 34	145,059	155,967	167,617	180,264
35 - 39	170,903	183,755	197,610	212,371
40 - 44	111,696	120,095	129,180	138,920
45 - 49	94,003	101,072	108,686	116,908
50 - 54	69,989	75,260	80,959	87,057
55 - 59	42,788	46,005	49,446	53,190
60 - 64	44,389	47,727	51,296	55,132
65 - 69	24,756	26,617	28,636	30,778
70 - 74	22,993	24,722	26,590	28,607
75 +	17,995	19,348	20,801	22,368
<b>T o t a l</b>	<b>2,520,414</b>	<b>2,709,956</b>	<b>2,924,756</b>	<b>3,111,037</b>

Note: 1. Population in 1971 from population census in 1971  
(SERI E No. 23 page 7)

2. The total Population in 1976 from Sulawesi dalam angka 1976

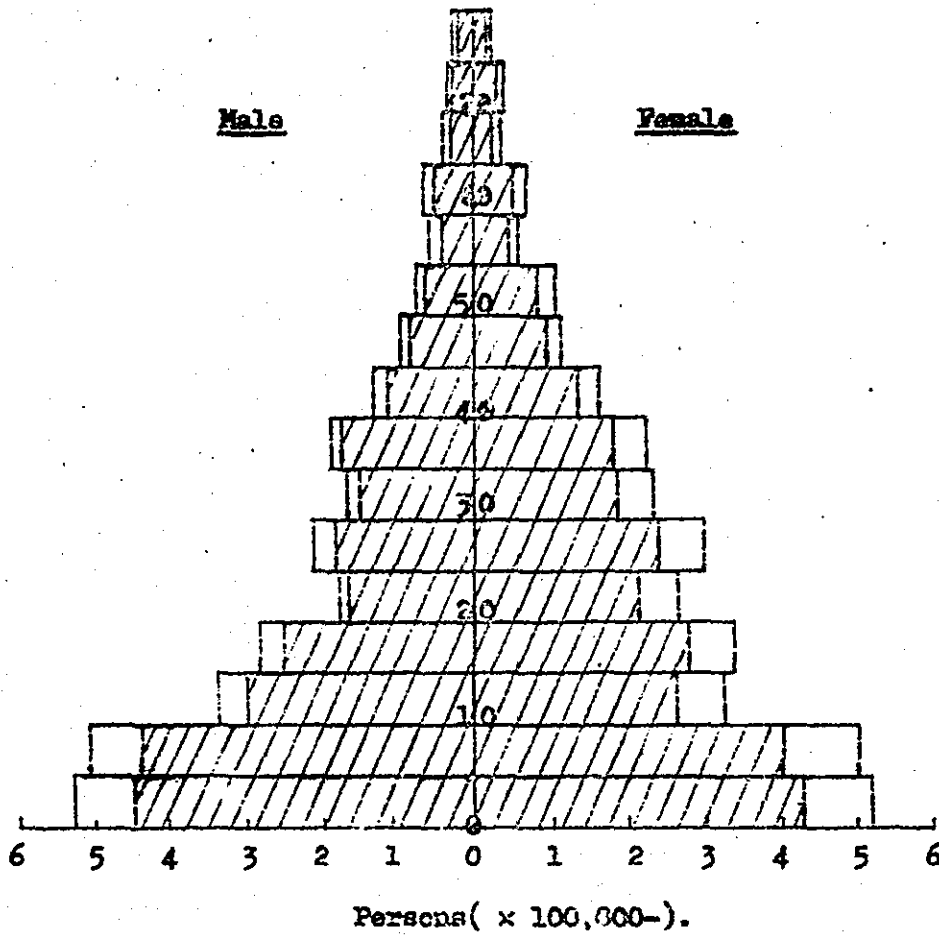
3. Population by Age Group in 1976 Confrom by the precentage of the 1971 population census.

(continue)

Table 5.6. Estimation of population in 1981 and 1986 by sex  
and by age in South Sulawesi  
 (continued)

Age Group	Population (Female)			
	1971	1976	1981	1986
0 - 4	428.674	474.668	526.113	582.319
5 - 9	409.422	453.351	502.199	556.627
10 - 14	267.004	295.652	327.319	362.588
15 - 19	271.592	300.732	332.904	368.561
20 - 24	216.876	240.146	265.847	294.287
25 - 29	239.322	265.000	293.458	324.465
30 - 34	185.248	205.124	227.105	251.494
35 - 39	181.573	201.055	222.560	246.409
40 - 44	128.029	141.766	157.024	173.819
45 - 49	93.266	103.273	114.405	126.718
50 - 54	83.419	92.369	102.240	113.261
55 - 59	40.672	45.036	49.879	55.210
60 - 64	49.482	54.791	60.663	67.187
65 - 69	23.250	25.745	28.491	31.545
70 - 74	24.023	26.600	29.452	32.594
75 +	17.645	19.538	21.639	23.962
T o t a l	2.659.497	2.944.846	3.261.298	3.611.046

**Fig. 5.1. Composition of population by sex and age in South Sulawesi Province (1971 & 1981)**



**Legend:**  Real number in 1971.  
 Estimated number in 1981.



Table 5.7. Pressure of Population on the Cultivated Area in South Sulawesi Province (1971)

Age Group	Population in Cultivated Area		Agricultural Labor				%
	Male	Female	Persons		Male	Female	
			Male	Female			
0 - 4	365,417	355,802	98,451	15,355	50.98	7.18	
5 - 9	370,007	341,942	84,617	11,289	71.03	6.58	
10 - 14	238,173	213,498	118,697	19,687	73.17	7.48	
15 - 19	193,108	213,766	92,540	13,306	78.24	8.67	
20 - 24	119,121	171,584	114,544	13,116	79.82	8.71	
25 - 29	151,845	196,318	74,089	9,587	82.57	9.05	
30 - 34	118,280	153,495	64,532	7,628	84.31	9.78	
35 - 39	143,625	150,528	49,317	6,459	84.05	9.05	
40 - 44	89,732	105,984	28,664	2,470	79.88	7.23	
45 - 49	76,540	78,009	28,169	3,410	73.65	8.06	
50 - 54	58,678	71,335					
55 - 59	35,886	34,153					
60 - 64	38,246	42,290					
65 - 69	21,147	19,539					
70 - 74	20,361	20,743					
75 +	15,401	14,700					
Total	2,055,567	2,183,687	753,720	102,307	73.53	8.40	

Note: 1) Number of Productive Population are: Male: 1,025,061 and Female: 1,217,462

\*) Ratio Agricultural Labor and Productive population in percentage \*\*) Self analysis.

Source: B.P.S. Sensus Penduduk 1971 Seri E No. 23

Table 5.8. Production per-capita by Commodity (1976)

No.	Commodity	Production (ton)	Production / capita
1.	R i c e	954,055	0.168
2.	C o r n	115,465	0.0204189
3.	Cassave	289,121	0.0369811
4.	Sweet Potato	35,116	0.0062099
5.	Peanut	13,719	0.002426
6.	Green gram	10,924	0.0019318
7.	Soybean	4,534	0.0008017
8.	Potato	3,388	0.0005991
9.	Cabbage	5,072	0.0008969
10.	Onion	2,753	0.0004868
11.	Coconut	67,862	0.0120007
12.	Coffee	5,690	0.0010062
13.	Kapok	2,176	0.0003848
14.	Pepper	129	0.0000228
15.	Clove	2,986	0.000528
16.	Nutmeg	1,152	0.0002037
17.	Tobacco	1,265	0.0002237
18.	See fish	106,238	0.0187872
19.	Inland fish	126,205	0.0223181
20.	C o w	536,975 *	0.0949591
21.	Buffalo	391,084 *	0.0691596
22.	H o r s e	176,568 *	0.0308707
23.	Goat + Sheep	360,115 *	0.063683

Note: \*) Head.-

Total population in South Sulawesi

1967 : 5,654,802

Table 5.9. Measuring average of population consumption by calory and protein per capita per day in South Sulawesi in 1975

No.	Name of stuffs	Average consumption (g.)	Calory (cal.)	Protein (g.)
1.	Rice	318.33	1,145.98	21.64
2.	Corn	56.38	202.96	4.84
3.	Cassave	121.47	177.34	1.45
4.	Sweet potato	4.32	5.31	0.07
5.	Peanut	12.63	56.83	3.15
6.	Green gram	4.84	16.64	1.16
7.	Soy bean	3.80	13.07	0.91
8.	Fresh fish	61.72	69.74	12.19
9.	Beef	4.24	8.77	0.79
10.	Buffalo meat	9.72	8.16	1.81
11.	Goat meat	1.89	2.77	0.29
12.	Eggs	8.05	13.04	1.02
	T o t a l	607.39	1,720.61	49.32

Source: Seksi Gizi hasil analisa data Sulawesi Selatan dalam angka th. 1975

Table 5.10 Estimation of food stuffs demand in South Sulawesi Province  
(1981)

Commodity	Per capita per day (kg)	Per capita per year (kg)	Total demand (ton)	110 % (ton)	Yield rate %	Product 110 % (ton)
1. Rice	318.33	116.2	718.819	790.701	52	1.520.579
2. Corn	56.38	20.6	127.433	140.176	93	150.727
3. Cassava	121.47	44.3	274.042	301.446	80	376.808
4. Sweet potato	4.32	1.6	9.898	10.888	80	13.610
5. Peanut	12.63	4.6	28.456	31.302	60	52.170
6. Green gram	4.84	1.8	11.135	12.249	67	18.282
7. Soy bean	3.80	1.4	8.660	9.526	34	28.018
8. Fresh fish	61.72	22.5	139.186	153.105	61	250.992
9. Beef	4.24	1.5	9.279	10.207	51	20.014
10. Buffalo meat	9.72	3.5	21.651	23.816	45	52.924
11. Goat meat	1.89	0.7	4.330	4.763	50	9.526
12. Egg	8.05	2.9	17.940	19.734	100	19.734
Total	1.569.31	221.6	1.370.829	1.507.913		2.513.384

- Note: 1) Population in 1981 is 6.186.054 (estimated by Cohort method)  
 2) Consumption average calory 1.720.61 and protein 49.32 gr per capita per day.  
 3) Loss of marketing and conveyance loss from farm give to consumer.  
 4) Slaughtering ratio = 10 % (Source: laporan tahunan Inspektorat Dinas Peternakan Dati I Sulsel.

Table 5.10. Estimation of food stuffs demand in South Sulawesi Province (1981)

(continued)

Commodity	Yield per Unit (ton/ha.)	Acreage needed (ha.)	unit (ha.)	Acreage (unit) average in 8 year (ha.)	+ -
1. Rice	2.709	561.306		563.940	2.634
2. Corn	0.690	218.445		245.430	26.985
3. Cassava	6.934	54.342		39.582	- 14.760
4. Sweet potato	4.349	3.129		11.854	8.725
5. Peanut	0.560	29.215		30.441	1.226
6. Green gram	0.393	46.519		33.909	- 12.610
7. Soy bean	0.527	53.165		8.011	- 45.154
8. Fresh fish	-	250.992 ton		192.188 ton	- 58.804
9. Beef	250 kg	80.056 head		37.030 head	- 43.026
10. Buffalo meat	350	151.211		35.430	-115.701
11. Goat meat	17	560.353		25.030	-535.525
12. Egg	20 eggs/kg	394.600.000		-	-
	75 eggs/hen	5.262.400		7.380.862	+2.118.462

Source: a. Yield rate - from no.1 to no.7 from Dinas Pertanian Rakyat Prop. Sulsel.  
 - no.8 from Dinas Perikanan Prop. Sulsel.  
 - no.9, 10, 11 from Majallah Pertanian (1976/1977 No. I/XXIV page 4)

b. Yield per unit  
 - from no.1 to no.7 Dinas Pertanian Rakyat Prop. Sulsel (average 1968 - 1974)  
 - from no.9 to no.12 Dinas Peternakan Prop. Sulsel (average 1968 - 1974)

5.2. Land holding

Number of farm household and farms

According to the Agricultural Census 1973, the total number of farmshousehold is 952,873 (source: a data from Agricultural Extension Service, Soutj Sulawesi) with an acreage of 843,534 ha.

In comparison with agricultural farms <sup>1)</sup> and estates farms <sup>1)</sup>, there is a large difference as total number 648,707 for agricultural farms with an acreage of 737,455 ha. and 92 for estates farms with an acreage of 106,079 ha., while the average of size of farms by type are 1.14 ha. for agricultural farms and 1,15 ha. for estates farms (see table 5.11. and 5.12.).

Table 5.11. Agriculture and estates farms in South Sulawesi

No.	Type of farms	Number of farms	Acreage (ha.)	Average (ha.)
1.	Agricultural farms	648,707	737,455	1.14
2.	Estates farms	92	106,079	1.15
	Total	648,799	843,534	-

Source: Agricultural Census 1973 and Adjusted data by Team ATA-140.

1) Farms means the unit areas of farming activities by type of farming. Agriculture farms oriented the farming for food crops, and estates farms are oriented the farming for estate crops.

And following data also shows a condition of land holding with number of tractors on developed irrigation system:

Items	Sidrap	Pinrang	Polmas
Number of farmers	178,935	171,910	225,874
Number of tenants	114,190	88,210	-
Percentage of tenant	63.80	51.31	-
Acreage of holding	33,894	47,597	77,630
Number of tractors	148	110	53

Source: a Result of the study by Nazaruddin L. at Diperta of Kabupaten-s Sidrap, Pinrang and Polmas.

5.12.2. The conditions of land holding

According to the obtained data by interview at Agricultural Extension Service, South Sulawesi, total number of farmers is 919,542, consisting of 270,835 free workers (buruh tani/pengarah) and 648,707 land holders. The land holders are divided for three groups as showing on the table 5.12.

In case of the areas of developed irrigation systems, i.e. Kabupaten Sidrap and Polmas, big land holders/land owners are found as follows:

	<u>Sidrap</u>	<u>Polmas</u>
0 - 5 ha	4,662	81
5 -25	68	178
25- 50	-	57
50	-	144

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Source: a result of the study by Nazaruddin L. at Diperta in Kabupaten Sidrap and Polmas.

Table 5.12. Number of Farms by Tenure in South Sulawesi (1973)

No.	Size of Holding:		Number of Farms		Whole area owned		Part of Area owned		Not Owned	
	(ha.)	Total (%)	No. of farms	(%)	No. of farms	(%)	No. of farms	(%)	No. of farms	(%)
1.	>0.10	14,520 : 2.2	11,123	76.6	2,148	14.8	1,249	14.8	1,249	8.6
2.	0.10 - 0.20	45,890 : 7.1	32,467	70.7	9,065	19.8	4,378	19.8	4,378	9.5
3.	0.20 - 0.30	49,406 : 7.6	32,461	65.2	10,704	21.6	6,321	21.6	6,321	12.8
4.	0.30 - 0.40	40,356 : 6.2	26,378	65.2	11,177	27.7	2,851	27.7	2,851	7.1
5.	0.40 - 0.50	30,254 : 4.7	17,701	58.5	9,922	32.8	2,631	32.8	2,631	8.7
6.	0.50 - 0.60	65,623 : 10.1	41,472	63.2	18,392	28	5,757	28	5,757	8.8
7.	0.60 - 0.75	44,523 : 6.9	23,532	52.8	18,389	41.3	2,611	41.3	2,611	5.9
8.	0.75 - 1.00	70,740 : 10.9	40,418	57.1	27,132	38.4	3,190	38.4	3,190	4.5
9.	1.00 - 2.00	187,165 : 28.9	107,897	57.6	72,821	38.9	6,462	38.9	6,462	3.0
10.	2.00 - 3.00	61,211 : 9.4	34,670	57.0	75,044	40.9	1,297	40.9	1,297	2.1
11.	3.00 - 4.00	19,872 : 3.1	11,463	57.7	8,150	41.0	259	41.0	259	1.3
12.	4.00 - 5.00	9,289 : 1.4	5,303	57.1	3,986	42.9	-	42.9	-	-
13.	5.00 - 7.50	6,770 : 1.0	4,677	69.1	2,003	29.6	90	29.6	90	1.3
14.	7.50 - 10.00	1,277 : 0.2	520	40.7	712	55.8	45	55.8	45	3.5
15.	10.00 - 15.00	1,287 : 0.2	663	51.5	573	44.5	51	44.5	51	4.0
16.	15.00 <	439 : 0.1	148	33.7	291	66.3	-	66.3	-	-
Total		648,707 : 100.0	391,008	60.3	220,505	34.0	37,194	34.0	37,194	5.7
Total Area (ha.)		737,455 :	422,419	57.3	290,096	39.3	24,940	39.3	24,940	3.4

Source: Agricultural Census 1973.



Table 5.12. Number and area of Farms by size of Holding in South Sulawesi (1973).

No.	Size of Holding	Number of Farms	o/o	acreage	o/o
1.	0.10 HA	14,520	2.2	841	0.1
2.	0.10 - 0.20 HA	45,890	7.1	6,421	0.9
3.	0.20 - 0.30 HA	49,486	7.6	12,083	1.6
4.	0.30 - 0.40 HA	40,356	6.2	13,569	1.8
5.	0.40 - 0.50 HA	30,254	4.7	13,195	1.8
6.	0.50 - 0.60 HA	65,623	10.1	34,480	4.7
7.	0.60 - 0.75 HA	44,528	6.9	29,349	4.0
8.	0.75 - 1.00 HA	70,740	10.9	58,595	7.9
9.	1.00 - 2.00 HA	187,165	28.9	245,818	33.3
10.	2.00 - 3.00 HA	61,211	9.4	139,921	19.0
11.	3.00 - 4.00 HA	19,872	3.1	65,653	8.9
12.	4.00 - 5.00 HA	9,289	1.4	40,428	5.5
13.	5.00 - 7.50 HA	6,770	1.0	39,387	5.4
14.	7.50 - 10.00 HA	1,277	0.2	10,746	1.5
15.	10.00 - 15.00 HA	1,287	0.2	14,966	2.0
16.	15.00 -	439	0.1	12,003	1.6
Total		648,707	100	737,455	100

Notice: 1. More than 0.5 HA  
 Farm household = 72.2 %  
 Farm area = 93.8 %  
 Average size = 1.48 H

2. 0.50 HA - 3.00 HA  
 Farm household = 66.2 %  
 Farm area = 68.9 %

Source: Agricultural Census 1973 Part I

5.3. The situation of integrated rural development

5.3.1. General informations

- 1) The South Sulawesi Province consists of 2 Kotamadya's and 21 Kabupaten's, 169 Kecamatan's and 1,170 Desa's. The population of South Sulawesi is made up various ethnig. Roughly, there are four main ethnig groups, namely the Buginese, the Makassarases, the Mandarese and the Torajanese.
- 2) According to the data from Directorate of Rural Development, South Sulawesi, concerning rural development by using some indicators, the general picture of the situation of rural development shows the levels of development of Desa's in 2 Kotamadya-s and 21 Kabupaten-s can be seen on table 5.13. and 5.14.
- 3) Out of 1,170 Desa-s in South Sulawesi Province 45.83 % of Desa-s have level's land productivity, 44.97 % have medium level's one and only 9.20 % have high level's one (see table 5.15.).
- 4) The livelihood of Desa population are generally primary (agriculture) 83.76 %, secondary (industry and - handicrafts) 11.78 % and very few earn their living in the ~~very~~ third (sector of service) 4.56 % (see table 5.16.).
- 5) Lembaga Sosial Desa/L.S.D. (Village Social - Institute); in the 1,170 Desa-s of South Sulawesi Province, there are 109 L.S.D. (9.32 %) in passive stage, 574 L.S.D. (49.06 %) in developing stage and 487 L.S.D. (41.62 %) in active stage.
- 6) For the last three years, formation of the system UDKP/Unit Desa Kegiatan Pembangunan (Unit Desa-s of the Development activities in the frame of rural development in South Sulawesi) have been attempted by conducting discussions on UDKP at Kecamatan level, workshop on UDKP at Kotamadya/Kabupaten and Provincial levels. In this forum all agencies, the community and higher education organization are involved. The locations of UDKP in 23 Kecamatan-s have been decided for 1976 (see table 5.17.).

Table 5.13.

LEVEL OF VILLAGE DEVELOPMENT IN  
SULAWESI SELATAN, 1972 - 1976

Year	Number of villages	Swadaya villages Total %	Swakarya villages Total %	Swasembada villages Total %
1972	1,162	603 (51.89)	543 (47.16)	11 (0.95)
1976	1,163	527 (45.31)	523 (44.97)	113 (9.72)
1976	1,170	541 (46.24)	509 (43.50)	120 (10.26)

Table 5.14.

THE LEVEL OF VILLAGE DEVELOPMENT PER  
KABUPATEN IN SULAWESI SELATAN (1975)

Kabu - paten.	Total Number of villages	Swadaya villages Total	%	Swakarya villages total	%	Swasebada villages total	%
Bantaeng	15	1	667	13	86,67	1	6.67
Barru	24	11	45.83	9	37.50	4	16.67
Bone	205	69	33.66	129	62.93	7	3.41
Bulukumba	43	13	30.23	23	53.49	7	16.28
Enrekang	28	0	0	27	96.43	1	3.57
Gowa	48	13	27.08	33	68.75	2	4.17
Jeneponto	28	13	46.43	9	32.14	6	21.45
Luwu	143	101	70.63	42	29.37	0	0
Majene	20	20	100.00	0	0	0	0
Hamuju	27	27	100.00	0	0	0	0
Maros	41	33	80.49	8	19.51	0	0
Pangkep	80	60	75.00	18	22.50	2	2.50
Pinrang	37	6	16.22	30	81.08	1	2.70
Poimas	83	26	31.33	40	48.19	17	20.48
Selayar	20	15	75.00	4	20.00	1	5.00
Sidrap	32	13	40.63	17	53.13	2	6.25
Sinjai	38	26	68.40	8	21.05	4	10.53
Soppeng	26	4	15.38	22	84.60	0	0
Takalar	35	15	42.86	18	51.43	2	5.71
Tana Toraja	65	43	66.15	20	30.77	2	3.08
Wajo	51	13	25.49	27	52.94	11	21.57
Kotamadya Fare-Fare	12	2	16.67	10	83.33	0	0
Kotamadya U. Pandang	62	3	4.84	16	25.81	43	69.35
Total	1,163	527	45.31	523	44.97	113	9.72

Source : Direktorat Pembangunan Desa Propinsi Sulawesi Selatan, Klasifikasi Desa Pada 23 Kabupaten / Kotamadya Daerah Tingkat II Propinsi Sulawesi Selatan, 1975.

Table 5.15

LAND PRODUCTIVITY IN THE VILLAGES IN  
EACH KABUPATEN IN SULAWESI SELATAN (1975)

Kabupaten.	Total Number of villages	Low Number of villages	%	Medium Number of villages	%	High Number of villages	%
Bantaeng	15	1	6.67	9	60.00	5	33.33
Barru	24	4	16.67	17	70.83	3	12.5
Bone	205	162	79.02	42	20.49	1	0.48
Bulukumba	43	3	6.98	34	79.07	6	13.95
Enrekang	28	18	64.29	10	35.71	0	0
Gowa	48	12	25.00	36	75.00	0	0
Jeneponto	28	8	28.57	8	28.17	12	48.86
Luwu	143	80	55.94	63	44.06	0	0
Hajene	20	16	80.00	4	20.00	0	0
Mamuju	27	0	0	27	100.00	0	0
Maros	41	11	26.83	27	65.85	3	7.32
Pangkep	80	32	40.00	48	60.00	0	0
Pinrang	37	7	18.92	13	35.13	17	45.95
Polmas	83	53	63.86	27	32.53	3	3.61
Selayar	20	3	15.00	17	85.00	0	0
Sidrap	32	6	18.92	13	35.13	17	45.95
Sinjai	38	11	28.95	5	13.16	22	57.89
Soppeng	26	21	80.77	5	19.23	0	0
Takalar	35	20	57.14	12	34.29	3	8.57
Tana Toraja	65	4	6.15	53	81.53	8	12.31
Wajo	51	28	54.90	21	41.18	2	3.92
Kotamadya Pare-Pare	12	6	50.00	4	33.33	2	16.67
Kotamadya U. Pandang	62	27	43.53	30	48.39	5	8.06
<b>Total</b>	<b>1,163</b>	<b>533</b>	<b>45.83</b>	<b>523</b>	<b>44.97</b>	<b>107</b>	<b>9.20</b>

Source : Direktorat PTD, Klasifikasi Desa, 1975.-

Table 5.16.

LEVELHOOD OF THE VILLAGE POPULATION PER  
KABUPATEN IN SULAWESI SELATAN

Kabupaten.	Total no. of vil- lages	1		2		3	
		No. of villages	%	No. of villages	%	No. of villages	%
Bantaeng	15	9	60.00	5	33.33	1	6.67
Barru	24	24	100.00	0	0	0	0
Bone	205	199	97.07	5	2.44	1	0.49
Bulukumba	43	1	2.33	28	65.12	14	32.55
Enrekang	28	24	85.71	3	10.71	1	3.57
Gowa	48	45	93.75	0	0	3	6.25
Jeneponto	28	22	70.75	0	0	6	21.43
Luwu	143	137	95.80	1	0.70	6	4.20
Majene	20	20	100.00	0	0	0	0
Mamuju	27	26	96.30	0	0	1	3.70
Maros	41	41	100.00	0	0	0	0
Pangkep	80	77	96.25	1	1.25	2	2.50
Pinrang	37	36	97.30	1	2.70	0	0
Polmas	83	79	95.18	4	4.82	0	0
Selayar	20	19	95.00	1	5.00	0	0
Sidrap	32	30	93.95	2	6.25	0	0
Sinjai	38	38	100.00	0	0	0	0
Soppeng	26	26	100.00	0	0	0	0
Takalar	35	18	51.43	14	40.00	3	8.57
Tana Toraja	65	63	96.92	0	0	2	3.08
Wajo	51	31	60.78	17	33.33	3	5.88
Kotamadya Pare-Pare	12	7	58.33	4	33.33	1	8.34
Kotamadya U. Pandang	62	2	3.23	51	82.26	9	14.51
<b>T o t a l: 1,163</b>	<b>974</b>	<b>83.76</b>	<b>137</b>	<b>11.78</b>	<b>53</b>	<b>4.56</b>	

Source : Direktorat PPD, Klasifikasi Desa, 1975

- Explanation:
1. More than 55 % of the population is engaged in agriculture.
  2. More than 55 % of the population is engaged in industry and handicraft.
  3. More than 55 % of the population is engaged in the service sector.

Table 5.17.

## Kecamatan Lokasi UDK-? 1977 / 1978.

No.	Kab/Kodya	Pembinaan	Pelaksanaan	Persiapan	Calon
1.	Bone	Sibulue	Ulaweng Tjengale	Lappariaja	M a r a Cenrana
2.	Luwu	Bone-bone	B a j o	Sabbang	W a r a Malili
3.	Wajo	Sabbangparu	Sajoanging	Tansitolo	Belawa
4.	Polmas	Wonomulyo	Tinambung	Capalagiang	-
5.	Pinrang	Patampanua	-	S u p p a	Mattiro Bulu
6.	Tator	Sesean	Mengkendek	Sanggala- ngi.	-
7.	Pangkep	Pangkajene	Segeri Man- dalle.	-	Bungoro
8.	U. Pandang	Biringka- naya.	Tamalate	-	Panakku kang.
9.	Gowa	Tinggi - noncong.	Pallangga	-	Bonto- nompo.
10.	Bulukumba	Bulukumba	-	Bontotiro	Gangking
11.	Maruju	Tappalang	-	-	Kaluku
12.	Enrekang	A l l a	-	-	Baraka
13.	Sidrap	Beranti	-	Panca Lau- tang.	-
14.	Soppeng	Mariori- wako.	-	Marioriawa	-
15.	Barru	Soppeng - riaja.	-	-	Tanete- riaja.
16.	Takalar	Galasong Solatar.	Mangara - bombang.	-	-
17.	Sinjai	Sinjai C.A.	-	-	Sinjai Barat.
18.	Selayar	Bontomatene	-	Bontoharu	-
19.	Majene	Sandana	-	-	-
20.	Pare-Pare	Bacukiki	-	-	-
21.	Maros	Bantimurung	-	-	-
22.	Jenepono	Bangkala	-	-	-
23.	Bantaeng	Tempobulu	-	-	-

23 Kecamatan ! 10 Kecamatan ! 10 Kecamat. ! 14 Kec.

### 5.3.2. Transmigration

The transmigration in South Sulawesi Province can be classified into two categories : the transmigration before Independence of Indonesia which is called as "the colonization" and the transmigration after Independence of Indonesia. The colonization seemed to have a better condition than the transmigration does. The reason may be that colonization occurred in earlier time than transmigration, so that adaption time is over now and only the development and maintenance time is left. It may be the better preparation of facilities and the proper sending of people in older times.

Over-abundance of facilities and improper placement can induce social tensions with old inhabitants in the areas for the transmigration, as the transmigrants lead better life than the old inhabitants do. The other problems are the disturbance by hogs attacking new plants/crops, the shortage of market for production of secondary crops, and the problem for certification of lands.

In the colonization areas, the shortage/limitation of lands for their (transmigrants in the areas of the colonization) children becomes the main problem; in new transmigration areas it is due to the arrival of new spontaneous transmigrants, for whom no similar facilities are available with adequate costs through the Ministry of Labor, transmigration and Cooperative.

List of resettled at the time arrival, resettled according to the provinces of origin and the list of the progress of transmigration activities, can be seen in the tables 5.18, 5.19 and 5.20. While the list of population increase of Kabupaten Luwu as the areas for the transmigration and the area of mining activities, which cause spontaneous population inflow can be seen in table 5.21.



Table : 5.18

Settlet transmigrant (by area origin) untill 1976.

No.	Transmigration Village unit	Area origin										Total house- hold	Re- mark				
		Jabar per- house- hold	D.K.I. per- house- hold	Jateng per- house- hold	D.I.Y. per- house- hold	Jatin per- house- hold	Bali per- house- hold	N.T.B. per- house- hold									
1.	Sidobinangun	-	-	100	462	-	-	150	656	-	-	-	250	1118			
2.	Sidomakmur	-	-	-	-	-	-	75	339	175	790	-	250	1129			
3.	Sukaraya	50	227	-	25	96	50	204	75	361	-	-	200	888			
4.	Sukamaju	-	-	25	105	72	332	78	406	75	369	-	250	1212			
5.	Sukadamai	-	-	50	337	50	171	50	300	100	478	-	250	1286			
6.	Sidoraharjo	-	-	151	692	-	-	149	699	-	-	-	300	1391			
7.	Mulyorejo I	100	416	100	354	200	1111	-	450	2178	150	689	1150	5444			
8.	Mulyorejo II	-	-	100	498	-	-	250	1075	-	-	-	350	1573	army		
9.	Mulyorejo III	-	-	*50	304	-	-	100	495	89	407	-	239	1206	trans-		
10.	Kertoraharjo I	-	-	48	286	-	-	100	503	352	1686	-	500	2475	mig-		
11.	Kertoraharjo II	-	-	52	276	-	-	-	98	472	-	-	150	748	rant.		
12.	Cendana Hitam	*50	335	50	226	-	-	-	-	-	-	100	422	200	983		
13.	Maramba I	-	-	100	454	-	-	-	-	-	-	150	754	250	1208		
14.	Maramba II, III	-	-	*200	822	-	-	-	-	-	-	-	200	822			
15.	Cendana Hijau	-	-	50	199	-	-	-	-	-	-	50	222	100	421		
16.	Pepuro Utara	100	396	-	-	-	-	-	-	-	-	100	418	200	814		
17.	C. Putih I	-	-	-	-	-	-	103	487	108	442	-	211	929			
18.	C. Putih II	-	-	-	-	-	-	-	-	150	653	150	644	300	1297		
19.	C. Putih III	107*	466	-	-	-	-	*43	201	150	704	-	300	1371			
Total		407	1840	400	1706	901	4516	172	707	1623	7700	1447	6697	700	3149	5650	26315

Table : 5.19 Settlet transmigrant (in arrived) untill 1976.-

No.	Transmigration Villages unit	1970	1971	1972	1973	1974	1975	1976	Total						
		household	household	household	household	household	household	household	household						
		persons	persons	persons	persons	persons	persons	persons	persons						
1.	Sidobinangun	250	1118	-	-	-	-	-	250 1.118						
2.	Sidomakmur	250	1129	-	-	-	-	-	250 1.129						
3.	Sukaraya	-	200	888	-	-	-	-	200 888						
4.	Sukamaju	-	250	1212	-	-	-	-	250 1.212						
5.	Sukadamai	-	150	649	100	637	-	-	250 1.286						
6.	Sidoraharjo	-	-	300	1391	-	-	-	300 1.391						
7.	Mulyorejo I	-	-	-	650	3245	500	2199	1.150 5.444						
8.	Mulyorejo II	-	-	-	76	341	274	1232	350 1.573						
9.	Mulyorejo III	-	-	-	-	-	239	1206	239 1.206						
10.	Kertoraharjo I	-	-	-	156	782	344	1693	500 2.475						
11.	Kertoraharjo II	-	-	-	-	150	748	-	150 748						
12.	Cendana Hitam	-	-	-	-	-	200	983	200 983						
13.	Maramba I	-	-	-	99	524	151	684	250 1.208						
14.	Maramba II & III	-	-	-	-	35	219	65	216 100 387						
15.	Cendana Hijau	-	-	-	-	-	100	421	100 421						
16.	Pepuro Utara	-	-	-	-	-	200	814	200 814						
17.	Cendana Putih I	-	-	-	-	211	929	-	211 929						
18.	Cendana Putih II	-	-	-	-	150	653	150	644 300 1.297						
19.	Cendana Putih III	-	-	-	-	-	150	667	150 704 300 1.371						
<b>T o t a l</b>		500	2247	600	2749	400	2028	981	4892	1104	4951	250	1091	5.650	26.315

Table : 5.20

## Condition of the transmigrator's increase in Kabupaten Luwu

( Until 1976. 12)

No.	Transmigration Village unit	in arrived		decrease		increase		house- hold	persons		
		house- hold	per- sons	dead per- sons	house- hold	born	house- hold			persons	
1.	Sidobinangun	250	1,118	65	37	143	340	44	46	257	1,296
2.	Sidomalmur	250	1,129	90	34	166	217	46	156	262	1,246
3.	Sukaraya	200	888	62	15	51	242	34	88	219	1,105
4.	Sukaraju	250	1,212	89	4	36	315	78	207	324	1,609
5.	Sukadama	250	1,286	49	5	29	162	46	71	291	1,461
6.	Sidoraharjo	300	1,391	35	13	55	140	50	80	337	1,521
7.	Mulyorejo I	1,150	5,444	121	112	345	220	94	173	1,132	5,371
8.	Mulyorejo II,III	589	2,779	50	29	140	121	72	135	632	2,845
9.	Kertoraharjo I	500	2,475	49	7	38	236	54	153	57	2,777
10.	Kertoraharjo II	150	748	27	3	15	85	30	122	177	913
11.	Cendana Hitam	200	983	17	5	25	45	14	58	209	1,044
12.	Maramba I	250	1,208	19	21	89	94	24	76	253	1,270
13.	Maramba II,III	200	822	6	6	57	11	7	191	201	961
14.	Cendana Hijau	100	421	7	-	-	41	8	24	108	479
15.	IB. Pepuro Utara	200	814	9	5	20	70	12	19	207	874
16.	Cendana Putih I	211	929	55	7	20	122	85	317	289	1,293
17.	Cendana Putih II	300	1,297	20	20	95	47	10	37	290	1,265
18.	Cendana Putih III	300	1,371	13	2	9	41	3	8	301	1,398
T o t a l		5,650	26,315	783	325	1,333	2,569	711	1,961	6,036	28,729

Table : 5.21 Developments in population of Kabupaten Luwu  
(1971 - 1976)

No.	Kecamatan	Number of population in		Increase	
		1976	1971	persons	%
1.	Larompong	13,621	11,434	2,187	19,127
2.	S u l i	14,773	13,761	1,012	7,354
3.	B a j o	32,836	27,802	5,034	0,181
4.	Bastem	12,905	11,321	1,584	0,134
5.	Bupan	42,585	29,184	13,401	45,919
6.	W a r a	49,646	45,584	4,062	8,911
7.	Walenrang	63,799	56,853	6,946	12,217
8.	Sabbang	26,156	21,785	4,371	20,064
9.	Limbong	10,128	8,396	1,732	20,629
10.	Malangke	14,535	12,736	1,799	14,125
11.	Mesamba	22,234	16,574	5,660	34,150
12.	Bone-Bone	43,792	26,614	17,358	65,221
13.	W o t u	18,795	12,667	6,128	48,378
14.	Mangkutana	20,775	13,069	7,706	58,964
15.	Malili	13,816	9,958	3,858	38,743
16.	N u k a	19,064	8,194	10,870	132,658
T o t a l		419,640	325,980	395,922	

### 5.3.3. Resettlement

This is different to transmigration, yet there are similarities like the movement of population to new settlement areas and the implementation by many agencies. As yet there are two kinds of resettlement, i.e. one is implemented by the Ministry of the Interior (by the P.M.D.), for instance in Kabupaten Sinjai, and the other is by the Ministry of Social Welfare, e.g. in Kabupaten Jenaponto. The difference among the two is not so apparent, except from the aspects of finance and facilities.

The resettlement by the P.M.D. is very minimally financed; sometimes only a piece of uncultivated land and house-transferring facilities are given. The resettlement by the Ministry of Social Welfare has a better condition since it has larger financial cost. Yet it is deficient when compared to the transmigration.

In addition to that, another resettlement is planned, that which is implemented by the Ministry of Agriculture (by the General Directorate of Forestry). Which emphasizes on the population suffering from natural disaster; soluted community while the implemented by the P.M.D. emphasizes on the rearrangement of Desa-s. Yet in fact no obvious difference is seen in the two concerning the mentioned above aims, for instance the resettlement implemented by the Ministry of Social Welfare in the Kabupaten Jenaponto, besides transferring population living in mountainous area, there is no difference between it and the resettlement by the P.M.D. in Kabupaten Sinjai. Though these two resettlements have same aims, social facilities, from the point of view of social welfare, there is a great difference (see table 5.22.).

In Kabupaten Wajo there is evidently a kind of resettlement which is not implemented by any agency, but it occurs spontaneously, i.e. the movement of some people in Kabupaten Pangkep and Pinrang to the Kabupaten Wajo. This occurs due to the fact that the people of these two Kabupaten-s who have already experienced in brackish water fish ponds, view an economic probability, more than other people/the old inhabitants do (see table 5.23.).

Table 5.22. The condition of resettlement in Kabupaten Jeneponto and Sinjai

No.	Items	Jeneponto	Sinjai
1.	Executer	Ministry of Social Welfare	P.M.D.
2.	Acreeage of the project area		
	a) Plan (ha.)	2,000	1,000
	b) Existing (ha.)	595	218
3.	Settler		
	a) Plan (families)	250	500
	b) Existing (ditto)	200	109
4.	Financing (Rp.)	74,675,000	21,570,000
5.	Facilities have prepared		
	a) Shelter/house	1/Family	(only financial aid)
	b) Land	1.5 ha./Fam.	2 ha./Fam.
	c) Livestocks	4 cows/10 Fam.	-
	d) Polyclinic	1/Project site	1/Project site
	e) Public well	74	2
	f) W.C.	26	-
	g) Primary School	1	-
	h) Staffs*	(for the 9 months)	-

Note: \*Staffs consists of rice, dried fishes, kerosene, coconut oil, sugar and salt.

Source: 1) Governmental Office of Jeneponto and Project Site Office  
2) Governmental Office of Sinjai and P.M.D. Office of Sinjai.

Table 5.23 Spontaneous resettlement in Kabupaten Wajo (1977)

No.	In Desa/Kecamatan	Number (owner of fish pond)	Original Kabupaten
1.	Akbujeng/Sajoanging	36	Pangkep
		16	Pinrang
	Sub-total:	52	
2.	Akkotngeng/Sajoanging	270	Pangkep
		80	Pinrang
	Sub-total:	350	
	Total:	402	

Source: By the study of the Team AFA-140 Project.

5.4. Income distribution and labor supply/employment

According to the classification of Repelita, economic development main sector divided into 8 sectors as follows:

1. Agriculture,
2. Industry,
3. Mining,
4. Transportation and Telecommunication,
5. Infra-structure
6. Housing,
7. Development of provinces, and
8. General matters.

And the agricultural sector divided into 2 sub-sectors, i.e.

- 1.1. Agriculture, and
- 1.2. Irrigation.

Agricultural sub-sector, furthermore, divided into following 5 sub-sub-sector:

- 1.1.1. Farmers agriculture,
- 1.1.2. Estates agriculture,
- 1.1.3. Fishery,
- 1.1.4. Forestry, and
- 1.1.5. Animal husbandry.

And especially the farmers agricultural sub-sub-sector divided more 2 sub-sub-sectors:

- 1.1.1.1. Rice/Paddy, and
- 1.1.1.2. Secondary crops and Horticulture.

Hereafter the words "agricultural sector" and "sub sector" will be described frequently in this title, the words means "agricultural sub-sector" mentioned above No. 1.1.) and "sub-sub-sector" (No.1.1.1. - 1.1.5.).

5.4.1. Income distribution

- 1) Outline of the regional income.

Many indications have been found in the data of Hasanuddin University:

- a) Weight of agricultural income against the total income in this Province have decreased slowly from 60 % of 1969 to 50 % of 1976 as shown figure 5.2.

- b) On the contrary, the income of other sectors have increased.
- c) Weight of rice production is very higher than that of other agricultural products. However, in the recent years the weight of estate crops and fishery products are increasing than that of food crops. This condition shows that the regional agriculture is taking a turn from self sufficiency oriented to producing for selling for markets. Farmers hope to get more increase income and their charge the products (see fig. 5. 3 .).
- d) Regional income of rice had increased, not in the increased of production but mainly based on the high unit price during the period as shown figure 5. 4 . This figure is an example of rice and other commodities are also estimated in same condition. After 1972 wide fluctuation of prices are found in this region, and total income have increased very much, but net values are not so high.
- e) Concerning the growth of net values by sub-sector, net value of estate and fishery have increased because production of clove, coffee and shrimp have increased as shown figure 5.5.
- f) Income per capita of agricultural sector was less than others sector, only 58 % compared to the others sector in 1971. This indicates that more disparities will be in recent years (see table 5.24.)

Table 5.24. Comparison of income of Agricultural and other sectors (1971)

Sector	person	%	Hundred Thousand Rp.	%	per- capita	%
Agriculture	936,117	66	64,911	54	69,300	58
Others	475,210	34	54,820	46	119,900	100
Total Average	1.411,327	100	119,731	100	84,900	

Source: Census 1971



Fig.5.2. Weight of regional income by sector in South Sulawesi

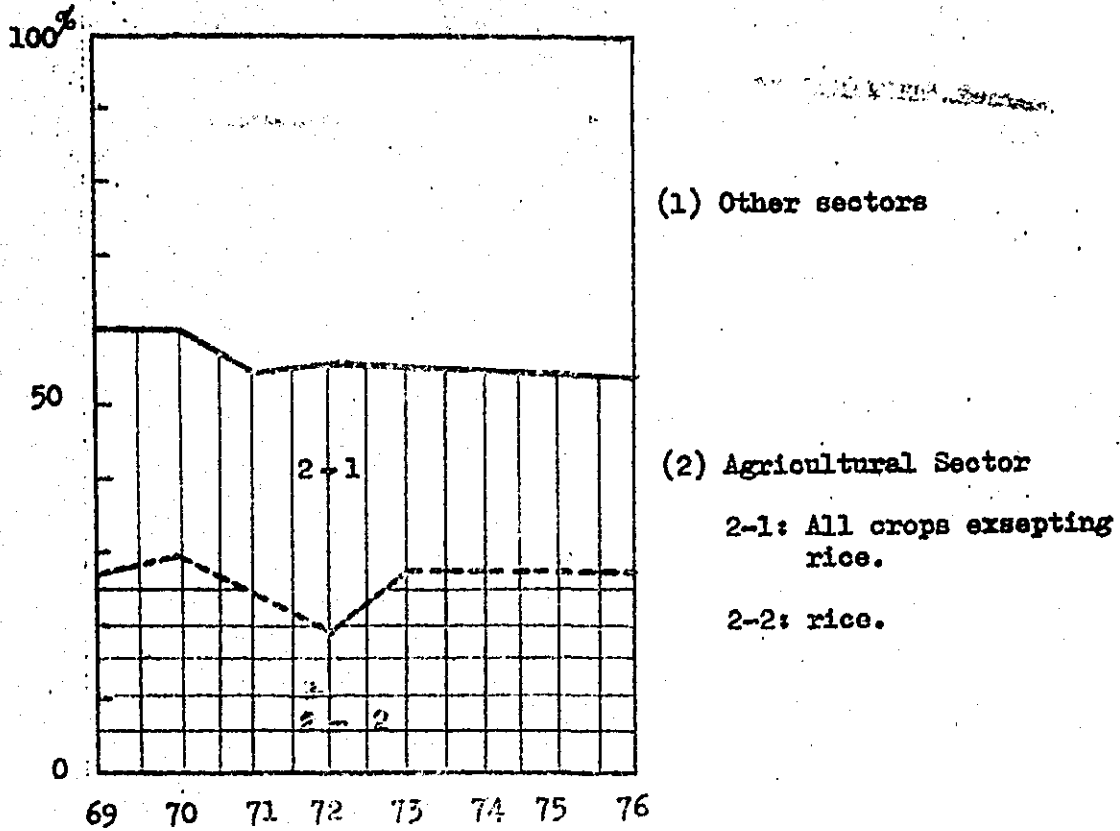


Fig. 5.3. Weight of income by sub-sector of Agricultural Sector

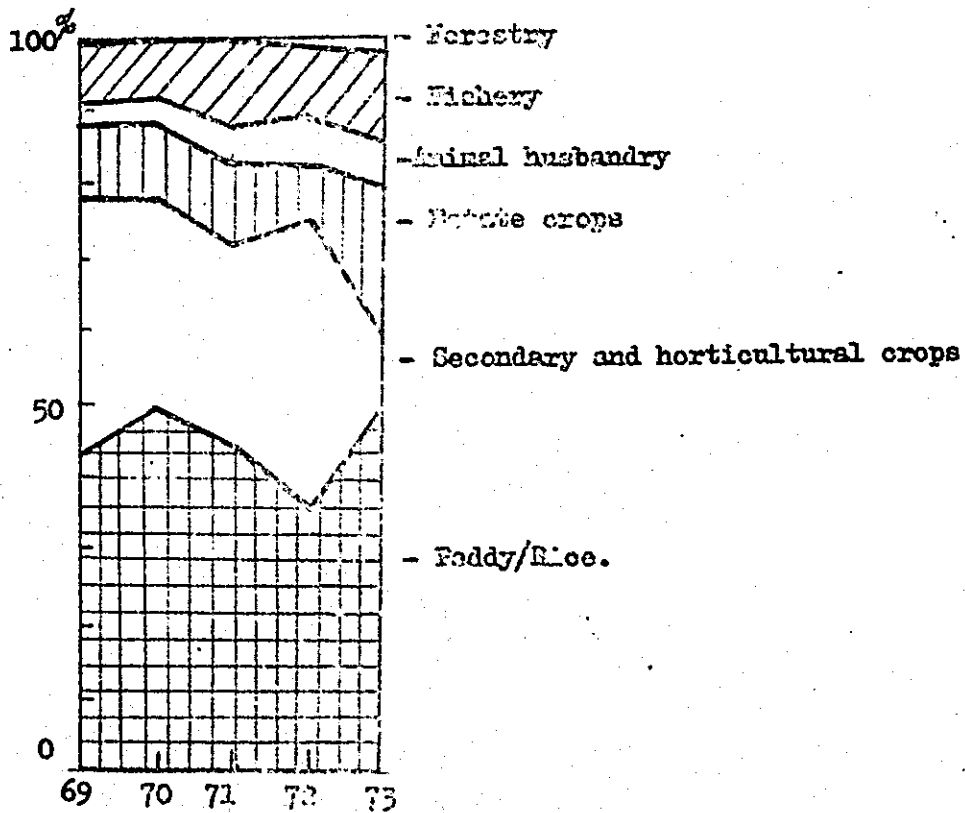


Fig. 5.4. Fluctuation of Rice price  
(1969 - 1973)

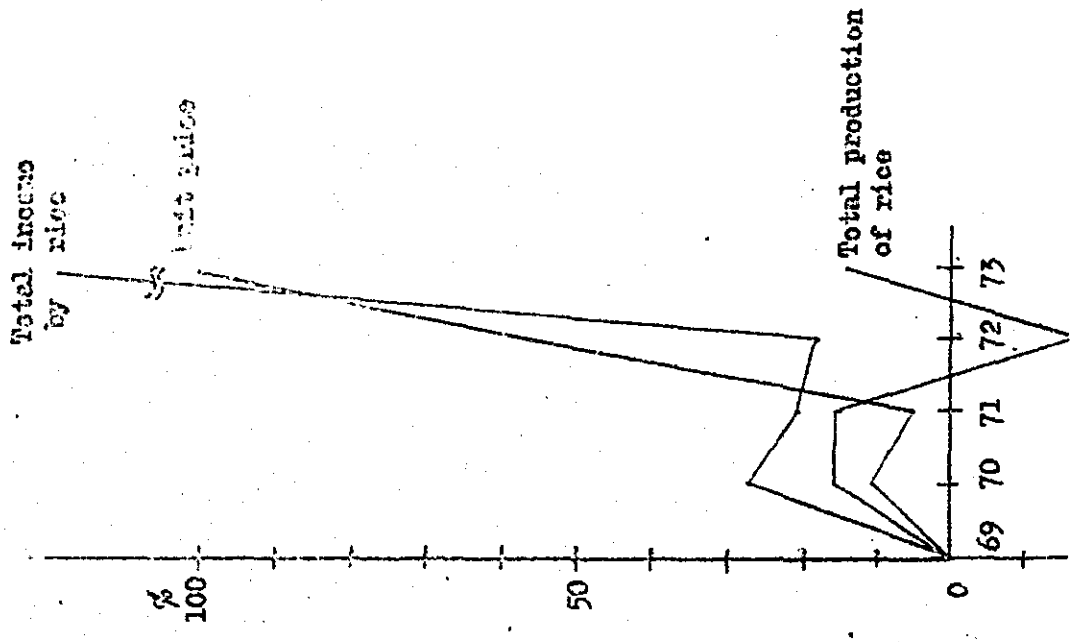
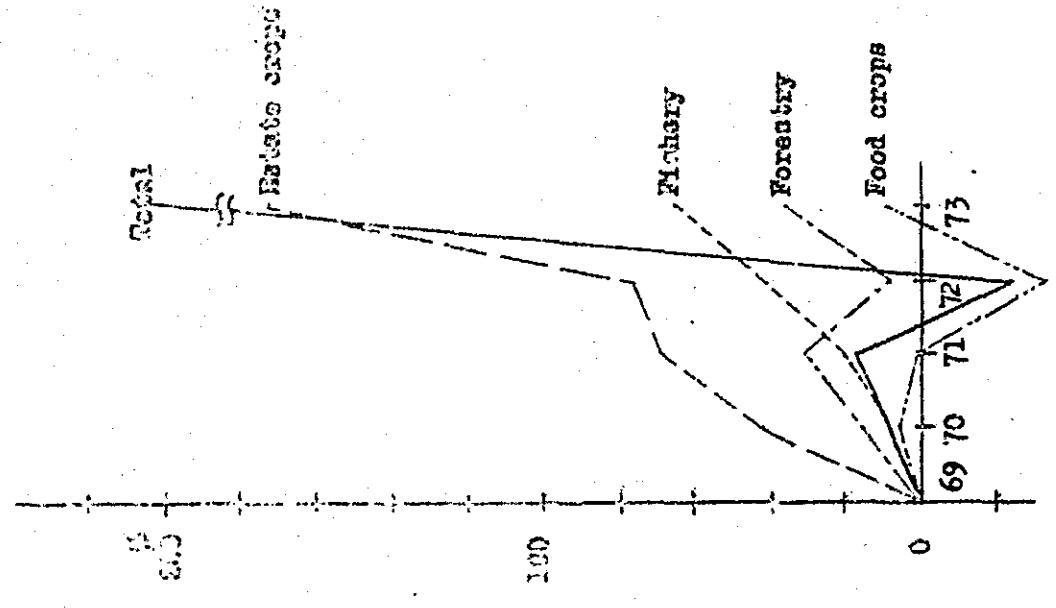


Fig. 5.5. Fluctuation of net value of Sub-sector's products (1969-1973)



2) Income distribution in the agricultural sector  
 The BAPPEDA South Sulawesi cooperated with the Hasanuddin University have made an estimation about the level of income by bloc<sup>1)</sup> in South Sulawesi Province (see table 5.25.). On the table it clarified that there has been a proper increase of regional income as well income per capita by bloc from 1974 to 1976, but it also apparent that the distribution of the regional income is not averaged throughout the bloc. The bloc having the highest level of income in 1976 are respectively: 1) Bloc I (South Development Area), 2) Bloc II (East), 3) Bloc IV (North), 4) Bloc II (West) and 5) Bloc V (Mandar).

Just like the regional income, the table shows some changes of the distribution of income per capita by bloc for the last three years, 1974 - 1976.

The percentage of the gross income from activities of agricultural sector, that is from agricultural productions, which is occupied among the other sectors can be seen on table 5.25. And the table 5.26. shows the distribution of the value of gross income of agricultural sector by bloc in South Sulawesi.

Next we see the product of the agricultural sector from its various activities in its role to promote the regional as well as the per capita income of the South Sulawesi regions in 1973, which is as follows:

food crops	approx. 33.2 %
estate crops (by the farmer)	" 11.3 %
estate crops	" 0,2 %
husbandry	" 3,6 %
forestry	" 0,9 %
fishery	" 6,8 %

These percentages are each taken from the value of gross domestic products of South Sulawesi, and adding them we get 56 %. It means that the amount of percentage is the agricultural sector's contribution to the gross regional domestic products of South Sulawesi in 1973.

In 1976 there is an increase of the agricultural sector's contribution, i.e. to the amount of 57 %. If however, we look at its development from 1969 to 1976, we will see a decrease.

1) (see next page).

The distribution of gross income of South Sulawesi according to the activity of the agricultural sector from 1969 to 1976 is to be seen on table 5.26.

The values of gross domestic products of South Sulawesi from the agricultural sector, from 1974 to 1976 are as shown on table 5.26.

3) Income distribution

From each activity outside the agricultural sector we see its great role for the regional income distribution and per capita income distribution during the period 1969 to 1973, and it increase from year to year, while the sector having the greatest role in the sector of trade, whether it is the wholesale or the retail business. Next comes the industrial sector. The role of these two sectors in 1973 were seen as follows: the contribution of the wholesale and retail trade was 19.8 % to the regional domestic products, and that of the industrial sector was 6.2 %. See table 5.27.

- 
- 1) The word "bloc" means "central area of the bloc" such as Ujung Pandang for Bloc I, Palopo for Bloc IV, e.t.c.

Table 5.25. Distribution of regional income and income per capita in South Sulawesi by Bloc.

Unit : 1,000 Rupiah-s.

Bloc	1974		1975		1976	
	Regional	per capita	Regional	Per capita	Regional	Per capita
I	30,123,929	68,240	51,346,083	91,444	59,542,142	99,756
III	14,803,798	24,155	28,078,493	45,505	29,023,823	46,701
I	12,943,463	34,727	16,045,360	42,060	22,955,545	53,803
II	3,197,102	73,653	4,260,849	74,561	6,029,705	78,001
V	2,807,768	35,368	3,535,738	38,629	4,965,186	52,195
Total	71,876,060	47,229	103,274,528	58,439	122,518,401	66,091
Average						

Source: BAPPEDA of South Sulawesi Province.

Table 5.26. Distribution of the value of the gross  
of agricultural sector by bloc (1974 - 1976)

Unit: 1,000 Rupiah-s

Bloc	1974	1975	1976
I	4,353,592.1	5,095,139.7	4,708,290.3
II	673,565.2	792,613.2	1,270,630.1
III	8,603,601.6	19,645,723.9	18,216,562.2
IV	8,516,427.4	9,659,423.2	13,781,585.6
V	1,871,088.0	2,371,528.0	3,425,401.0
Total	24,018,274.3	37,564,428.0	40,402,489.2

Source: BAPPEDA of South Sulawesi Province.

5.4.2. Labor supply/employment

1) According to the data of BAPPEDA, the number of labor force in 1961 and 1971 was respectively 2,803,869 and 3,349,071 persons. The labor force referred to here is the South Sulawesi inhabitants ranging from 10 to 54 years of age. For 1977 to 1979 it is projected as shown on table 5.28.

It is also known from the data found that the number employment in South Sulawesi was 1,621,429 manpower in 1961, and 1,861,934 manpower in 1971. Estimated to the period 1977 to 1979 it will be:

1977 - 2,023,790	manpower
1978 - 2,052,021	"
1979 - 2,080,647	"

From the data above we see that the labor supply will only be absorbed respectively 57.8 % for 1961, 55.6 % for 1977 and from then on 60.4 %.

The number and estimation of the employment for agricultural sector in South Sulawesi are as follows:

1961 - 1,345,832
1971 - 1,548,532
1977 - 1,681,040
1978 - 1,684,492
1979 - 1,728,269

or an average of 49.0 % of the number of labor supply available each year. This means that if it is estimated that about 85 % of South Sulawesi inhabitants live on the agricultural sector. It is obvious that the agricultural sector still requires a large number of labor force (see table 5.29.).

2) Labor supply and employment: comparison between the urban and rural areas.

According to the data found, the availability of labor 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 only 21.51 %.

The number of labor supply absorbed in employment in each sector is found respectively: about 86.64 % in rural area and about 13.36 % in urban area. With the growth rate of manpower in South Sulawesi of 1.04 % each

year, the available labor supply in 1961, that is 3,142,611, and in 1971, 3,484,772 will become 3,853,857 in 1981.

The number of labor force is the number of South Sulawesi inhabitants aging 10 years and older.

Calculated by classification of urban and rural areas, we see that in 1961 the number of labor supply in rural area was 2,466,635 and in urban area 675,974. In 1971, 2,735,198 in rural area and 749,574 in urban area. In 1981 there will be 3,853,857 respectively 3,024,900 in rural area and 828,957 in urban area.

The entire number of labor employment in 1961 was 1,621,429, respectively 1,404,805 in rural area and 216,624 in urban area. In 1971 the entire number was 1,861,934; 1,613,180 in rural area and 248,754 in urban area. It is estimated to become 2,139,102 in 1981, respectively 1,853,318 in rural area and 285,784 in urban area. See table 5.30. and 5.31. to get a clear description.

Estimating that 80,95 % of number of employment in South Sulawesi is located in the rural area, especially for the agricultural sector, and about 2,37 % in the urban area, we can calculate the number of labor employment in 1961 to be 1,346,832 in agricultural sector, in rural area 1,308,522 and in urban area 38,310. In 1971 the number was 1,548,532; in rural area 1,502,614 and in urban area 45,922. The estimation for 1980 yields a number of 1,776,782 for the agricultural sector, with the following classification: 1,726,238 in rural area and 50,544 in urban area. See table 5.32 for a clear explanation.

3) From the discussions above we see obviously the importance of the agricultural sector, especially in South Sulawesi, because this sector is the largest one in its part of increasing the regional domestic products in South Sulawesi. In addition to this, the agricultural sector is one which absorbs the largest number of labor supply available. It shows that the agricultural sector is still the backbone of economy in South Sulawesi until 1981, as the largest part of the inhabitants live on this sector.



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 exclusively and that of other sectors in general.

If we say the promotion of the agricultural sector, we are not only referring to the promotion of this sector alone, but also other sectors which will develop and promote; it is even hope that the other sectors especially the industrial one will increase in growth rate, so that the aims of the construction will be achieved.

The chief priority of the agricultural sector is urgently felt to be fixed in arranging steady and goal-conscious programs. This matter is important as we see that the potentiality activities is as yet far beneath the target expected, and simultaneously we still see the non-uniform potentiality throughout South Sulawesi. In relation to this matter, in our discussions before, we see that both the income distribution in each construction area and the per capita income are still much different in each construction area, whereas we know that the main activities in the agricultural sector itself are located in the rural area and being cultivated by the largest part of the rural inhabitants.

There is a possibility that this gap can be overcome by promoting the agricultural sector in general and especially the activity designated to get the privilege.

Table 5.27.

Distribution of Gross product by sector in South Sulawesi Province (1969 - 1976)

Sector	Unit: %							
	1969	1970	1971	1972	1973	1974	1975	1976
1) Food crops	62.0	60.9	56.0	57.5	56.0	62.9	57.3	57.0
2) Estate crops by farmers	48.3	47.4	40.5	43.5	33.2			
3) Fishery	6.2	5.8	6.0	4.2	11.3			
4) Forestry	0.2	0.2	0.2	0.2	0.2			
5) Husbandry	4.6	4.8	0.3	5.3	6.8			
Mining	0.5	0.2	0.2	0.4	0.9			
Industry	2.2	2.4	2.8	3.9	3.6			
Construction	0.8	0.9	1.1	1.5	1.3			
Electricity, Gas and Tap water	5.7	5.4	4.4	6.2	6.2			
Transportation & Communication	1.4	1.4	1.9	2.7	2.2			
Wholesale & retail trade	0.2	0.3	0.2	0.2	0.2			
Banks & other financial agencies	1.8	2.0	1.8	1.8	1.6			
House rents	16.9	16.8	21.9	16.4	19.8	37.1	42.7	43.0
Government & Security	1.4	2.4	2.5	1.3	1.3			
Services	4.1	3.7	4.0	4.2	4.1			
Total	4.8	5.3	4.7	5.0	4.6			
	0.9	0.9	1.5	1.2	2.4			
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: BAPPEDA, Sulsel.

Table 5.28. The Number of labor force by age group in 1961 and 1971 and estimated number in 1977 - 1979 in South Sulawesi Province

Unit: persons

Age group					
10 - 14	548,309	560,538	739,613	749,931	760,393
15 - 19	470,624	721,671	606,573	615,035	623,614
20 - 24	402,424	377,441	496,082	503,002	510,019
25 - 29	342,805	426,245	404,194	409,833	415,550
30 - 34	289,962	330,307	327,527	332,096	336,728
35 - 39	243,893	352,476	264,389	268,077	271,817
40 - 44	202,792	239,725	211,399	214,384	217,338
45 - 49	167,112	187,260	167,763	169,763	172,631
50 - 54	135,948	153,408	130,785	132,610	134,460
Total	2,803,869	3,349,070	3,348,325	3,394,731	3,441,550

Source: BAPPEDA, SulSel.

Table 5.30. a. Number of labor supply by region South Sulawesi Province in 1961 and 1971, and estimated number in 1977 - 1978.

Year	Rural area	Urban area	Total
1961	2,466,635	675,976	3,142,611
1971	2,735,198	749,574	3,484,772
1977	2,881,347	784,420	3,646,767
1978	2,902,278	795,362	3,679,640
1979	2,942,764	806,459	3,749,223
1980	2,983,815	917,708	3,801,523
1981	3,024,900	828,957	3,853,857

Note: Manpower: inhabitants aging 10 year and older.

Source: BAPPEDA, SulSel.

Table 5.29.

Number of labor employment outside the Agricultural Sector in 1961 and 1971, and the projection to 1977 - 1979, in South Sulawesi

No.	S e c t o r s	Unit: persons				
		1961	1971	1977	1978	1979
1.	Industry & Mining, Electricity, Gas and Construction	74,511	85,571	93,010	94,500	96,541
2.	Commerce and Insurance	53,018	60,863	66,176	67,107	68,037
3.	Transportation/Communication/ Government	141,637	163,061	177,345	179,738	182,319

Source: The South Sulawesi Agency of Regional Development Planning (Data reprocessed).

Table 5.31. Number of labor Employment in South Sulawesi in 1961, 1971, and estimated number in 1977 - 1981

Year	Rural area	Urban area	T o t a l
1961	1,404,805	216,624	1,621,429
1971	1,613,180	248,754	1,861,934
1977	1,753,412	270,378	2,023,790
1978	1,777,871	274,150	2,052,021
1979	1,802,673	277,974	2,080,647
1980	1,827,820	281,852	2,109,672
1981	1,853,318	285,784	2,139,102

Source: BAPPEDA, SulSel.

Table 5.32. Number of labor Employment in Agricultural Sector of South Sulawesi by region in 1961, 1971, and 1977 - 1980.

Year	Rural area	Urban area	T o t a l
1961	1,308,522	38,310	1,346,832
1971	1,502,610	45,922	1,548,532
1977	1,633,224	47,816	1,681,040
1978	1,636,007	48,485	1,684,492
1979	1,679,109	49,160	1,728,269
1980	1,726,238	50,544	1,776,782

6. Marketing and transportation services for Agriculture

6.1. Marketing of farm products

6.1.1. The relation of city and villages in South Sulawesi Province

Having the reviews on the relation of cities and village, following three types of classification would be meaningful.

a) The first type is the big or medium "cities" where majority of farm commodities come from not only surrounding villages, but also from remote areas including foreign countries.

b) The second type is the small "cities" where majority of farm commodities come from surrounding villages and a few specific and expensive commodities, i.e. vegetables and fruit come from remote areas through the markets in the first type cities.

c) The third type is the small "cities"/the large villages where each farm commodities come from only within or near the villages.

Kotamadya-s Ujung Pandang and Pare-Pare only belong to the first category in the Province and the following six "cities" such as, Watampone in Kabupaten Bone, Polmas in Kabupaten Luwu, Sinjai in Kabupaten Sinjai, Pangkajene in Kabupaten Pangkep, Sungguminasa in Kabupaten Gowa are included, in the second type of cities.<sup>1)</sup> And then the third type of cities are able to be found out in the center of other Kabupatens.

The marketing routes for the selected commodities and the concerned areas with each type of city can be shown as table 6.1. The improvement of marketing systems would promote a regional agricultural development in the second type of city, because the transportation of farm products produced there and other kinds of goods depend a great deal upon the transportation means. However, if the marketing improvement plans were formulated, agricultural producing should be formulated at the same time.

Group of commodity for agricultural production in South Sulawesi Province are distributed as follows, and each group has each marketing route to 3 types of city as mentioned above.

---

1) These cities have many trucks and pick-ups (more than 100).

- a) Food Crops
  - i) Rice,
  - ii) Processing of drying the products such as corn, cassava, onion, green gram, peanut,
  - iii) Commodities produced in plain area such as tomato, Eggplant,
  - iv) Commodities stocked few days such as pumpkin, potato, sweet potato, papaya, banana, salak,
  - v) Citrous fruits, this is produced in specific area, i.e. Kabupaten Jeneponto and Selayar, and
  - vi) Commodities of import and interinsular trade such as apple, sunkist, orange.
- b) Estate Crops
  - i) Coconut, coffee, these commodities also is food stuffs,
  - ii) Kakisa, sugar cane, these commodities have processing factories in the Province,
  - iii) Kapok, tobacco, these commodities are mainly for inter-insular, and
  - iv) Coffee, nutmeg, other commodities for export.
- c) Fisheries products
  - i) Commodities of inland fish captured such as carp etc,
  - ii) Commodities of brackish water fish cultured such as milkfish, etc,
  - iii) Commodities of sea fish,
  - iv) Commodities of drying fish, and
  - v) Shrimp and flying fish for export.
- d) Livestock Products
  - i) Commodities of big or middle animal such as cattle, buffalow, goat,
  - ii) Commodities of small animal such as poultry, duck,
  - iii) Horses and pigs, these are eaten in specific area in the Province, and
  - iv) Milk and eggs.
- e) Input commodity
  - i) Commodities for using food crops and estate crops,
  - ii) Commodities for using fishing and fish culture, and
  - iii) Commodities for using livestock.

Table 6.1. Routes of farm products by commodities  
for each region.

No.	Commodities	Ujung Pandang and Pare-Pare (1st type)
1.	Rice/paddy	all rice/paddy come from almost all regions in South Sulawesi
2.	(processing commodities)	-ditto-
3.	(produced in plain areas)	from neighboring-Kab. Takalar, Gowa, Maros/Pinrang, Sidrap and Barekang.
4.	(possible to trans- port)	almost all regions all seasons except Kab. Majene, Luwu, Selayar and Mamuju
5.	(produced in high land areas)	from Kab. Jeneponto, Gowa, Barekang at all seasons, from Kab. Sinjai at season.
6.	(tropic fruit)	the same as (4)
7.	(citrus fruits)	from Kab. Jeneponto and Selayar
8.	(import and inter- island	from Java island, Australia, Taiwan and other regions.
9.	(estate crops)	from almost region export commo- dities through this cities.
10.	(livestock)	-ditto-
11.	(fishery products)	from Kab. Pangkep, Takalar, Jenepon- to, Pinrang and Barru.



Table 6.1. Routes of farm products by commodities  
for each region  
 (continued)

No.	Watampone and Polman, etc (2nd type)	Other small cities/range Desc-s (3rd type)
1.	almost all come from neighboring a little come from far off	come from only neighboring (include near kabupaten)
2.	-ditto-, and Kab. Wajo, Sidrap/Kab. Tator, Wajo	-ditto- (a little include other kabupaten area)
3.	-ditto-	-ditto-
4.	-ditto-	-ditto-
5.	from Kab. Sinjai, Jeneponto/Enrekang, Tator at all seasons	almost in each Kabupaten at all seasons a little from near Kabupaten
6.	almost in each Kabupaten all seasons a little from near Kabupaten	only in Kabupaten
7.	through Ujung Pandang, Pare2 from Kab. Jeneponto and Selayar	a little from Kab. Selayar.
8.	a little through Ujung Pandang	come a little
9.	from only neighboring export commodities collecting here.	from only neighboring
10.	-ditto-	-ditto-
11.	-ditto-	ditto, except inside area-Kab. Tator, Enrekang, Soppeng.

6.1.2. Distribution of supply area and shortage/demand area by commodity

Distribution of producing area of farm products in South Sulawesi Province is shown in table 6.2. Using following indicators, XX (two X) means one unit for consumption per-capita and X (one X) means 0.5 unit, i.e. in the case of commodity peanut. The mark of X (one X) in Kabupaten Luwu means to be scarce, the mark of XX (two X) in Kabupaten Enrekang means enough to consumption in this Kabupaten. And the mark of XXX (three X) in Kabupaten Soppeng is showing that surplus of one X had existed in the Kabupaten in 1976.

An equation of calculation X is as follows:

$$X = \frac{\text{Average of farm production per-capita by Kabupaten}}{\text{Average of consumption per-capita in the Province}} \div 2$$

$$= \frac{\text{Volume of farm production} \div \text{population in Kabupaten}}{\left( \frac{\text{Total volume of farm Production} - \text{Volume of export}_1}{\text{Total population in South Sulawesi}} \right) \div 2}$$

Mark: X = 0.3 - 0.7

XX = 0.8 - 1.2

XXX = 1.3 - 1.7

· · ·  
· · ·

Note: The volume of export was taken away from total volume, because other factors are not available in this time.

For instance, in case of livestock in both area Luwu and Pare-Pare there are one shortage of X and two of it in Ujung Pandang. On the other hand there are four surplus of X in Tator, however, probably their surplus meats in Tator may have been transported to Pare-Pare and Ujung Pandang, because to they are almost all pork. Especially consumers in Ujung Pandang who have pure buying power may have bought more meat than consumers in Pare-Pare. Consumers in Luwu may have bought it from other Kabupaten. In general, consumers in rural area have bought shortage commodities, they have eaten other foods such as fishes and peanut in South Sulawesi Province, particularly in Kabupaten Pinrang and Majene. This table 6.2. shows that there are surplus of two commodities only, vegetables and fruit, other commodities of main food stuffs are in shortage, but farmers in the rural area probably would be able to get the main food stuffs some money which is obtained farmers selling vegetables and fruit to other areas.

1) The analysis of collected data by the Farm Practice Survey have not been finished yet, therefore this is a estimation but not a conclusion.

Table 6.2. Estimation of supply area and area of shortage (1976)

Commodity	Rice/Corn Cassava	Peanuts	Green beans/ Soy beans	Vegetables	Bananas
LUV 01	XX	X	XX	X	XX
TAT 02	XX			XXX	
SOP 03	XXX	XXXXX	XXXXXXX	XX	XXXXXXXX
WAJ 04	XX		XXXXX	XXX	XXXXX
BON 05	X	XXXX	X		X
SIN 06	XX	XXXXXXXXX		XX	
BUL 07	XX	XXXX		X	
SEL 08	XX	X	X		X
BAN 09	XX	X		XXX	
JEN 10	XX	X	XXXXX XXXXX	XXX	XXXXX XXXXX
TAK 11	X		XXXXX	XXXX	XXXXX
GOW 12	XX		XXX	XX	XXX
U.P 13					
MAR 14	XXXX			X	
PAN 15	XXX	X	XXX	X	XXX
BAR 16	XX	XXXXX XXXXX XX	X	XX	X
P.P 17				X	
SID 18	XXXXXXXX			XX	
ENR 19	X	XX	X	XXXXXXXXXX XXXXXXXXXX XXX	X
PIN 20	XXX		XX	X	XX
POL 21	X			X	
MAJ 22	X	X	XX	XXXX	XX
MAM 23	X	XX	XXXXXXXX		XXXXXXXX

Source: Reffer to appendix 6.1.-6.7.

Table 6.2. Estimation of supply area and area of shortage (1976)  
(continued)

	Fruit		Coconut	Coffee	Livestocks	Fishes
01	XX	XX	XXXXX	XXXX	X	XX
02				XXXXX	XXXXXX	
03		XXX	XX		XX	X
04	XXXXXXXX	X	XXXX		XXX	XX
05			XX		X	X
06			XXX	XXXX	XXXX	XXX
07	XXXXX	X	XXXXX	XXXXX XXXXX	X	XXX
08	X	XX	XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX		X	XXX
09		XX	X	XXXXXXXXXXXX XX	XX	XXX
10		XXXXXX	XXX		X	X
11	XXXXX	X	X		XX	XXXXX
12	X	XX		XXX	XX	
13		X				XX
14	XXXX	X			XX	XXXX
15	X	X	XXXX		XX	XXXX
16	X	X	X		XXX	XXX
17			X		X	XXXXXXXX
18	XXX	XX	XXX		XX	
19		XXXXXX	X	XXXXXXXXXX	XX	
20	XXX	XX	XXXXXXXX	X	X	XXXX
21	XX	XXXXX	XXXXXXXX	XXXXXXXXXX	X	XX
22	XXXXX XXXXX XXXXX X	XXX	XXXXXXXX XXXXXXXX	XX	X	XXXXX
23	XX	XXXX	XXXXXXXXXXXX XXXXXXXXXXXX XXXXXX	XXX	XX	XXX

There is no farm Products in Ujung Pandang and Pare-Pare, in addition, consumers there get some income from non-agricultural industries, already it is said to be the consuming cities. Table 8.2. shows the situation of only one year 1976, consequently the data are different from general information that Kabupaten-s Takalar and Gowa have enough food stuff and then Wajo has sometime much surplus of it. This will be clear in the following table 6.3. and figure 6.1.

Table 6.3. Estimation of supply area and shortage area of major food (1974 - 1976)

No.	Kabupaten	1974	1975	1976	Average
1.	IJW	XX	XX	XX	XX
2.	TAT	XX	XX	XX	XX
3.	SOP	XXX	XXX	XXX	XXX
4.	WAJ	XXX	XXXX	XX	XXX
5.	BON	X	XX	X	X
6.	SIN	XX	XX	XX	XX
7.	BUL	XXX	XXX	XX	XXX
8.	SEL	X	X	XX	X
9.	BAN	XX	XX	XX	XX
10.	JEN	XX	XX	XX	XX
11.	TAK	XXX	XX	X	XX
12.	GOW	XXX	XX	XX	XX
13.	U.P.				
14.	MAR	XXX	XXX	XXXX	XXX
15.	PAN	XX	XX	XXX	XX
16.	BAR	X	XX	XX	XX
17.	P.P.	X			
18.	SID	XXX	XXX	XXXXXXXX	XXXX
19.	ENR	X	X	X	X
20.	PIN	XXX	XXX	XXX	XXX
21.	POL	XX	X	X	XX
22.	MAJ	X	X	X	X
23.	MAM	XX		X	X

Source: Refer to Appendix 6.1.

Fig. 6.1.1. Shortage and surplus area  
Main food stuffs 1974 - 1976/Average

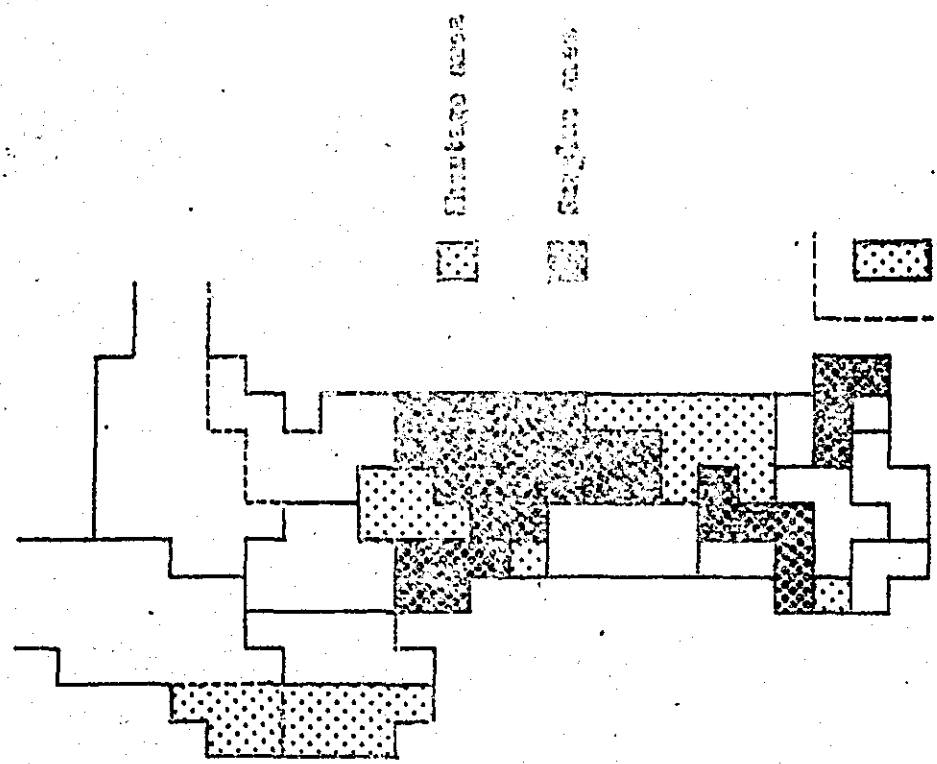
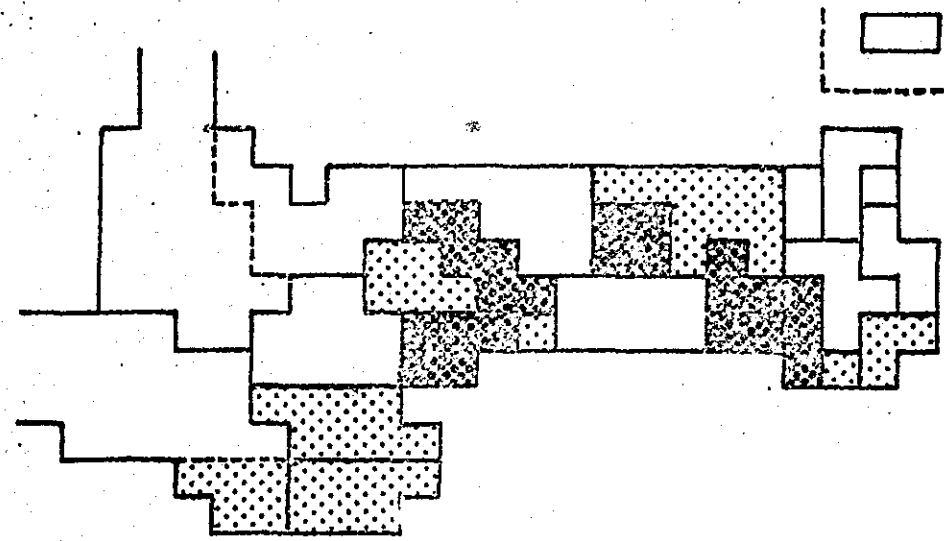


Fig. 6.1.2. Shortage and surplus area  
Main food stuffs 1976



Source: refer to Appendix II, II.1. and  
Table 6.2

FIG. 6.1.3.

Shortage area and surplus area  
Dry vegetable & Potato.

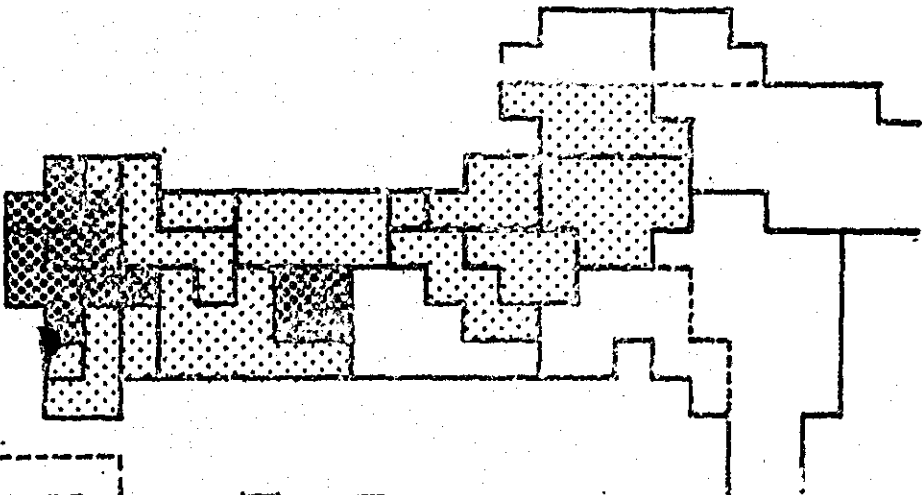


FIG. 6.1.4.

Shortage area and surplus area  
Drainable vegetable

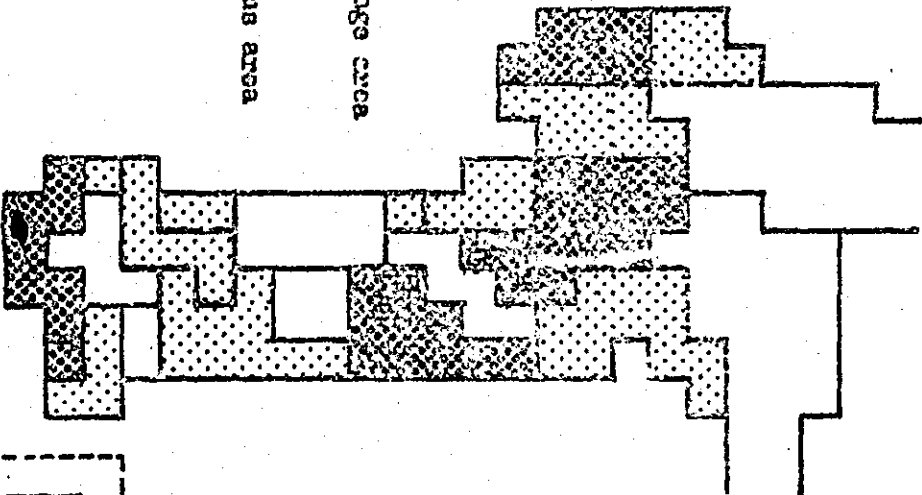
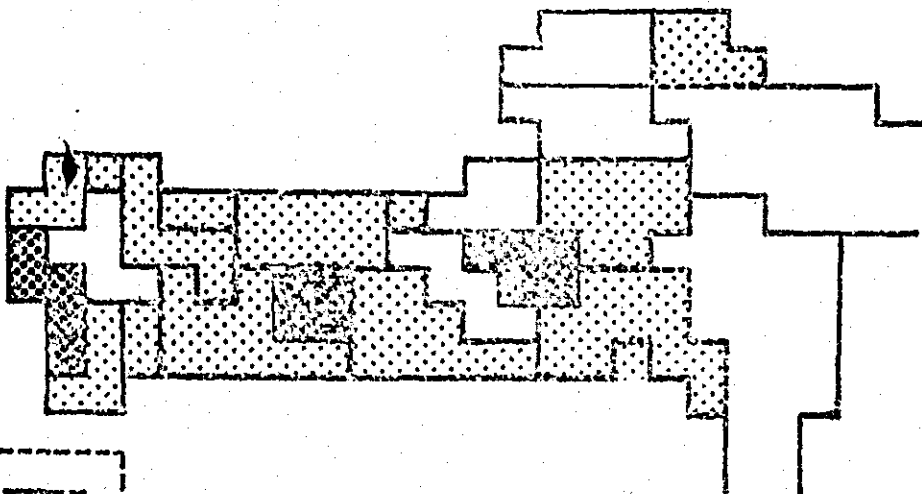


FIG. 6.1.5.

Shortage area and surplus area  
Zenit



Notes: by average of 1974-76.

### 6.1.3. Monthly supply of main food stuffs

Comparison with gross yielding and estimated net consumption<sup>1)</sup> is shown in Fig. 6.2. In the case of formulation agricultural development plans, the following subjects are very important to study:

- i) How to preserve the commodity during a term of produced surplus, and
- ii) How to distribute and how to transport during a shortage term.

For instance, in case of rice as shown in fig. 6.2., though short volume (gross yielding - net consumption) of rice was about 140 thousand tons during 5 months, October 1974 to February 1975, before that there were surplus of rice about 140 thousand tons during 3 months from June to September, therefore when their surplus had been preserved for regional consumers, balance of the supply and demand could be kept, but there are many stock loss, transportation loss, and processing loss, but inter-insular trade of rice exist in 1975, maybe regional consumption was made in South Sulawesi Province. Figure 6.2. has some errors like that, however the term of shortage and of surplus is made clear in the same figure, i.e. commonly the term of shortage of rice is from November to February, corn and cassava is from June to November, in South Sulawesi Province.

In the Province most commodity except rice do not have systematic stock system at present. Particularly to preserve cassava and corn depend farmers thought in spite of they are necessary for export and interinsular trade. Almost all surplus of these commodities is preserved in farmers houses. Unfortunately if they are not sold, farmer is deprived of thought of producing them.

The concern of this Province, though they had tried to increase corn and cassava due to export, farmer did not produce them always more than before. In future the stock systems for these commodities should be improved from dependence on farmer.

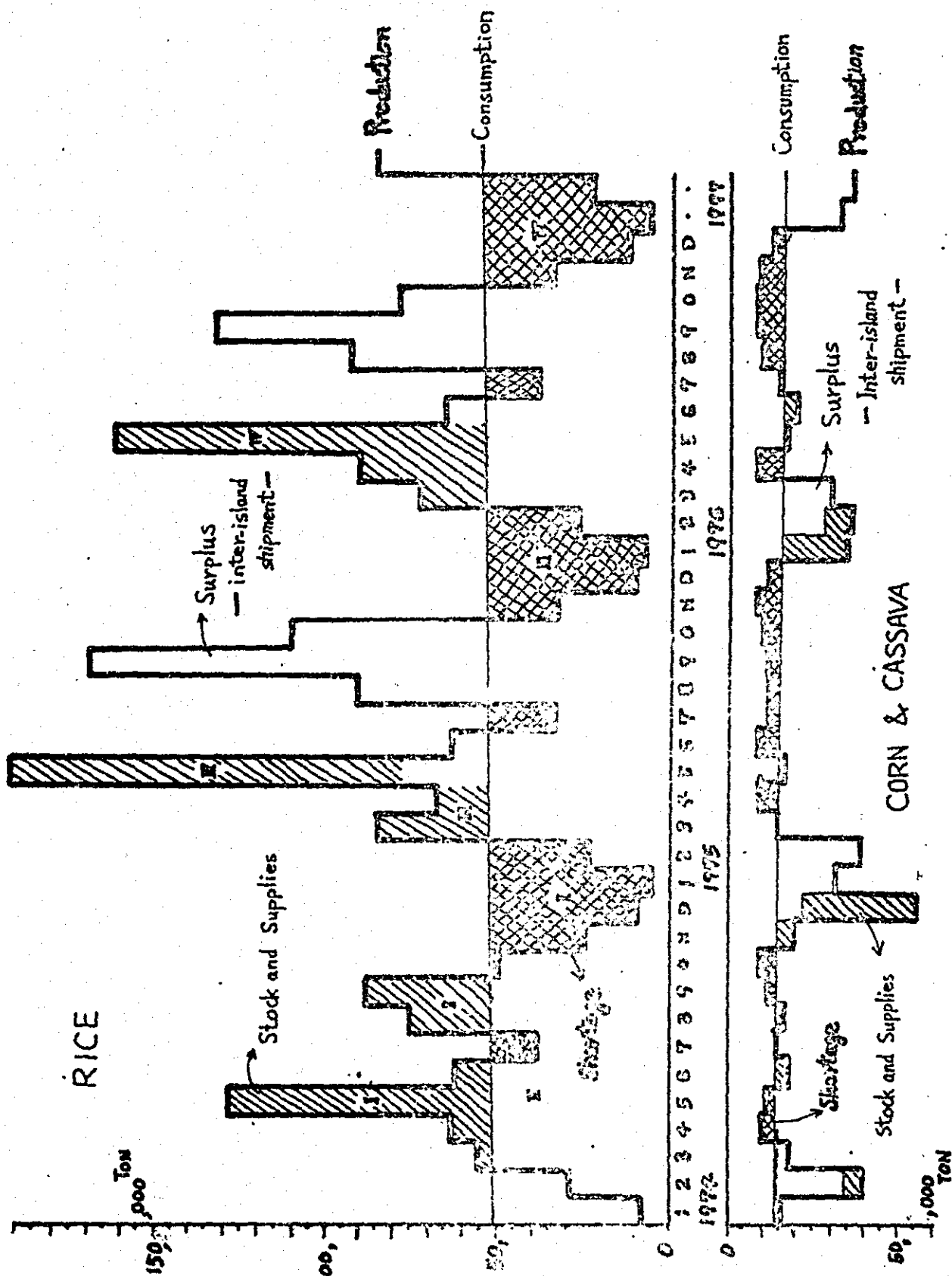
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1) Volume of consumption of rice = population x 116 Kg./capita  
x 30 days/month

Volume of consumption  
of cassava



Fig. 6.2. Condition of monthly supply of raw feed stuffs in South Sulawesi (1974 - 1977, Feb.)



Source: Laporan Pertanian 1974, 1975 and 1976.

6.1.4. Change of demand structure and regional production structure

Share of producing food stuffs (tons) in South Sulawesi Province keep expanding rice consumption as shown on table 6.4., that is demand structure keep changing, because each people hopes to eat rice but corn/cassava. Therefore production of corn/cassava decline, though the prices of these commodities have been increased. Particularly, increasing prices high of corn is higher than that of rice, and though increasing rate of price of cassava is lower than their, the declining of production of cassava is lower than that of corn as shown in figure 6.3. and 6.5. One of the reason is shown in the following figure 6.4. i.e. share of gross income of rice for farmers is very bigger than other crops.

Table 6.4. Share of producing food stuffs (ton) 1964 - 1976

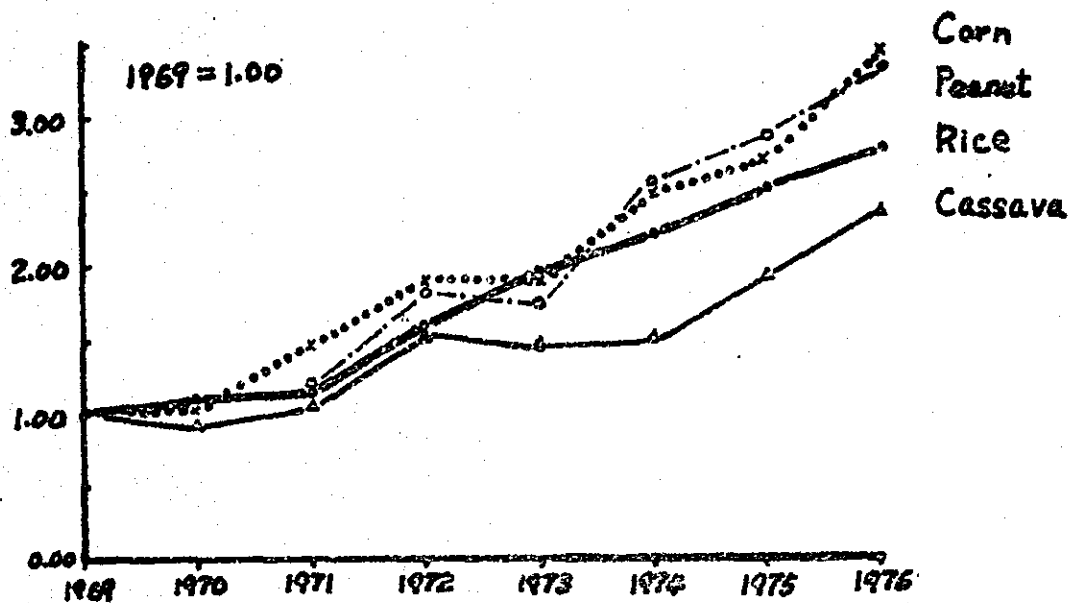
Year	Rice	Corn	Cassava	Other	Total
1964	46	29	11	14	100
1965	47	22	16	15	100
1966	44	28	13	15	100
1967	50	21	13	16	100
1968	53	22	11	14	100
1969	55	19	10	16	100
1970	63	15	7	15	100
1971	66	11	7	16	100
1972	60	11	11	18	100
1973	56	23	7	14	100
1974	66	9	10	15	100
1975	70	8	6	16	100
1976	70	9	7	14	100

Source: refer to appendix 6.14.

According to the figure 6.5., the total volume of production by commodity, rice is increasing, corn/cassava is decreasing, but peanut has different state. For instance in case of peanut as compared with both Fig. 6.5. and 6.6. considerable correlation is found out i.e. if yield per-ha. of cassava were not decline, farmer could get 20% more gross income than that in 1976.1)

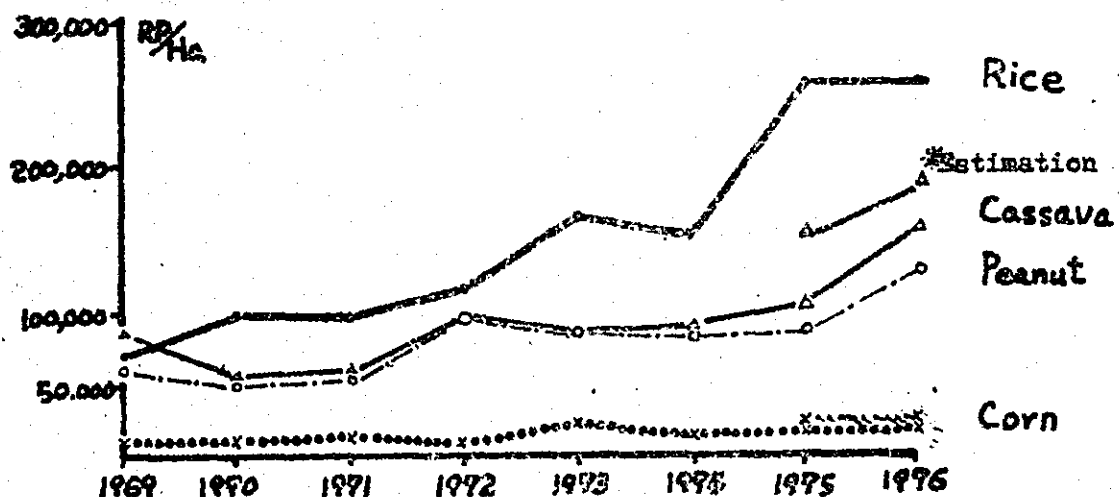
1) Farmers income is Rp. 156,600 in 1976 estimated one is Rp. 187,800. Farmer would get Rp. 31,200 per ha. of gross income.

Fig. 6.3. Fluctuation of Prices by commodity in South Sulawesi  
(1969 - 1976)



Sources: refer to Appendix II, table II.15 - 19.

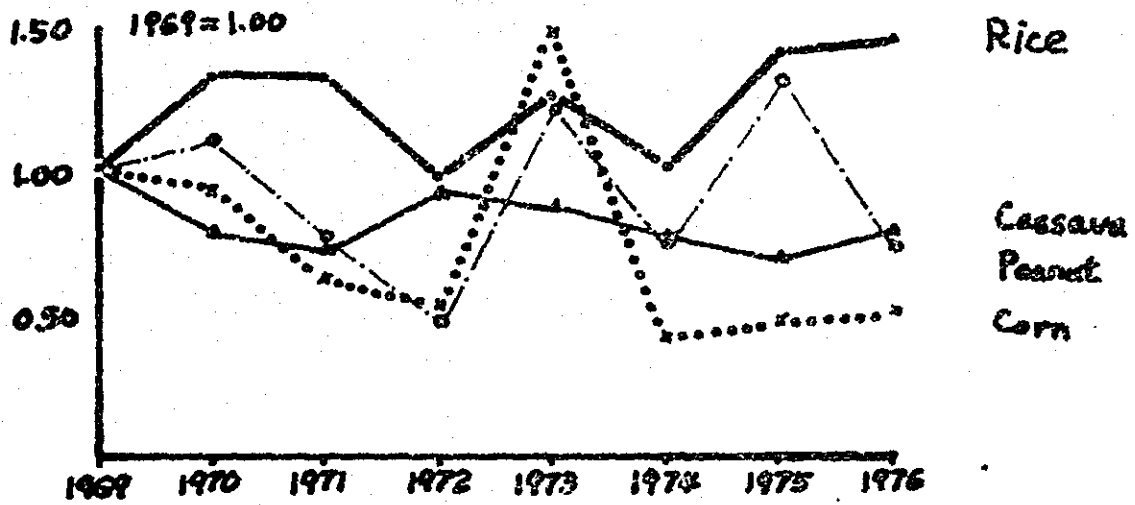
Fig. 6.4. Gross income fluctuation (Rp./ha.) by commodity  
in South Sulawesi (1969 - 1976/farmers level)



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

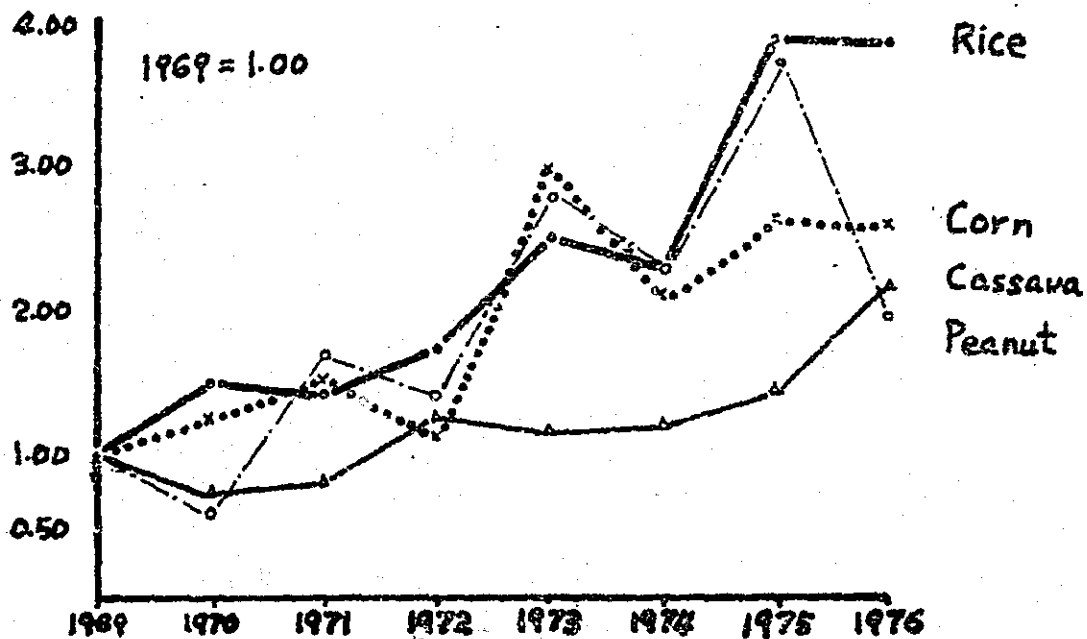
Sources: refer to Appendix II, Table II.15 - 18.

Fig. 6.5. Trend/index of total volume by commodity in SOUTH SULAWESI 1969 - 1976



Source: refer to Appendix II, II.15. - 18.

Fig. 6.6. Trend/index of farmers gross income (per ha.) in South Sulawesi (1969 - 1976)



Source: refer to Appendix II, II.15. - 18.

Recently yield per ha. of most main food stuffs except rice keep declining, that is due to not only socio-economic factors but also technical problems. The later is considerable problem particularly in marketing, because in the marketing of export, stabilized shipment of quantity and the quality of commodities is considerable factors for profitable trading. On the other hand in South Sulawesi Province annual rate of increase of food stuffs is only 0.3 % and annual rate of population increase is 1.6 %.

In near future even in the region probably the food stuffs will fall into shortage and many infrastructures and much budget will be required to increase rice production. If farm technique for other crops also will be raised, and and yield per hectare by commodity will be kept, the budget requirement will not be so larger.

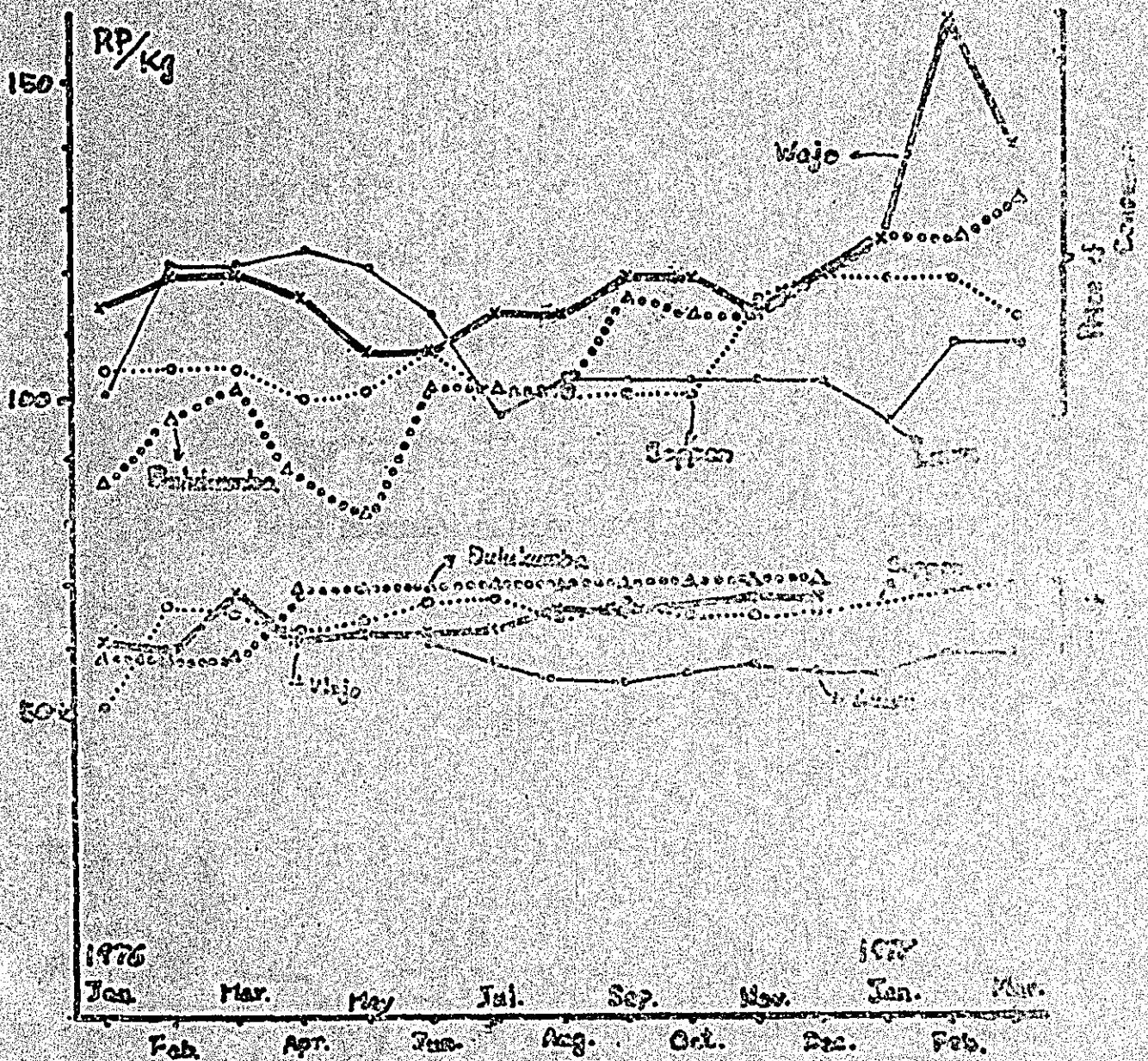
#### 6.1.5. Movement of prices for farm product

The fluctuation of prices for farm products are larger than that of non-farm products, and commonly the fluctuation for farmers are less than that for consumers as shown figure 6.7. In South Sulawesi Province particularly condition of transportation system between rural area and urban area is very poor, and the frequency are a little. Under the condition, to keep the stable balance of supply and demand is very difficult, there are poor stocking system in each city in the Province. Therefore there are large differences of the price of farm products by month and by Kabupaten as shown in figure 6.8., 6.9. and 6.10.

These data are showing further consideration, i.e. price of tomatoes in Ujung Pandang in December 1976 is 4.5 times that of Kabupaten Enrekang even corn in main food stuffs has 1.5 times of difference of the price in Pare-Pare with Kabupaten Wajo in September. The farmer is caused by the problem of the supply and demand and then is due to very bad natural condition in the wet season. The latter is estimated to be the over supply by the reason of poor communication to Pare-Pare from surrounded areas such as Kabupaten Wajo and Bone.

Estate crops have also large fluctuation by Kabupaten, i.e. average prices of coconut in 1973 are Rp. 17 in Kabupaten Luwu and Rp. 68 in Bone, and they are Rp. 140 and Rp. 55 in each Kabupaten in 1974 they are Rp. 21 and Rp. 25 in 1975. On the other hand livestock commodity and fish commodity has comparatively low fluctuation than other food crops and estate crops. The fact mentioned above are very important condition, but in any case there there are many fluctuation of the prices and the cause is not simple but complicated. On the following article 6.1.6. this item was studied based on the results of field surveys and data analyses.

Fig. 6.7. Consumer price of rice and Producer price of dried and unhusked rice (1976 - 1977)



Sources: refer to Appendix II, II.20 & 21.

Fig. 6.8. Price fluctuation of rice by Kabupaten (1976)

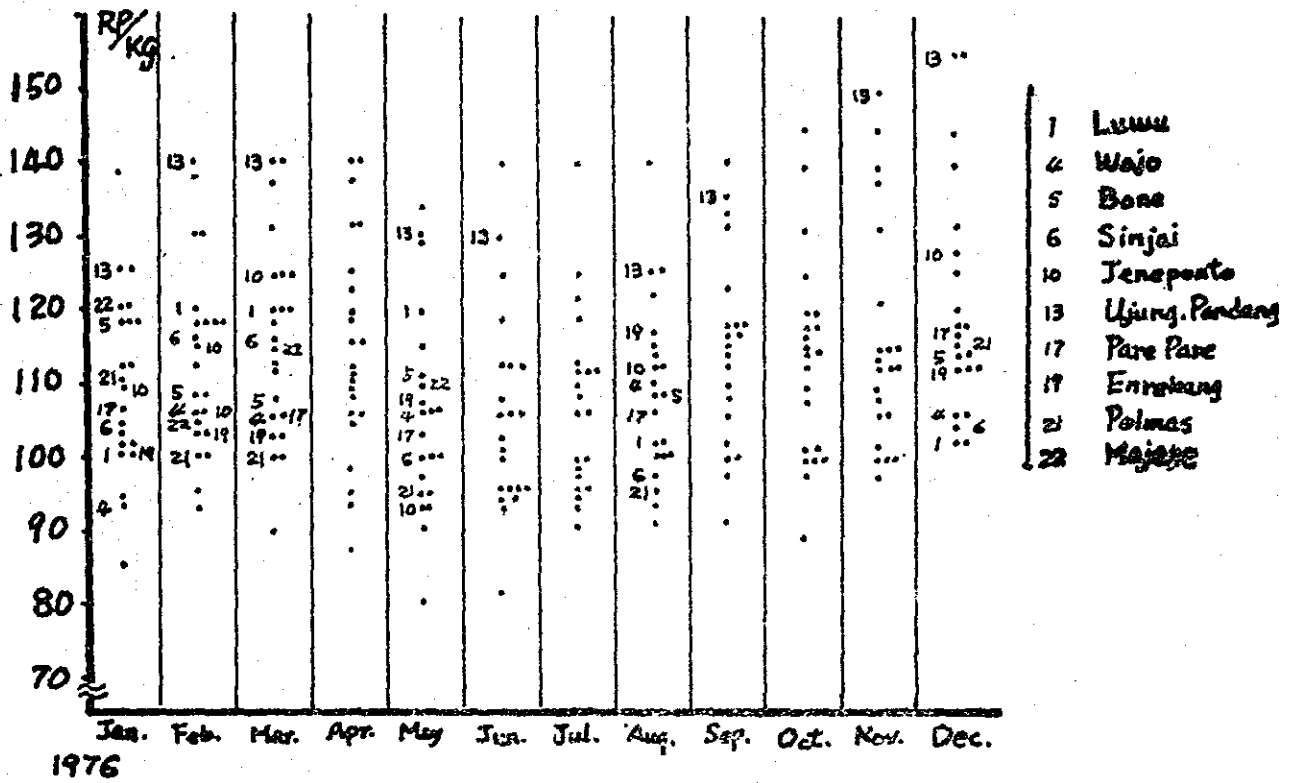


Fig. 6.9. Price fluctuation of onion by Kabupaten (1975-1976)

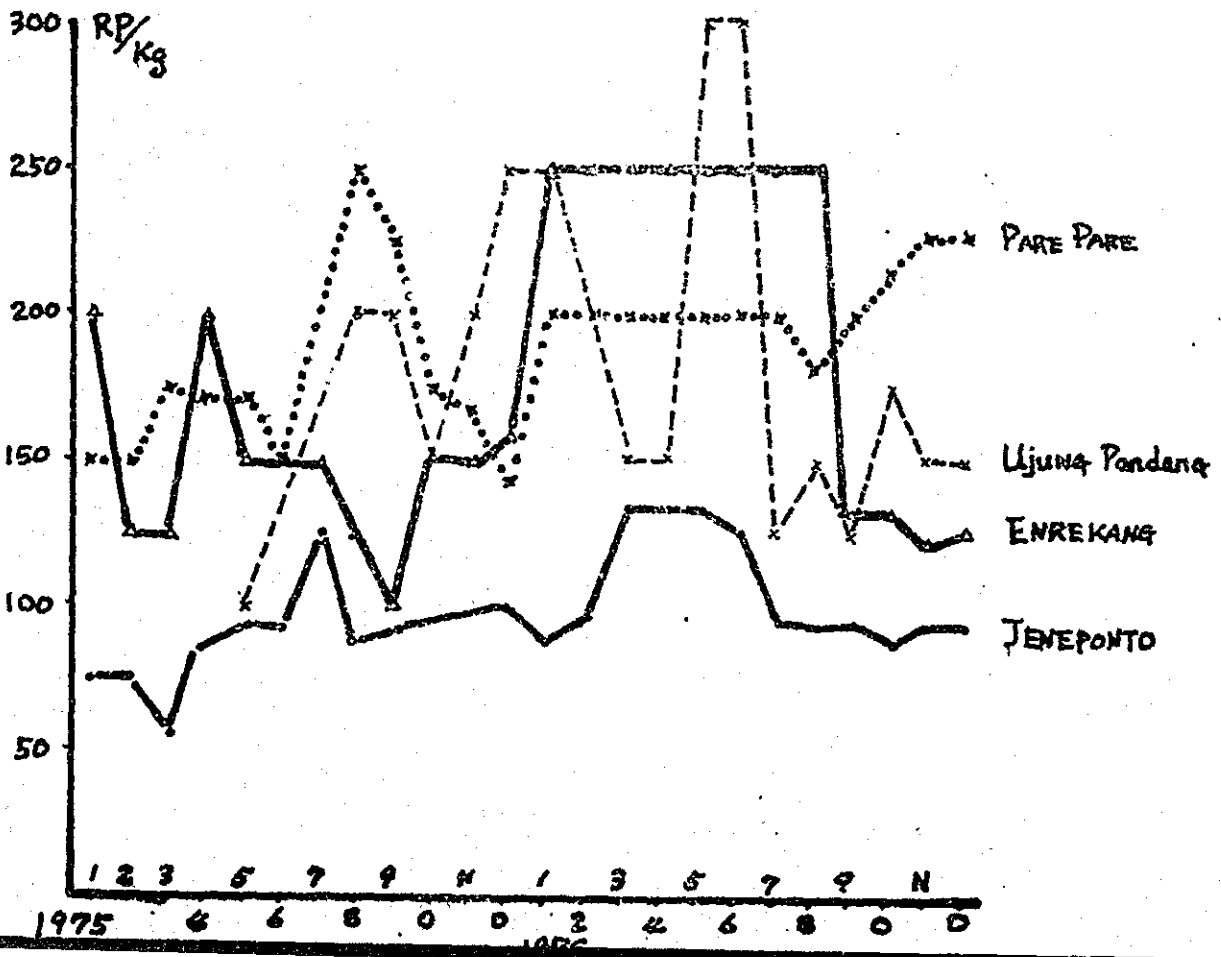
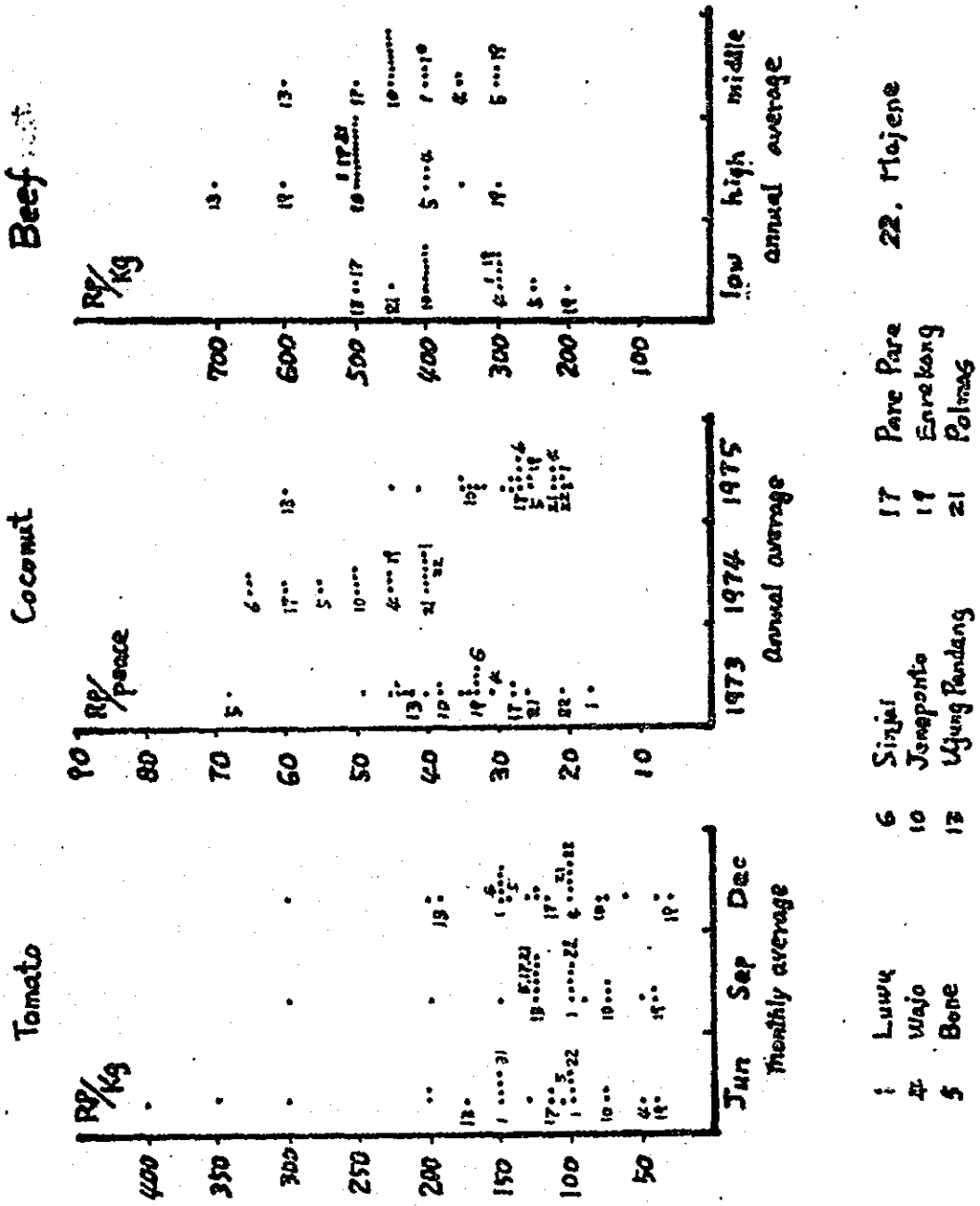




Fig. 6.10. Difference of price of tomatoes, coconuts and beef. (1973/1975)



6.1.6. Systematic problems on the agricultural marketing

The primary objective of marketing improvement is that the prices at farm level and at the market level should be stabilized and the amount of input materials should be enough to keep agricultural production. Stabilization at the low price level makes the production stagnate. The high price level constrain the demand. Thus these drastic fluctuation of prices make the agricultural development retard. The secondary objective is value added. Both farmers and traders should share benefit based on their contribution. As the strategy for the farmer, the agricultural output will be stabilized by taking various means to fit the productive conditions for instance, regulation of producing, infrastructure such as irrigation system and land improvement. As the strategy for the measures mentioned above, traditional marketing system should be changed into a rational and modern one. This could bring a reasonable profit for the farmers. As the strategy for the latter, the adjustment of marketing volume by the stock of production in the regional and export-import will be delivered as a countermeasure.

In connection with promoting those aspects mentioned above, some important problems of agricultural marketing in South Sulawesi were studied as follows:

- a) The physical and technical constraints against the improvement of agricultural marketing.
  - i) The agricultural productivity is restricted by physical features such as soil and climate condition, insect and pest. Therefore a volume of farm production and the supply of it to the consuming area is variant among the regions. The prices of farm products have a wide fluctuation as compared with other type commodities.
  - ii) The main farm products in South Sulawesi Province are commodities for food stuffs, therefore abundant production of these commodities result a fall in prices because consumption in the Province is limited.
  - iii) Almost all farm products in South Sulawesi Province are characterized as perishable commodities, therefore the cost to maintain the quality is added on the marketing system, i.e. packing case, packing work, perishable loss, where the road conditions are not so good.

iv) Agricultural technique is at low level on the physical feature, therefore the farm products has little good quality as merchandise, i.e. in Kabupaten Brekang, Tator and Polmas there are a lot of those commodities, therefore middleman of the city can buy those with low prices though the traffic cost is high.

b) The socio-economic and farm practical constraints.

v) In South Sulawesi Province almost all farmers are small scale farming, therefore farm products which are traded have to be collected from a lot of farmers. In order to that, each middleman has use many collectors, naturally marketing cost is up by them.

vi) Almost all Desa-s are still in self-sufficient economy, therefore merchandies are surplus of livelihood, and it is very difficult to collect commodities together as marketing unit. Especially, farmer produce many commodities little by little because they make them for self consumption, therefore there are poor marketing system only in Desa-s.

vii) There are scattered distribution of farming in South Sulawesi Province, therefore it is difficult to collect farmers information in which the surplus are much or little.

viii) There is a traditional custom for trading between farmer and middleman in South Sulawesi, therefore farmer cannot get the proper profits, i.e. farmer cannot use the intensive management because almost all farmers are small scale farming and poor. By supplying the new seeds, the input materials and the operation cost such as harvesting, the middleman get the unjustifiable profits more than 50 % against total profit.

ix) There exist many feudal land-ownership customs in South Sulawesi and land rent is payed in kind to landlord by tenants, it is difficult for tenant-farmers voluntarily to select the farm commodities for selling. Besides, farmers can neither make an accumulation for reproduction nor intensive management, because land rent at fee is very high, i.e. 50 % of harvested production.

c) The constraint of communication and transportation between Desa and city

x) The middleman in the consumption area and marketing system also are small scale and poor. For small marketing system, the facility with stocking and transportation means to be also equiped insufficiently.

xi) Communication net works among Desa-s and cities are poor in South Sulawesi. Therefore the Desa-s cannot easily get enough information concerning consumers movement and demand of the cities. The improvement of marketing systems in Desa-s should be emphasized.

xii) Transportation systems are also poor in South Sulawesi. Thus the expenditure of transportation could not be lessen in South Sulawesi.

6.1.7. A summary of comment'on marketing and processing by a short-term Expert

A short-term Expert for marketing and Processing, Mr. Nishiyama Iwao have made a series of study on the subject, since 25-th October '77 together with a Counterpart Mr. Tajuddin Dullah at Ujung Pandang and some Kabupaten-s. On the way of survey and data collection, emphases have put on transfer of technics, especially how to approach the marketing system development. The findings and recommendations are as follows:

1) Marketing systems and prices of agricultural products in Ujung Pandang has been studied. Two Distribution markets, Pasar Terong and Pasar Pabaeng-Baeng in Ujung Pandang, even enough they are so called as distribution market, in which the mixed function of distribution and retail are still exist in those market. Consequently, it is not clear that middleman are working as distributors or retail dealers and that prices are for distribution or retail.

2) The survey has been made on the retail market in Sungguminasa, capital of Kabupaten Gowa. The functions of this market are part of Ujung Pandang, because the distance between two markets is quite near and both are located in the same route of commodity flow. The two cities are already in the same socio-economic conditions.

3) Ujung Pandang and Sungguminasa are considered to be one area of consumption. This way of thinking will be adaptable for other cities such as Sinjai, Pare-Pare, Pinrang, Palopo and Polewali. On this premise, a large distribution market shall be established on the midway of the two cities at the planning stage of future market system.

4) The pasar Central, Pasar Terong and Pabaeng-Baeng in Ujung Pandang and the pasar Sungguminasa in Gowa are regarded as retail markets in the area.

- 5) There are necessities to modernize retailers, helping the establishment of their retailers shop instead of stalls and hut prevailing at present. Thus the retail markets will match with the city conditions and will be able to supply fresh commodities and joyful shopping for citizens who utilize those facilities.
- 6) There are many systems which are found in the shipment of agricultural products in the production area, however almost all systems are doing the business not in collectively but between each farmer and middleman separately. Consequently scarce profit are shared for farmers and sometimes pre-harvest transactions are seen indicating the poverty of farmers.
- 7) The function of BUUD/KUD for purchasing rice by the Government is to be expanded for other commodities. That is to say BUUD/KUD have to work for the collection of commodities and after that price negotiation should be done with middleman by BUUD/KUD.
- 8) After accomplishing some expansion of functions in BUUD/KUD, there will be necessity to build up a set of facilities including transit centers, collecting centers and storage facilities. The plan mentioned above have to be decided based on the real conditions of production area
- 9) There will be necessity and availability of a planning on demand and supply after deciding the delivery system in the consumptive area, and the collection and shipment system in the production area. Each consumptive area have decide necessary amounts of demands by commodity by month. At the same time each production areas must make a plan for cultivating and selling which is distinctive of destination by commodity by month. Then the conference will be hold among the consumptive areas and production areas to reach conclusion on the demand and supply plan based on the each plan brought by respective area. The production areas have to estimate the amounts of products and shipment and the consumption areas must have adjustment for the amount and the arrival period by commodity so as to maintain an adequate price. This new work shall be responsible for the provincial Government, because it is a policy and implementation for expanded area far beyond the border of Kabupaten Governments.

10) It is quite important to clarify the future demands and price forecast of estate crops in the international marketing, because the price of many estate crops are influenced by the international prices. In addition, main estate crops such as coconut, coffee, clove and so forth have long usefull life and competative alternative crops. Consequently, prompt dispatch of an additional marketing Expert who has been dealt with such aspects mentioned above would be recommended.

6.2.

Communication and transportation

The conditions of communication and transportation in South Sulawesi Province were written by the Team of SRDS. The following items are described in the Report (refer to p.356, Part D, Volume 3, Intern Report of SRDS):

Introduction (Summary & Recommendation)

- 1.1. Road transportation
- 1.2. Sea transportation
- 1.3. Air transportation
- 1.4 Trade and storage

Road Transportation

- 2.1. Road network
- 2.2. Vehicle ownership
- 2.3. Demand for transportation
- 2.4. Cost of new construction, rehabilitation and maintenance of new roads
- 2.5. Major road transportation programs of the past
- 2.6. An inter-regional perspective on road transportation
- 2.7. Major future plans

Sea Transportation

- 3.1. Port location and facilities
- 3.2. Port operations
- 3.3. Major problems and future plans

Air Transportation

- 4.1. Major airports and facilities
- 4.2. Major problems and future plans

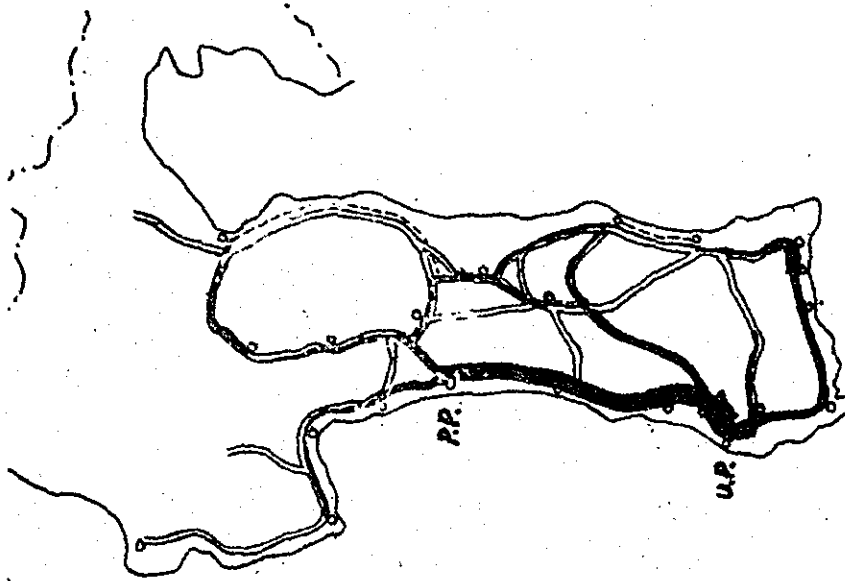
Trade and Storage

- 5.1. International trade
- 5.2. Storage

Main point relating to agriculture of the Report is in appendix III.

Particularly the following figures 6.11. - 6.13. show road condition and traffic state. Some correlation between Palopo in Kabupaten Luwu and Sengkang in Kabupaten Wajo, between Watampone in Kabupaten Bone and Sinjai and Watansoppeng in Kabupaten Soppeng because there are very bad road condition and poor condition of bridges.

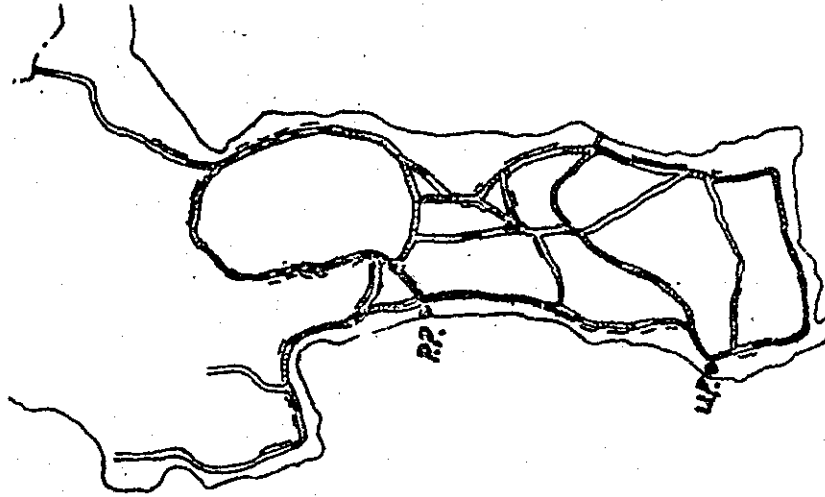
Fig. 6.11. Flow of goods and trucks  
(1974)



■■■■ = much or too much traffic volume  
 - - - - = many traffic volume  
 \_\_\_\_\_ = a little traffic volume  
 - - - - = little/very little

Source: Dir. Perekonomian, Sulsel/1974.

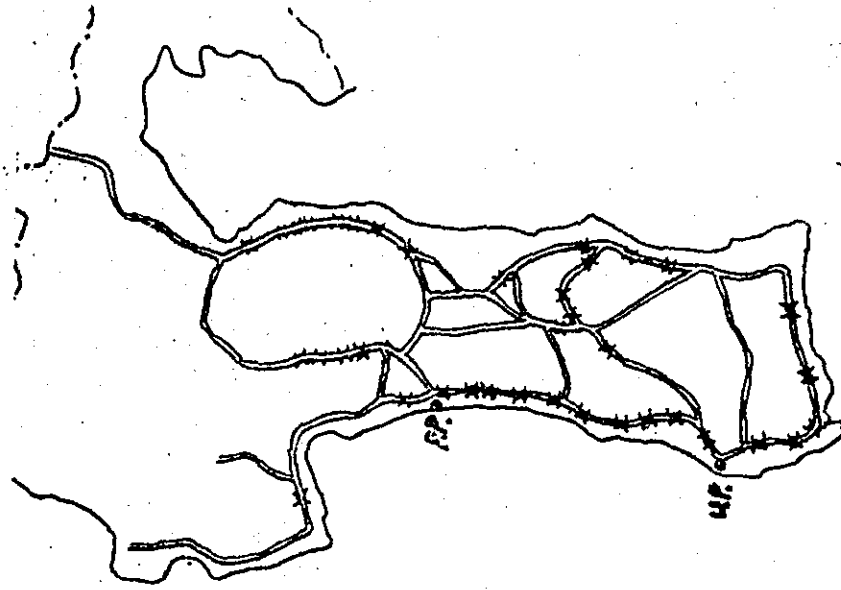
Fig. 6.12. Road condition by sur-  
face at present/1976



■■■■ = Good  
 - - - - = average  
 \_\_\_\_\_ = broken  
 - - - - = heavily broken

Source: DPU, Sulsel/1976.

Fig. 6.13. Major bridges recon-  
struction program  
(1976)



■■■■ = under construction.  
 - - - - = Planned

Source: DPU, Sulsel/1976.



7. Administration of agricultural extension service

The agricultural extension as an activity extending agricultural skill and technology is one of the aspect of the agricultural services for development. And the agricultural services include at least the following items:

- a) Agricultural credit service as a capital extending activity,
- b) Agricultural products marketing service as a means for common marketing, and
- c) Agricultural extension service itself as an activity extending skill and technology.

On this occasion the administration and organization of the Agricultural Extension Service will be discussed. To explain about the administration and organization of the Agricultural Extension Service it is advisable to explain the organization of the Ministry of Agriculture.

The organization of the Ministry within the region of the Republic of Indonesia, including the Ministry of Agriculture, has been regulated under a Government at Decision called the President's Decision No. 44/1974 and No. 45/1974 on fundamentals of the organization of the Ministries and the structure of organization of the Ministries.

The President's Decision has determined that the arrangement of Ministry's organizations consists of:

- a) the leader: Minister,
- b) the deputy leader: General Secretary,
- c) the conductor: General Director, and
- d) the supervisor: General Inspector.

Based on this President's Decision, to arrange the structure of organization and the operational principles of the Ministry of Agriculture, the Minister of Agriculture has made a decision called the Decision of Minister of Agriculture No. 190/KPTS/Org/5/1975, which classifies the main duties, function, structure of organization and the operational principles of the organization unit within the scope of the Ministry of Agriculture, both central and regional.

Generally speaking, the organization unit of the Ministry of Agriculture consists of:

- a) the General Secretariate,
- b) the General Inspectorate,
- c) the General Directorate of Food Crops Agriculture,
- d) the General Directorate of Forestry,
- e) the General Directorate of Fishery,
- f) the General Directorate of Husbandry,
- g) the General Directorate of Estates,
- h) the Bureau of Agricultural Investigation and Development,
- i) the Bureau of Agricultural Education, Training and Counselling, and
- j) the Regional Offices in provinces.

According to what is determined by the President's Decision mentioned above, i.e. the General Secretariate acting as deputy, the General Inspectorate as supervisor, and the General Directorate as conductor, thus the existence of the Bureau of Agricultural Investigation and Development and the Bureau of Agricultural Education, Training and Counselling constitute supporting units for the development and progress of the conducting unit's endeavors.

It is at the Bureau of Education, Training and Counselling that we hope to find an integrated arrangement of agricultural administration and counselling organization which have the aims of enabling farmers to utilize their ability to improve their welfare as subjects of agricultural development, managing farmers' culture in poly-valenced shape. The organization of the Bureau of Agricultural Education, Training and Counselling consists of:

- a) the Secretariate,
- b) the Agricultural Education and Training Center,
- c) the Personnel Education and Training Center,
- d) the Agricultural Extension Center, and
- e) the Unit of Technical Accomplishment.

The establishment of units of agricultural extension within the Ministry of Agriculture in accomplishing the tasks of the Bureau of Agricultural Education, Training and Counselling, based on the Minister of Agriculture's Decision No. 190/1975 is done by the Agricultural Extension Center.

The organization of the Agricultural Extension Center consists of:

- a) The office of Extension Guidance, which has the task of extending guidance on the matter of counselling (extension), the development of counselling methods, and the preparation and distribution of agricultural informations to the Agricultural Extension Units.
- b) The office of Extension Planning Guidance, which has the task of developing and guiding the arrangement of agricultural extension planning for farmers, which is done by the Agricultural Extension Units.
- c) The office of Extension Administration, which has the task of administering the development and guidance to accomplish the administration of extension, the report on extension and the evaluation on counselling extension for all the Agricultural Extension Units.

The development and guidance of the agricultural extension planning for farmers, which are done by the Agricultural Extension Units, are regulated by the office of Extension Planning and Guidance.

The organization of the office of Extension Planning and Guidance consists of:

- a) the sub-section guidance for adult farmer, which has the task of developing and guiding the programming of adult farmers guidance for the Agricultural Extension Units
- b) the sub-section of guidance for young farmer, which has the task of developing and guiding the formation of farmer youth extension program for Agricultural Extension Units
- c) the sub-section of guidance for farmer household, having the task to develop and guide the programming of farm household counselling for the Agricultural Extension Units.

With these explanations above we can explain further about the administration and organization of Agricultural Extension viewed from various approaches as follows:

7.1. National, provincial and local governmental services

7.1.1. National

At national level, there is a Agricultural Extension Center belonging to the Bureau of Agricultural Education, Training and counselling (the Indonesian abbreviation is B.P.L.P.P.) which has the task of building Agricultural Extension Units. The Agricultural Extension Units belong to the Sub-Directorate of Corporational Development under the Directorates of Facility Improvement of the General Directorates of Food Crops Agriculture, Forestry, Husbandry and Estates, and to the Sub-directorate of Fishery Culture Development of the Directorate of Facility Improvement belonging to the General Directorate of Fishery.

Nevertheless, the role of the Agricultural Extension Center as a unit authorized to arrange the establishment of the agricultural extension done by the extension units within national level of the Ministry of Agriculture has not been functioning properly yet.

Hierarchic connection on the regulation of establishment of the agricultural extension, which is temporarily needed within the program of Bimas intensification, has only been seen at the Food Crop Agricultural Extension.

At national level in the General Directorate of Food Crops Agriculture, there is a Project of Food Crops Agricultural Extension directed by the Project Director who is directly subordinate to the General Director of Food Crops Agriculture, having the task, among others, of extending technical guidance to the extension units at provincial level.

The organization of the extension project mentioned above is autonomous and it is not structural extension device of the General Directorate of Food Crops Agriculture.

Therefore the organizational and functional relations between the extension project mentioned above and the extension unit of the Sub-directorate of

Corporational Development within the Directorate of Facility Improvement is not so obvious.

7.1.2. Provincial

At provincial level there is no hierarchy on the regulation and guidance of the administration and organization of agricultural extension as a whole the Bureau of Agricultural Education, Training and Counselling. There is as yet indeed no institution of the BPLPP at provincial level to manage the maintenance and to extend guidance to the extension units of the General Directorate agencies within the Ministry of Agriculture, especially in the attempts of developing methods, the guidance on programming and the guidance on the accomplishment of the counselling activity. Whereas the activity ought to be handled by an institution of the Agricultural Extension Center of the BPLPP at provincial level so that the approach to agricultural extension problems in the regions can be done consistently, the same way as the Central Education and Training for personnels which has its activity at provincial level in the form of Personnel Education and Training.

Thus up to this time the activities of constructing and developing agricultural extension services at provincial level, both in the planning and the implementation are still entirely handled by the extension unit of the General Directorate with the methods and techniques according to each their sections.

It is even apparent that in some extension units within agricultural agencies in South Sulawesi Province, they have lost their structural shape, so that the administration and organization of the extension service towards the Kabupaten's, Kecamatan's and Desa's levels are vague and even disconnected.

We take for example:

- a) the extension units belonging to the Fishery Service supported by Agricultural Extension Specialists (PPS) in the fields of:
  - i) fish capture,
  - ii) culture,

iii) processing techniques and  
iv) cooperative agencies,  
are found to do more routine activities than counselling activities, due to indefinite financial support as well as indefinite direction.

b) At the Husbandry Service, the extension unit is situated at the Bureau of Production, with its administrative and organizational hierarchy which are not clear down to the Kabupaten's level of extension unit.

c) At the Forestry Service, there is relatively no special extension unit, the only existing one being the Educational Section which has the job to select among the personnel who are to be trained at the Forestry Education and Training Center in Ujung Pandang or Bogor.

Thus the integrated program of approach towards the solution of problems especially faced by farmers in their poly-valenced culture has not been concreted yet.

Whereas the endeavor to solve problems within the agricultural development cannot stand apart from the integrated approach of problems. And the important matter is the exact choice and determination of the strategic main problem, since the exactness in determining the strategic problems is already a step onward, both in accelerating the solution of the problem alone to achieve optimal results, and in economizing costs.

It means that efficiency and effectivity can be improved for the utilization of nature potential resources in developing the agricultural sector. Exclusively for the Estates Service, they are waiting for the authorization from the South Sulawesi Governor for an extension unit as a structural organ within the organization of the South Sulawesi Estates Service which is directly subordinated to the Chief of Service at provincial level.

Since the South Sulawesi Estates Service has only an agency at residential level and there is no agency of it at Kabupaten's level, the extension service to the estate farmers is given by the extension unit which exists at the Regional agency. At the Provincial Food Crops Agricultural Service, the extension unit is directly subordinated to the Chief of Provincial Level Service as

a Bureau in Organizational Structure of Service.

The chief of this extension unit educates five PPS-es who have each their speciality in the respective fields of:

- a) agronomy,
- b) agro economics,
- c) soil and irrigation, and
- d) extension methods and techniques.

The task of the Head of Extension Unit in the education of those specialists is to coordinate their work plan and activities relating to administrative matters, operational facilities, coordination with other heads of Bureaus in Service Organizations, Investigation Institutes, Universities etc. for the smooth run of the PPS' job.

At the regional level extension unit, four PPS-es work in their respective speciality:

- a) agronomy,
- b) agro economics,
- c) soil and irrigation, and
- d) plant protection.

The PPS' job at the provincial level extension unit is aimed at the tackling and developing of regional matters, e.g.:

- a) informing Institutes of Investigation and Universities to receive, recess and continue the new findings, or extend problems to be investigated further,
- b) giving informations to the residential and kabupaten level PPS-es about the new technological development, both concerning government programs and for the solution of farming problems in the field,
- c) conducting surveys and making evaluations on the results of agricultural extension activities, and
- d) processing and analyzing survey findings and field experiments to be used as basis for the development of agricultural extension programs.

While the PPS' job at the regional/residential level extension unit is stressed on the solution of field problems faced by the Field Agricultural Extension Worker (PPL).

### 7.1.3. Kabupaten and Kecamatan (Districts)

Not all agencies of the General Directorate within the Ministry of Agriculture in South Sulawesi Province have an extension unit at Kabupaten's level, let alone at kecamatan's level. That is why not all activities in Developing the agricultural sector, especially those in connection with the utilization of nature potential resources, without damaging their prosperity, have been accomplished by means of guided and organized extension service.

Out of so many activities in the development of the agricultural sector, which are striving to enable farmers in utilizing their potentials to improve their welfare, only the Food Crop Agricultural Service has been conducting the administrative arrangement of the agricultural extension service down to the desa unit regions within the range of the BIMAS program.

At the Kabupaten level Food Crop Agricultural Service there is an extension unit where a new PPS is working, who handles more about general gardening. A PPS' main job at kabupaten's level extension unit is stressed on the guiding of Senior Field Agriculture Extension Workers (PPL-S) at Kabupaten's level and at the Rural Extension Centre in accomplishing the extension activity.

The number of PPL-S at Kabupaten's level in Rural Extension Center (R.E.C.) is two persons. Each R.E.C. is directed by a PPL-S and it covers ten to fifteen Rural Unit Regions (Wilud). While the criteria of Wilud formation is based on the following items:

- a) the range of service including an acreage of 500 to 1,000 ha. of paddy fields,
- b) the farthest distance from the farmer to the center of the Wilud is 3 hours vice-versa, and
- c) there must be four forms of service facilities:
  - i) a Rural Unit Bank (of the B.R.I.) which functions in extending credits,
  - ii) a Rural Extension Service with at least one PPL,
  - iii) a Village Unit Store/Kios to serve as supplier of production devices: fertilizers, pesticides, seeds and farming equipments.



- iv) BUUD/KUD (Village Units of Cooperation and Cooperative of Village Units) which function in the marketing and processing of products and the economic activities of the farmers.

The agricultural extension service is conducted by the PPL with one Wilud included in each his scope of service. A PPL has five fundamental tasks, i.e.:

- a) to distribute useful agricultural informations,
- b) to teach better agricultural skill,
- c) to suggest more profitable farming industry,
- d) to make efforts to get the devices, facilities and agricultural informations required, and
- e) to develop self-ability and self-support in farmers to achieve a more prosperous living.

By applying a new extension method called the Training-and-Visiting System (which is abbreviated LAKU from the Indonesian term Latihan-dan-Kunjungan) it is expected that one PPL will train 16 Key farmers/Konta Tani (from 16 different farmers group), and one Key farmer will train 20 progressive farmers (as his group member), while one progressive farmer will train about 5 ordinary farmers. Thus one PPL is expected to do his job within an area included in one Wilud which is about 600 to 1,000 ha. in acreage and which has about 1,500 farmers in it.

## 7.2. Agricultural Institution

It turns out that there is no steady planning on the development of an agricultural extension which includes food crop agriculture, fishery, husbandry and estate, adapting the potentials which can be developed within the development of the agricultural sector in each Kabupaten.

The agricultural institution as the Agricultural Extension Center activities which exist at present is still at its preparatory stage in South Sulawesi Province and it consists of a Rural Extension Center, Agricultural Extension Service and Agricultural Information Center.

### 7.2.1. Rural Extension Center/R.E.C.

A pilot activity for this purpose is being started by the BPLPP by means of the USAID. Four Rural Extension Centers have been built in the Kabupaten Luwu in the scope of the Luwu Project for the development of the agricultural sector through the transmigration program in the region. Those four REC-s will include 4 fields according to agricultural potentials which need to be developed at the location of its existence, such as the following:

- a) REC on food crop agriculture at Kecamatan Bone-Bone,
- b) REC on fishery at Kecamatan Walenrang,
- c) REC on husbandry at Kecamatan Mangkutana, and
- d) REC on estates at Kecamatan Bajo.

Such REC-s seem more useful and therefore they need to be developed in other Kabupaten-s according to the agricultural potential which needs to be developed. Those four RECs in the Kabupaten Luwu constitute facilities to support a consistent approach towards the solution of problems concerning the development of agricultural sector in the region. Therefore there has to be a coordination of the guidance in program formation synchronizing activities which have to be developed through RECs at provincial level.

### 7.2.2. Agricultural Extension Service

As a basis of extension activities of the Food Crops Agriculture Extension Project and it constitutes an institution within the rice BEMAS program to conduct the following activities:

- a) formulating an extension program for farmers,
- b) spreading informations on agriculture which is useful for farmers by means of films, slides, demonstrations etc.
- c) suggesting more provitable farming industries by means of trials, demonstration plots and so on,
- d) helping to find devices needed by farmers, e.g. Seeds of high variety, pest-proof high varieties etc.,
- e) teaching the knowledge of agricultural skill through farming courses, demonstration plots/demonstration farms, contests, trainings etc., and
- f) developing farmers' self-supporting and self-laboring abilities to improve their welfare by means of meetings with farmers groups, discussion etc.

An agricultural Extension Service directed by a PFL-S or a Middle Agricultural Extension Worker/PPM will functionally serve ten Wiluds handled by 10 PFL-s to train 15,000 farmers according to the extension method of the LAKU system.

This extension method applying the LAKU system for South Sulawesi Province is only at the preparatory stage, where the agricultural extension institutions referred to above is also only at its preparatory stage of the aid of World Bank through the Agricultural Extension Project at the General Directorate of Food Crops Agriculture in Jakarta, which is planned to be 46 in number. The personnel directly involved in the implementation of this new method of extension is composed of the following:

- a) Middle Agricultural Extension Worker/PPM  
or senior PFL 138 persons,
  - b) Field Agricultural Extension Worker/PPL 620 persons,  
and
  - c) Agricultural Extension Specialists/PPS 52 persons.
- (see table 7.1.).

### 7.2.3. Agricultural information center

This agency appears to be an activity unit of the Agricultural Extension (BPLPP) at provincial level, which is at its planning stage only.

Table 7.1. List of Agricultural Extension Service distribution plan PPS, PFM and PPL in the development of Rural Regions in South Sulawesi Province

Province/Regions/Kabupaten-s	Wiluds	BPP	PPS	PFM	PPL
A. Province	-	-	5	-	-
<b>B. Representatives</b>					
1. Region I Palopo	-	-	4	-	-
2. " II Bone	-	-	4	-	-
3. " III Bantaeng	-	-	4	-	-
4. " IV Ujung Pandang	-	-	4	-	-
5. " V Pare-Pare	-	-	4	-	-
6. " VI Polewali	-	-	4	-	-
Total	-	-	24	-	-
<b>C. KABUPATEN</b>					
1. Luwu	60	4 *)	1	2	60
2. Tana Toraja	30	3	1	8	30
3. Pare-Pare minicipal	2	1	1	4	2
4. Pinrang	63	4	1	10	63
5. Sidrap	62	3	1	8	62
6. Barru	14	2	1	6	14
7. Enrekang	13	1	1	4	13
8. Polmas	20	3	3	8	20
9. Bone	59	4	1	10	59
10. Soppeng	30	3	1	8	30
11. Wajo	58	4	1	10	58
12. Pangkep	30	2	1	6	30
13. Maros	26	2	1	6	26
14. Ujung Pandang	4	1	1	4	4
15. Gowa	41	4	1	10	41
16. Takalar	18	1	1	4	18
17. Jeneponto	17	1	1	4	17
18. Bantaeng	12	1	1	4	12
19. Bulukumba	31	2	1	6	31
20. Sinjai	15	1	1	4	15
21. Majene	5	1	1	4	5
22. Selayar	5	1	1	4	5
23. Mamuju	5	1	1	4	5
Total	620	46	23	138	620
Grand Total	620	46	52	138	620

Note : \*) IBRD - USAID.

Other services for farmers

In addition to the agricultural extension mentioned above, we will present in headlines the bureau of agricultural credit service and the service for common marketing of agricultural products.

Although an activity already exists which serves credits and common marketing, and which has already extended services to industries of fishery, husbandry and estates, it is only an insignificant activity, so that its approach is restricted to the service of credit and the service of the common marketing within the scope of the BIMAS only. Those two kinds of service are included within the functions of the four devices of the Wilud-s where the village unit bank (B.R.I.) has its job in credit service (the channelling and return of credits), and afterwards through the KUD functionally serves the farmers in getting the necessary production devices (seeds, fertilizers, pesticides and equipments for pesticides).

Especially for the service of common marketing of rice, it is executed by means of the BUUD/KUD. Based on the decision of the Governor of South Sulawesi No. 487a/VII/1977, the 23 kabupaten-s and Kotamadya, 156 Kecamatan-s and 956 Desa-s in South Sulawesi Province excluding the Kecamatan-s and Desa-s within Kotamadya are classified into 620 Wilud-s with their already-existing four facilities:

- |  |                |
|--|----------------|
| a) PPL-s   | 358 persons,   |
| b) Rural Unit Bank (the B.R.I.)  | 199 units,     |
| c) BUUD/KUD (including that for fishermen, Sapta Marga villages and copra) | 345 units, and |
| d) Kios  | 508 units.     |

Up to the end of December 1977 these four facilities have increased as follows:

- |           |                  |
|-----------|------------------|
| a) PPL-s  | 596 persons, and |
| b) B.R.I. | 210 units.       |

Thus the remaining lack of the four facilities is as follows:

- |             |                |
|-------------|----------------|
| a) PPL-s    | 24 persons     |
| b) B.R.I.   | 100 units,     |
| c) BUUD/KUD | 301 units, and |
| d) Kios     | 1,938 units.   |
- (see table 7.2.).

Table 7.2. Distribution of WILUD and their facilities in South Sulawesi Province (1977.7.1.)

No.	Kabupaten/ Kotamadya	Kecamatan	Number of WILUD	Village 1)	Existing Four facilities			
					PPL	BRI	KUUD/ KUD 2)	Stores
1.	L u w u	14	50	143	29	18	24	35
2.	T a t o r	9	31	65	20	10	14	52
3.	K.M. Pare-Pare	3	2	12	2	2	1	4
4.	P i n r a n g	7	61	37	40	20	28	41
5.	S i d r a p	7	52	30	40	22	24	24
6.	B a r r u	5	13	24	9	9	11	11
7.	Enrekang	5	14	28	8	4	5	14
8.	Polmas	8	36	83	18	7	16	26
9.	B o n e	21	50	205	32	12	27	46
10.	Soppeng	5	50	46	20	12	13	33
11.	W a j o	10	52	51	15	10	21	2
12.	Pangkep	6	30	33	16	10	6	34
13.	M a r o s	4	26	41	20	7	17	43
14.	K.M. U.Pandang	3	6	13	4	4	5	1
15.	G o w a	8	41	47	32	17	31	40
16.	Takalar	6	18	35	8	6	15	34
17.	Jeneponto	5	21	28	12	5	14	14
18.	Bantaeng	3	12	15	9	3	8	6
19.	Bulukumba	7	31	33	19	7	21	25
20.	Sinjai	5	17	38	10	5	12	20
21.	Majene	4	9	20	2	4	11	3
22.	Selayar	5	5	20	-	2	4	4
23.	Mamuju	6	7	27	-	2	4	-
T o t a l		156	620	956	358	199	345	508

SK. Governor's decision no. 487 a/VII/1977, July 6, 1977.

Note : 1) excluding the Kecamatan and Desas within Kabupaten of municipal cities.

2) including the BUUD / KUD of fishermen, Sapta marga villages and Copra.

Continued

Table 7.2. Distribution of WILUD and their facilities in  
South Sulawesi Province  
(Continued)

No.	Kabupaten/ Kotamadya	Required Four facilities			
		PPL	BRI	BUUD/KUD	Stores
1.	L u w u	50	25	50	175
2.	T a t o r	31	15	31	152
3.	K.M. Pare-2	2	2	2	10
4.	P i n r a n g	61	30	61	250
5.	S i d r a p	52	26	52	250
6.	B a r r u	13	9	13	112
7.	Enrekang	14	7	14	36
8.	Polmas	36	18	36	100
9.	B o n e	50	25	50	212
10.	Soppeng	30	15	30	105
11.	W a j o	58	29	58	152
12.	Pangkep	30	15	30	150
13.	M a r o s	26	13	26	150
14.	K.M. U.Pandang	6	4	6	5
15.	G o w a	41	20	41	250
16.	Takalar	18	9	18	67
17.	Jeneponto	21	10	21	62
18.	Bantaeng	12	6	12	22
19.	Bulukumba	31	15	31	52
20.	Sinjai	17	8	17	22
21.	Majene	9	4	9	7
22.	Selayar	5	2	5	7
23.	Mamuju	7	3	7	10
T o t a l		620	310	646	2,438

Table 7.3. Condition of development of WILUD until October 1977 in South Sulawesi Province

No.	Kabupaten/Kadya	Number of WILUD	Facilities of WILUD				BUUD/KUD	KIOS SAPRODI		
			P.P.L.	B.R.I. Unit Desa		Total				
			Old	Added	Total					
<b>I. Daerah Kelompok A.</b>										
1.	Pinrang	61	40	20	60	19	1	20	28	41
2.	Sidrap	52	37	23	60	19	4	23	24	24
3.	Soopeng	30	22	8	30	3	4	13	13	33
4.	Gowa	41	32	8	40	15	2	17	31	40
5.	Makassar	27	22	8	30	7	-	7	17	43
6.	Pangkep	30	15	15	30	10	-	10	6	34
7.	Polmas	36	18	12	30	5	4	9	16	26
8.	Luwu	50	30	15	45	15	4	19	24	35
<b>II. Daerah Kelompok B.</b>										
9.	Tattor	31	20	12	32	9	2	11	14	52
10.	Bone	50	32	13	45	11	2	13	27	43
11.	Wajo	58	16	24	40	9	1	10	24	2
12.	Baru	13	8	7	15	9	-	9	11	11
13.	Bulukumba	31	19	14	33	7	1	8	21	25
<b>III. Daerah Kelompok C.</b>										
14.	Enrekang	14	8	7	15	3	2	5	5	14
15.	K.M. Pare-2	2	2	2	4	1	1	2	1	4
16.	K.M.U. Pandang	6	4	2	6	3	1	4	5	1
17.	Takalar	18	9	9	18	6	-	6	16	34
18.	Jenepono	20	12	8	20	5	-	5	14	14
19.	Bantaeng	12	9	6	15	2	2	4	8	6
20.	Sinjai	17	10	7	17	4	2	6	12	20
21.	Majene	9	2	2	4	2	2	4	11	3
22.	Selayar	5	-	2	2	2	-	2	13	-
23.	Mamuju	7	-	4	4	2	1	3	4	-
<b>Total</b>		620	367	220	596	174	36	210	345	508

Source : Dinas Pertanian Rakyat, Sul - Sel.



#### 7.4. Agricultural Education and Training

Basically there are two categories of targets to be achieved by the agricultural education and training activities, especially those which will be executed by the BFUP, i.e.:

- a) prospective middle level technicians, and
  - b) personnel within the range of the Ministry of Agriculture.
- Whereas the targets to be achieved by the agricultural extension activity itself will be the farmer and his household.

##### 7.4.1. The agricultural education

The aims of the agricultural education is to produce middle level technicians who are able to promote the productivity and profitability wherever he works, for whoever he works and in whatever field he works.

Such an agricultural education in South Sulawesi Province has a secondary level agricultural school which consists of the following:

- a) 1 public secondary agricultural school in Ujung Pandang,
- b) 5 public and private secondary agricultural school in the regions respectively in Ujung Pandang, Palopo, Makale, Polmas and Bone, and additionally, 1 private secondary school for husbandry in Ujung Pandang and 1 secondary husbandry course in Ujung Pandang. Those who are accepted as pupils in these schools are male and female Junior High School graduates majoring in mathematics who have passed their entrance test. These schools will produce PFL-s. The management of these schools is regulated by the BPLFP in Jakarta.

##### 7.4.2. Personnel training

The agency conducting this kinds of training at provincial level is the Agricultural Training Center/PLP. The objectives of this training are:

- a) to increase the knowledge and skill of agricultural extension workers who are educated maximally under the new project agricultural school which has a poly-valenced feature, and
- b) to improve the knowledge and skill of PFL-s.

The term of this training for agricultural extension workers is 6 months, which is divided into 3 stages, each of 2 months' term. The agricultural extension worker referred to here is the Chief of Extension Service at Kecamatan's level and the Chief of Seeds Center,

Seed farms, and other agricultural objects of the same level, who is not more than 49 years old.

The training for PPL-s is 2 months term, and this term is divided into 2 stages of one month each. The people joining this training are the PPL-s graduated from the Secondary Agricultural School who are not polyvalent in quality yet. The management of this training is regulated by the BPLPP in Jakarta.

#### 7.4.3. The Agricultural Counselling

This is accomplished by the PPL-s or PPI-s within the range of the BIMAS intensification.

To enable the implementation of counselling by the LAKU system, the farmer is classified into groups referred to as:

- a) the adult groups,
- b) the woman groups, and
- c) the young farmer groups.

Up to 1976 the following numbers of groups are present condition in South Sulawesi Province:

- a) 2,191 adult groups,
- b) 133 woman groups, and
- c) 144 young farmers groups.

The counselling program according to the LAKU system which is executed by the PPL is regulated as follows:

- a) PPL makes visits to the farmers in the fixed groups at a certain place, twice a month,
- b) the number of farmer groups visited at the first and second visiting stages is 16 groups with the following schedule of visits:
  - i) first week on Monday, Tuesday, Wednesday and Thursday, 8 groups are visited, 4 groups in the morning and 4 groups in the afternoon,
  - ii) Fridays are used by the PPL to make his report, and Saturdays for meetings in the desa or kecamatan,
  - iii) second week on similar days as in first week, another 8 groups are visited in the mornings and in the afternoons,
  - iv) third week, repeat visiting the groups visited in first week on same days, and

- v) fourth week, repeat visiting the groups visited in second week, on same days.
- c) The material for each visit is adjusted to the farmers' needs for the next two weeks.

Thus each PPL is obliged to have the capability to perform training to 16 Key farmers and each Key farmer must in turn be able to train 20 progressive farmers, while each progressive farmer has to train 5 ordinary farmers.

Agricultural extension given through the Agricultural Extension Service may be of the following features, according to the program:

- a) agricultural information by means of films, slides and demonstrations,
- b) teaching on farming industry by means of trials and demonstration plots,
- c) teaching skill by means of Farmers' Courses, demonstration plots and farms contests and training, and
- d) developing self-reliance and self-supporting ability by means of meetings and discussions.

## 7.5. Conclusion

1) Based on the approach that:

a) about 75 % of the productive labor force in South Sulawesi Province are at present not graduated from Elementary School at adolescent to old ages,

b) about 75 % of the regional income of South Sulawesi at present (1976) originated from the agricultural sector,

c) farmers and farming activities are relatively located in Desa-s,

d) the majority of farmers' industry in the form of household types are still subsistent in property and combined with polyvalent activities, and

e) the development of the agricultural sector in the whole development program is inseparable from the utilization of natural resources by taking care of the maintenance of their well being,

it is obvious that here lies the urgency for the prompt completion and adjustment of the regulation and implementation of organizations and administrations for the management of service institutions, from the national level down to the village level, which move in the following fields:

a) agricultural counselling, extending technology and skill,

b) credits as an activity which extends capital, and

c) activities for the common marketing of agricultural products.

2) Agricultural Extension Units at national level at the General Directorates under the Ministry of Agriculture are still essential to be structurally present according to their respective fields, while the extension units at the BPLPF constitute the coordinator to build and maintain the approach to problems integratedly and towards the solutions included in the development of the agricultural sector.

At provincial level, all agencies of the General Directorate under the Ministry of Agriculture have to possess Extension Units structurally besides the Extension units from the BPLPF for provincial level,

which guide the composing of extension programs linked with the attempts to solve problems as a whole within the polyvalent farmers' industry.

At Kabupaten's level there has to be an extension unit which receives and passes on and feeds back informations from and to the extension units at provincial level.

3) To know how far the function of the service goes in the field of agricultural extension, and what the farmers think about the service to enable them to utilize the potentials and improve their welfare, a more detailed survey is still needed exclusively.

8. Needs of farmers

8.1. Definition of Farmers

In South Sulawesi Province, farmers are not so homogeneous that it is difficult to make a sweeping statement. Among those people involved in farming, absentee-land lords, land owners, tenants and landless workers are generally known. The activities regional agriculture development planning have to make clear the focus for whom the stress is taken. It is needless to say that majority poors shall be the first priority.

The number of household of landless workers reaches 270,835 occupying 29.4 % of the total farm household and small holders less than 0.5 ha. is 180,506 occupying 19.7 % of the total farm households. The two classes mentioned above occupy about a half (49.1 %) of the total farm households. Since they don't have any marketable surplus rice, they have no interest about the floor price of rice and also about technical development such as Bimas/Inmas. However, they may have strong desire to gain land on which they can build their stabilized livelihood continuously as the land owners.

Among sea fishery Desa-s the conditions are more difficult and complex, 1) and fish pond owners and laborers are in quite different socio-economic conditions in the brackish water fish pond area. There are 36,675 full-time and 9,184 part-time fishermen households and 174,000 laborers including sea catchmen, fish pond and fresh water fishery workers in 1975. The number of boats is 37,200 in total. These figures indicate that about 79 % are miserable fishing laborers.

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Note : 1) According to the Intern Report (vol.III) of the Team of SRDS, many sea fishermen in the Province do not own their own boats but rent them from a boat owner for a proportion of usually 50 % of the catch. Often lines, nets and other equipments, as well as food are also obtained from the boat owner, again for a proportion of the catch. What is more, fish usually have to be sold to the boat owner who then market the fish. The buying price by the boat owner is usually much lower than the market price. The result is that many fishermen receive as little as 10 to 20 % of the value of their catch. (continued to the next page). (continue to the next page)

8.2. Reclamation investment

Reclamation and resettlement policy should be given more attention and priority among the government agencies, not only in the South Sulawesi Province but in the Central Government for the development of such majority of the poors. It is recommended that the policy of transmigration of Javaness people to outside islands and resettlement in the Province should be integrated and promoted giving the same financial support and investments.

Fortunately, in South Sulawesi Province, along the seashore of the Province, there are, even though they are scattered owing to the topographical conditions, plenty of area suitable for reclamation of cultivation lands and fish ponds. In addition, there are many outmigration people seeking for agricultural lands and also spontaneous movements of fishery farmers from Kabupaten Pangkep and Pinrang to Kabupaten Wajo (Kecamatan Sajoanging), and Tempe Lake fishery laborers to the brackish water fish ponds in the same Kecamatan are already under going. In the sea reclamation, a new technical development way will increase the production even in the old fish ponds by an additional infrastructure investments as in the pilot project of the World Bank. New investments is quite important and effective in the brackish water fish pond areas, too.

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Note : 1), (continued from page 204)..

With increase so low, many are continuously in debt to the boat owner and are kept in a form of perpetual economic serfdom. In the sea fishery economic structure, it appears that upgrading of boat, equipments, or physical marketing facilities will not necessarily bring about an improvement in the income and economic well-being of the province's fishermen. The people to make profits are most likely to be boat owners. Consequently the way to ensure succes in modernizing the fishery industry is to ensure that fishermen themselves are economically independent and receiving a just reward for their labors so they can participate wholeheartedly in the modernization program. The way is not easy but to make first steady step by the strengthening of KUD of fishermen. The result of the survey by the Team of ATA-140 is also the same conditions in the fishery Desa-s.

### 8.3. Marketing system development

#### 8.3.1. Marketing of rice

As described in 8.1, half of the farm households have some marketable surplus in their farming. Rice is the main crop in South Sulawesi Province, however, DOLOG purchases only 5 % of total production. Since 70 % of total production is for self consumption and 10 % reserved in their farming as seeds, other storage and losses, 15 % of total products will be in the market by the middlemen. This aspect of rice marketing and upgrading of rice quality are the most fundamental for the farmers who have marketable surplus.

However, most of rice sold is from the middle income and rich farmers groups who own at least one hectare of land, and bulk of this comes from land lords who may own 5 to 10 hectare. Moreover, it should be noted that about 60 % of all rice farmers are share-croppers and half of the production pay for land owner as land rent. Consequently, the farmers who have the marketable surplus of rice are rich in general and they have enough ability to get credit and to organize a self-reliance organization for the rice marketing. It is considered that government involving is not so necessary for the marketing of this aspect.

#### 8.3.2. Marketing of other commodities

There are many systems for the shipment of agricultural products in the producing area. However, almost all system are doing the business not in collectively but between each farmer and middlemen separately. Consequently scarce profits are shared for farmers and sometimes preharvest transaction are seen indicating the poverty of farmers.

Especially in the remote distance areas such as Kabupaten Marekang, middlemen sometimes do not come to local market even in the market day of twice a week. Although farmers conveyed the cabbages and other vegetables on horsebacks from the mountainside Desa-s, those harvested production are destroyed in vain.



The function of BUUD/KUD for rice purchasing by the government is to be expanded for other commodities. That is to say BUUD/KUD has to work for the collection of commodities and after that price negotiation should be done with middlemen by the BUUD/KUD.

After accomplishing some expansion of functions in BUUD/KUD, there will be a necessity to build up a set of facilities. The plan mentioned above has to be decided based on the real needs of the farmers in the production areas.

On the other hand, in the consumption area, there will be a necessity and availability to make plans on demands and supplies after deciding the delivery systems in the consumption area and the collection and shipment systems in the production area. Each consumption area has to decide necessary amounts of demands by commodities by month. At the same time each production area must make plans for cultivating and selling, which are distinctive of destination by commodity by month.

Then the conference will be held among the consumption areas and production areas to reach the conclusion on the demand and supply plans based on the plans brought by respective area. The production areas have to estimate the amount of production and shipment and then the consumptive areas must have an adjustment for the amounts and the arrival period by commodity so as to maintain adequate prices.

The new work shall be the responsibility of the Provincial Government, because it is a policy and implementation for expanded area beyond the border of Kabupaten's Governments.

#### 8.4. Opinions of Bupati-s of specific Kabupaten-s

The Team of AMA-140 South Sulawesi often visited the specific Kabupaten-s Jeneponto and Enrekang in order to get common recognitions and acknowledgements among Team members through the case study training on several problems and aspect. At the same time the Team has studied the outline of implementable plans which should be more deeply studied on a prefeasibility study for the implementable plans in next phase.

Since those areas are so critical that more specific study should be done by various kinds of specialists. In addition, it is foreseen that the introduction of new commodities and new techniques might be necessary. Therefore, before the commencement of the implementation of development plans some demonstration pilot tests are requested by the Bupati-s of both Kabupatens respectively.

It is quite reasonable from the responsible from the responsible position as the Bupati to examine more precisely and prudently through the demonstration as the pilot tests which may be the most suitable way of technical training and education for the officials concerned and of involving the farmers.

The opinions presented by the Bupati-s at the end of 1977 summarized by Co-manager of the ATA-140 Project are as follows :

8.4.1. The opinions of Jeneponto's Bupati

- 1) We are expecting the Team of ATA-140 Project to solve and improve :
  - a) the problem of deficiency of water,
  - b) the problem of the critical situation of soil, and
  - c) the problem in organizing the farmers.The three kinds problems are below normal condition that will interrupt the agricultural development in Jeneponto.
- 2) It is necessary that the Team should carry out demonstration pilot tests in the form of :
  - a) Demonstration of the effective and efficient use of irrigation water, so that the acreage of irrigated paddy fields will be expand, especially in the areas where the paddy fields always have deficiency of water in the wet season. (this will certainly need a better net system of irrigation ditches with a well organized farmers water use).
  - b) Demonstration of effective and efficient use of Kelara Irrigation water for paddy and other crops.
  - c) Demonstration of the use ground water for the irrigation of crops, especially citrus in the dry season by equipment and modern technology.
  - d) Demonstration of soil conservation and production increasing of the critical lands.

- e) Demonstration of kinds of crops in order to know, which is suitable to be promoted on critical lands and which one on the location of reforestation and greening.
  - f) Demonstration of production increasing and productivity of shrimps in fish ponds.
  - g) Demonstration of organized marketing starting from the time of harvesting to the selling of the production.
  - h) Demonstration of improved supply of drink water, washing and bathing for the Desa's people who have difficulties in water.
- 3) Certainly there are already many problems identified by the Team, because Jeneponto has been visited many times by the Team. Therefore, the Team should know better what kinds of activities are essential to be carried out as demonstration activities before the implementation of the project. We are suggesting in solving problems to be discussed with the High Education Institution such as University of Hasanuddin. Additional input in the field of socio-economic will be observed, so that the analyzed results will be more suitable to the analyzed results that have ever been observed by the scientific institutions.
- 4) The pilot demonstration activities we propose above are considered to be preparations for the implementation of the project which are very necessary in relation with the activities of agricultural development planning in the Kabupaten of Jeneponto.

8.4.2. The opinions of Kabupaten Enrekang's Bupati

- 1) We are expecting the Team of ATA-140 Project to solve and improve :
- a) the problem of marketing and processing of the following production : Vegetables (cabbage, chinese cabbage, potatoes etc.), salak fruit papayas, and palm sugar.
  - b) the problem of critical agricultural land conditions by the use of equipments and modern technology.

- c) the problem of agricultural development by planting commodities which are suitable to the regional condition in order to obtain more beneficial income, because by solving the problem it will support to increase the farmers income obtained from the benefit of the agricultural development in Kabupaten Enrekang.
2. It is necessary that the Team should carry out a demonstration pilot test in the form of :
- a) Demonstration of vegetable storage methods (cabbage, chinese cabbage, potatoes etc.) as far as the vegetables cannot be sold yet after harvesting.
  - b) Demonstration of palm sugar processing methods without the use of fire wood, in order to decrease the use of fire wood, because monthly 100 tons of palm sugar can be produced, and the demonstration of storage methods as long as the product is not sold yet.
  - c) Demonstration of introduction of new commodities which are suitable with the agriculture of condition in the region which is more beneficial in comparing with the traditional commodities.
  - d) Demonstration of the use of modern equipments for the development of agriculture.
  - e) Demonstration of pastures for cattle on sloping area.
  - f) Demonstration of new species of tree and modern technology which is suitable to promote on the location reforestation and greening.
- 3) It is necessary to considered by the Team for :
- a) The canning of salak fruit and making of papaya's juice to support the development of well-managed salak and papaya estates and to increase the farmers and region income, because the monthly average of production of salak is 300 - 530 tons.
  - b) The construction of new paddy fields from new rural irrigation construction for the development of resettlement efforts.

#### 8.5. Preference of the farmers

The subject was studied by a short-term Expert, Dr. Hiroyuki Mishimura at Kabupaten Jeneponto and Enrekang in December 1977 to January 1978 in order to formulate farmers needs and preference towards regional agricultural policies. Main efforts were done in the context to transfer the practical techniques for collecting and analyzing the data to the Indonesian officers, how to find farmers needs and to formulate their expectation. However, experiences obtained from the surveys will be received in ADDENDUM together with the results of other short-term Experts surveys.

Two kinds of surveys were designed to clarify problems and relative preferences towards policies to solve those problems. The questionnaires were prepared to conduct surveys. These include the following information :

- a) To find kinds of problems and needs which farmers have, and
- b) To review preferences and requests towards regional agricultural policies.

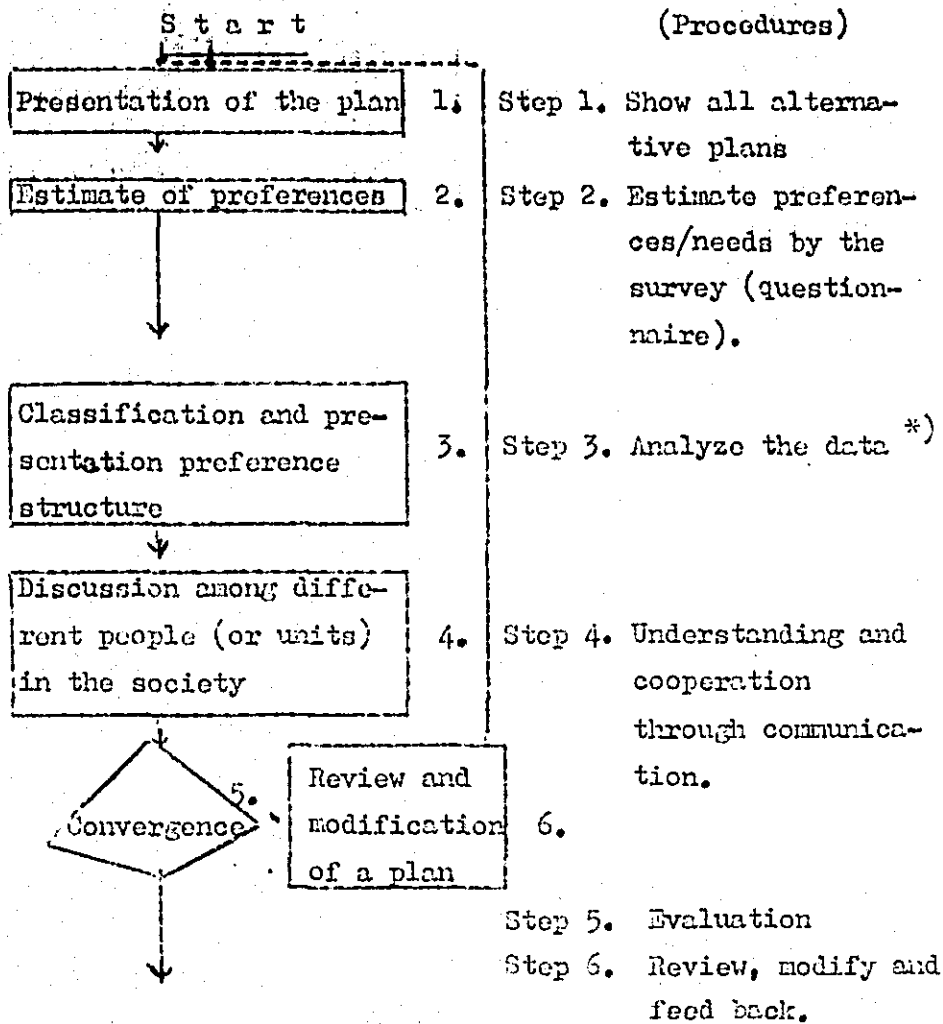
Possible factors which affect them such as : structure of farm - owner ship, labor-force, size, type of business, income, social status, location, etc. were examined.

Besides, patterns of behaviors and beliefs which farmers have were reviewed, too. The other kind of study was to review and analyze the statistical data to show socio-economic characteristics in the regions.

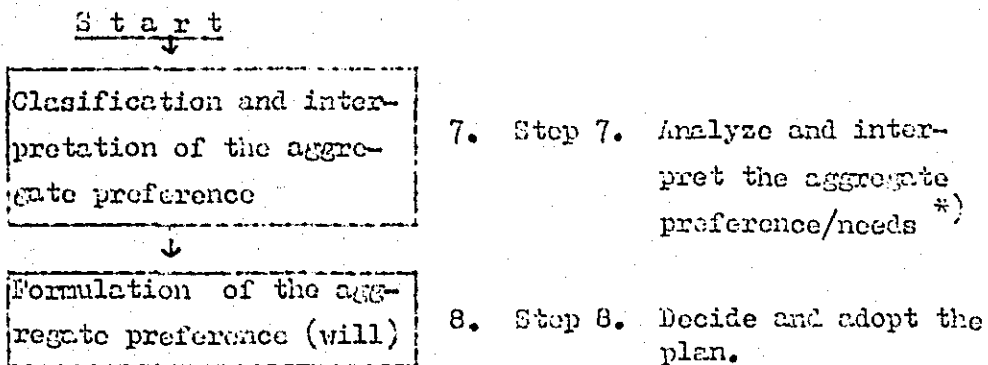
The method and its practical steps to deal with the subject will be shown on the following figure 8.1.

Fig. 8.1. Systematic approaches to formulation of the economical and social preferences

1. Formulation of a regional plan



2. Decision of the plan



3. Execution of the plan

S t a r t



Note \*) Statistical analysis

And summary and conclusion of the surveys in Kabupaten-s Enrekang and Jeneponto by Dr. H. Nishimura are as follows :

1) Enrekang

a) The most serious problems which farmers want to solve is uncertain price fluctuation of farm products. The following item which pointed out by them is a lack of capital. Concerning the question for improvements on agricultural development, an increase in prices of farm products was considered as most important. Next to this, marketing system, storage facilities, and transportation system seem to be desirable.

b) Regarding to the economic, social, and infrastructural improvements in the region, improvements on transportation system and market facilities look like important.

c) The needs for better living standards in the area are rather diversified. Among them, the lower prices of consumers goods and stability of food prices seem to be preferable substantially.

2) Jeneponto

a) As for the serious problem, farmers considered water deficit most important. In the case of areas with high level of commercialization and relatively many owner-operators credit deficit and instability and/or fall at the level of farm products follow as the next serious problem. In contrast this trend the problem which they can neither cultivate nor eat rice was pointed out by the sharecroppers. Poor land conditions and difficulty not to be able to expand the size of operation were other important problems for them.

b) Concerning economic development policies the farmers tend to prefer better rural roads and an increase of off-farm job opportunity to agricultural policy in itself. Overall and equal development policy or improvement of marketing facilities seem to be desirable nearly similar degree of the agricultural development policy. Estate development policy comes next followed by these policies.

At least, majority of farmers do not want to have the policy of "laissez faire".

c) It was a commonly important desire to have sufficient water supply and establishment of medical facilities in regard with the improvement policies of living conditions. In addition to these, religious facilities or primary schools were expected to be improved. Better secondary school facilities, transportation system, and shopping centres were pointed out with fairly high preferability. Farmers took rather disagreeable or negative views on the policies such those : establishment of library, telephone, public house, high school, sewage system, and relocation of community which might be necessary for better living conditions.



9. Production structures of the agricultural sector

9.1. Food crops

9.1.1. Paddy/rice

1) The condition of the paddy cultivation.

The average of the total acreage of paddy cultivation during the Pelita (1969 - 1976) is 564,000 ha., consisting of :

- a) Rendengan (the wet season's paddy) : 428,000 ha.
- b) Gadu (dry season's paddy) : 100,000 ha. and
- c) Gogo (upland/dry field paddy) : 36,000 ha.

Compared to the total acreage of paddy cultivation in 1969, the average of the total acreage of paddy cultivation during the Pelita has increased only by 1 %, i.e. from 556,000 ha to 564,000 ha. The developments of the total acreage of paddy cultivation is unsteady, and fluctuation due to a decrease of the total acreage by 21 % in 1972, to 445,000 ha.

The decrease of the acreage by 21 % in 1972 was due to the shortness of the wet season's period and the lack of rainfall, both in the west coastal and in the east coastal areas of South Sulawesi Province. Whereas the decrease of acreage of paddy cultivation by 2 % in 1974 was due to lack of rainfall and the spread of the pest "tungoro". This fact affected the decrease in 1972, both concerning the rendengan and the gadu, which were respectively 19 % and 37 %.

The acreage of the rendengan decreased by 3 %, i.e. from 439,000 ha. to 428,000 ha., while that of gadu increased by 65 % namely from 61,000 ha. to 100,000 ha. Quite the contrary occurred to the gogo as the acreage decreased continuously year by year, i.e. from 56,000 ha. to 36,000 ha. or a decrease of 35 %. This decrease in the acreage of the gogo is consistent to the Pelita II of the South Sulawesi BAPFEDA which demands a decrease in the acreage of the gogo in accordance with the salvation program of catchment areas.

The distribution of the acreage of paddy cultivation in South Sulawesi Province is two-sided with two different planting seasons due to the specific geographical state. The different planting seasons are indicated by different periods as follows :

a) The period October to March is the wet seasonal planting period for the west coastal area of South Sulawesi Province, while for the east coastal area, this is the same period of the dry seasonal planting period.

b) The period April to September is the wet seasonal planting period for the east coastal area while for the west coastal area, this is the same period constitutes the dry seasonal planting period.

The area undergoing the wet season during the period October to March are 14 Kabupaten-s and Kotamadya-s, i.e. Ujung Pandang, Maros, Pangkep, Mamuju, Majene, Selayar, Enrekang, Tator, Gowa, Takalar, Barru, Pare-Pare, Jeneponto, and part of Luwu. At the same time, nine other Kabupaten-s are undergoing the dry seasonal planting period, the nine Kabupaten-s are Bantaeng, Bulukumba, Sinjai, Bone, Wajo, Soppeng, Pinrang and part of Luwu. The same case occurs with the opposite season, April to September, when the nine Kabupaten-s mentioned above undergo the wet seasonal planting period while the 14 others undergo the dry seasonal planting period.

Thus there is a continuous planting season throughout year in whole South Sulawesi Province, and thereby on December 31 each year there is a carry-over of paddy cultivation for the following year. The trouble in this case is that the statistical data from the Agricultural Extension Service does not include the amount of carry-over as the remains of paddy cultivation, so that it is difficult to calculate.

The following developments of the acreage of paddy planted areas by BEMAS/IRMAS and non-intensification way, based on the condition mentioned above, are carrying out as two planting seasons, from April to September and from October to March (see table 9.1.). The total acreage of paddy planted areas by BEMAS during the period April - September has increased by an average of 17 %, while that of by the non-intensification has decreased by an average of 1.1 % during the three years 1974 - 1976. During the period October to March, the total acreage by BEMAS has increased by an average of 5.4 %, while that of by the non-intensification has decreased by an average of 0.8 %, during the three years 1974 - 1976.

The average acreage of planted area of the Rendangan during the three years 1974 - 1976, is 85 % of the whole paddy fields area 509,000 ha. or an acreage of 431,897 ha. And the average acreage of planted area of the Gadu in 1975 - 1976 is 29 % or an acreage of 147,873 ha.

Table 9.1. The acreage of paddy planted areas by period and season in South Sulawesi Province (1974 - 1976)

Period April - September

Unit : ha.				
Year	Program	Wet season	Dry season	Total
1974	BIMAS	32,364	5,111	37,475
	INMAS	5,384	244	5,628
	NON-int.	189,461	85,064	274,525
1975	BIMAS	32,599	5,528	38,127
	INMAS	8,963	1,529	10,492
	NON-int.	201,665	83,042	284,707
1976	BIMAS	44,743	5,960	50,703
	INMAS	26,088	4,607	30,695
	NON-int.	182,385	85,654	268,039

Period October - March

Unit : ha.				
Year	Program	Wet season	Dry season	Total
1974	BIMAS	40,991	16,617	57,608
	INMAS	4,914	7,128	12,042
	NON-int.	142,385	20,111	162,396
1975	BIMAS	34,520	21,967	56,487
	INMAS	13,953	6,086	20,039
	NON-int.	140,317	25,801	166,018
1976	BIMAS	37,615	26,106	63,721
	INMAS	20,952	14,491	35,443
	NON-int.	136,494	28,575	165,069

Note : 1) NON-Int. = non-intensification.

Table 9.2. Acreeage of farm lands in South Sulawesi Province  
( 1 9 7 5 )

NO.	KABU- PATEAN	Unit : ha.				
		P a d d y f i e l d s				
		(1)	(2)	(3)	(4)	(5)
1.	Luw	1,304.50	965	32,506.75	10,541.75	45,318
2.	Tat	-	600	5,275	11,926	17,801
3.	Sop	2,000.00	3,755.05	9,441.69	6,496.12	21,692.86
4.	Bon	4,880.00	1,500	7,550	60,236	74,166
5.	Waj	-	450	2,078	65,760	68,288
6.	Sin *	-	800	1,255	8,453	10,508
7.	Bul *	-	2,780	18,105.28	1,485.48	22,370.76
8.	Sel	-	-	-	799	799
9.	Ban	-	580	3,751	684	5,015
10.	Jen	-	3,060.09	4,714.49	5,968.06	13,742.64
11.	Tak *	3,450.00	2,310	1,475	8,888.35	16,123.35
12.	Gow *	9,337.51	-	6,235	14,650.09	30,222.60
13.	U.P *	-	-	250	3,706.38	3,956.38
14.	Mar	2,014.16	399.06	2,947.44	16,338.48	21,699.14
15.	Pan	1,500.00	600	1,505	17,268	20,873
16.	Bar	1,850.00	500	2,315	5,817.38	11,482.38
17.	P.P *	-	-	500.	578.69	878.69
18.	Sid	17,851.46	9,448.84	5,505.94	12,319.27	45,125.51
19.	Enr	-	-	3,268	5,732	9,000
20.	Pin	29,300.89	2,381	3,221.58	12,011.29	46,914.67
21.	Pol	5,700.00	2,377	2,821	9,327	20,225
22.	Ma;	-	-	355	780	1,135
23.	Mam	-	-	1,065	416	1,481
T o t a l		79,188.52	32,506.94		281,182.25	
T o t a l		79,188.52		115,941.17		508,818.88

Notes : \*) Source : B.P. Bimas (temporary numbers)  
 \*) No detailed information.  
 (1) Paddy fields by technical irrigation.  
 (2) Paddy fields by semi-technical irrigation.  
 (3) Paddy fields by Desa irrigation.  
 (4) Rainfall.  
 (5) Total of paddy fields.

Table 9.2. Acreage of farm lands in South Sulawesi Province  
(1975)  
 (continued)

Kab. K.M.	Up-land / d r y l a n d			T o t a l	
	Dry lands (6)	dry field (7)	Home yard (8)	T o t a l (9)	(5+9)
01	15,452.50	17,605	8,837.01	41,894.51	87,212.51
02	89,639.00	9,934	1,790	101,363	119,164
03	33,670.51	-	1,345.19	35,015.70	56,708.56
04	25,808.00	36,286	20,277	82,371	156,537
05	38,746.00	3,682	9,402	51,830	120,118
06	9,122.00	20,938	2,095	32,155	42,663
07	44,155.88	43,573.56	1,975.40	89,804.84	112,075.60
08	957.00	19,084	189	20,230	21,029
09	17,897.00	-	453	18,050	23,065
10	25,800.87	425	726.57	26,952.44	40,695.08
11	5,372.61	1,863.85	3,835.39	11,071.85	27,195.20
12	37,965.00	14,437.67	8,599.54	61,992.21	91,224.57
13	- **)	- **)	- **)	5,629.77	9,586.15
14	8,103.86	8,513	8,066.12	24,682.98	46,382.12
15	13,940.00	3,652	651	18,243	39,116
16	5,426.84	6,560.90	2,041.12	14,028.86	25,511.24
17	1,393.65	-	133	1,526.65	2,405.34
18	6,709.75	13,469.29	5,818.21	25,997.35	71,122.86
19	9,513.00	13,994	1,359	24,866	33,866
20	27,909.34	5,694	11,662.31	55,265.65	102,180.32
21	17,799.00	29,605	19,760	67,164	87,389
22	12,494.00	2,636	160	15,290	16,425
23	9,148.00	5,814	3,178	18,140	19,621
Total	466,723.81	257,767.27	112,353.96	836,845.04	1,345,663.92

Table : 9.2. Acreage of the planted areas with paddy Gogo by Kabupaten and year in South Sulawesi Province (1969 - 1976)

No.	Kabupaten	1969	1970	1971	1972	1973	1974	1975	1976
01.	Luwu	6,547	7,722	6,180	4,733	3,333	4,272	4,795	4,986
02.	Tator	12	4	4	-	2	2	-	13
03.	Soppeng	2,020	1,666	1,333	1,232	1,355	983	764	579
04.	Wajo	4,331	4,012	5,684	3,932	2,005	1,341	946	1,715
05.	Bone	14,260	11,267	2,711	6,758	6,290	5,558	4,901	4,568
06.	Sinjai	215	620	600	350	362	20	45	-
07.	Bulukumba	45	50	196	110	30	18	-	-
08.	Selayar	2,566	2,351	2,148	1,398	810	566	582	590
09.	Dantaeng	631	305	314	375	73	-	-	-
10.	Jeneponto	-	125	235	155	164	165	144	163
11.	Tutular	543	630	435	235	309	661	757	952
12.	Cowa	304	367	484	551	1,503	1,182	757	627
13.	K.M.U. Pangang	-	-	-	-	35	-	-	-
14.	Maron	1,091	-	170	256	155	70	56	59
15.	Pangkajene	473	106	188	251	415.25	250	466	278
16.	Barru	2,050	3,104	2,410	1,491	3,732	1,070	1,391	1,110
17.	K.M. Pare2	375	3,560	600	255	1,147	497	178	307
18.	Sidrap	190	130	133	163	174.70	251	158	33
19.	Enrekang	1,479	1,893	302	98	57	169	429	250
20.	Pioreng	243	38	101	144	173	139	140	61
21.	Polmas	5,485	388	2,494	2,842	1,399	1,291	523	2,735
22.	Majene	2,345	2,564	2,225	1,972	1,254	705	2,432	1,560
23.	Mamuju	6,290	4,135	5,750	6,400	5,553	6,330	5,814	5,923

2) Fluctuation of harvested areas.

The acreage of harvested areas is sometimes larger than the acreage of planted areas, because on December 31 each year there is carry-over of unharvested areas from the previous year and it increases the acreage of planted areas for the following year. Thus the acreage of planted areas each year consists of the harvested areas plus the acreage of the areas which carry over.

The average acreage of harvested areas during the Pelita (1969 - 1976) is 496,000 ha. which consists of:

- a) Rendengan: 374,000 ha.,
- b) Gadu: 89,000 ha., and
- c) Gogo: 33,000 ha.

Compared to the acreage of harvested areas in 1969, the acreage of during the Pelita turned out to have decreased by 4 %, i.e. from 517,000 ha. to 496,000 ha. There was an unsteady and fluctuating developments due to a decrease in the acreage of harvested areas in 1972 by 24 %, so it decreased to 379,000 ha. and by 8 % in 1974 that it became 457,000 ha.

The fluctuation mentioned above was due to the following causes:

- a) a fluctuation of the acreage of wet seasonal harvested areas, which decreased from 412,000 ha. to 374,000 ha. (in 1969) compared to the average acreage of harvest from 1969 to 1976 which decreased by 10 % due to the decrease of acreage of harvest in 246,000 ha., 370,000 ha. and 345,000 ha., and
- b) the continuously decreasing acreage of the gogo harvested areas year by year, so that if the acreage of harvest in 1969 compared to the acreage of harvest from 1969 to 1976, there has been a decrease of 35 %, or from the amount of 51,000 ha. to 33,000 ha.

Compared to the average acreage of planted during the Pelita, the acreage of harvest during the period is in average only 83 %, due to the following reasons:

- a) the average acreage of harvest of Rendengan is only 87 %,
- b) the average acreage of harvest of Gadu is only 89 % and
- c) the average acreage of harvest of Gogo is only 91 %.

The developments of the acreage of harvest in

cultivation areas by BIMAS/INMAS and non-intensification within two seasonal planting periods is as follows:

a) The percentage of the acreage of harvest in cultivation areas by BIMAS and non-intensification during the period April - September, compared to the acreage of planted areas during the same period in 1974, 1975 and 1976 are respectively as follows:

by BIMAS: 67 %, 93 % and 68 %. by non-intensification: 35 %, 37 %, and 41 %.

b) The percentage of the acreage of harvest in cultivation areas by BIMAS during the period October - March compared to; the acreage of planted areas during the same period in 1974, 1975 and 1976 are respectively as follows:

by BIMAS: 91 %, 78 % and 67 %.

(see table 9.4.)

Table 9.4. The acreage of paddy harvested areas by period and season in South Sulawesi Province (1974 - 1976)

		Unit: ha.		
year	Program	Wet season	Dry season	Total
<u>(Period Apr. - Sep.)</u>				
1974	BIMAS	20,430	4,967	25,397
	INMAS	4,309	234	4,543
	non-int.	19,559	71,542	91,101
1975	BIMAS	29,978	5,527	35,505
	INMAS	8,842	1,523	10,365
	non-int.	24,089	83,560	107,649
1976	BIMAS	31,643	2,930	34,573
	INMAS	22,842	3,344	26,186
	non-int.	23,921	88,434	112,255
<u>(Period Oct. - March)</u>				
1974	BIMAS	36,271	16,562	52,833
	INMAS	4,912	7,067	11,979
	non-intens.	130,395	149,379	279,774
1975	BIMAS	30,402	13,913	44,315
	INMAS	11,033	3,630	14,663
	non-intens.	141,334	214,440	355,774
1976	BIMAS	18,528	24,711	43,239
	INMAS	13,180	13,814	26,994
	non-intens.	152,458	134,483	286,941



Table 9.5. Acreage of the harvested areas of the paddy Gogo by Kabupaten and year in South Sulawesi Province (1969 - 1976)

Kab.	1969	1970	1971	1972	1973	1974	1975	1976
01. Luw.	8,161	7,441	5,755	3,659	3,272	3,304	3,347	4,466
02. Tat.	10	4	4	-	2	2	-	13
03. Sop.	2,026	1,666	1,333	240	1,240	973	764	579
04. Maj.	4,027	2,877	5,749	139	1,721	1,300	924	1,646
05. Pon.	11,390	14,749	9,672	1,493	6,937	4,387	4,657	4,544
06. Sin.	733	647	583	66	362	18	43	-
07. Bul.	67	50	164	32	30	-	18	-
08. Sel.	2,239	2,288	2,129	2,093	564	442	458	537
09. Ban.	582	749	298	100	65	-	-	-
10. Tak.	613	413	439	387	555	48	663	734
11. Jen.	571	120	90	150	210	108	158	158
12. Gow.	1,030	533	351	445	1,131	998	1,136	-
13. U.P.	-	-	-	-	-	-	-	-
14. Mar.	958	75	170	256	165	59	62	27
15. Pan.	477	106	105	205	487	247	363	362
16. Bar.	2,423	2,337	2,377	2,498	3,671	672	1,046	208
17. P.P.	925	760	300	852	977	393	400	1,069
18. Sid.	173	110	153	31	163	233	176	14
19. Enr.	1,431	1,548	554	27	140	114	410	223
20. Pin.	148	276	54	91	167	37	152	83
21. Pol.	5,273	4,695	3,500	1,969	3,050	988	985	303
22. Maj.	2,279	2,372	2,257	2,193	1,970	1,248	1,954	990
23. Mam.	5,074	6,019	5,137	3,557	6,236	5,266	6,024	5,451
Tot.	50,610	49,840	41,754	20,493	33,115	20,493	23,748	22,197

3) The condition of damage of paddy cultivation.

The average acreage of damaged areas in planted areas during the Pelita (1969 - 1976) is 68,000 ha., consisting of:

- a) the area of Rendengan: 55,000 ha.,
- b) the areas of Gadu: 10,000 ha. and
- c) the area of Gogo: 3,000 ha.

The damaged areas mentioned above consist of damages caused by:

Drought:	30 %
Flood:	6 %
Mice:	19 %
Stem-grating pests:	24 %
Others:	21 %
Total:	100 %.

Compared to the damaged acreage in 1969, the average of damaged acreage during the Pelita has increased by 54 % i.e. from 44,000 ha. to 68,000 ha. This is caused by the following reasons:

- a) an increase the average of damaged acreage in the area of Rendengan by 44 %, i.e. from 38,000 ha. to 55,000 ha.,
- b) an increase of the average of damaged acreage in the area of Gadu by 33 %, i.e. from 3,000 ha. to 10,000 ha. and
- c) an increase in the damaged acreage in the area of Gogo by 50 %, i.e. from 2,000 ha. to 3,000 ha.

Compared to the damaged areas in the period April - September 1974, the average of damaged acreage during the last three years (1974 - 1976) in the same period by cultivation ways (by BIMAS/INMAS and Non-intensification) are:

- a) BIMAS areas decreased by 5 %, from 29,000 ha. to 19,000 ha.,
- b) INMAS areas increased by 25 %, from 4,400 ha. to 5,800 ha. and
- c) Non-intensification areas decreased by 13 %, from 62,500 ha. to 52,800 ha.

In the period October - March 1974, those percentages and acreages are as follows:

- a) BIMAS areas increased by 32 %, from 4,100 ha. to 6,000 ha.,
- b) INMAS areas increased by 16 %, from 4,000 ha. to 4,700 ha. and
- c) Non-intensification areas increased by 6 %, from 27,500 ha. to 29,300 ha. (see table 9.6.)

The way of the increase of the harvest area can be taken two ways, (1) increasing the planted areas and (2) reducing the damaged area.

Table 9.6. The acreage of damaged areas by period and season  
in South Sulawesi Province (1974 - 1976)

		Unit: ha.		
year		Wet season	Dry season	Total
(Period Apr. - Sep.)				
1974	BIMAS	1,188	28,124	29,312
	INMAS	1,165	3,185	4,350
	non-int.	3,545	58,959	62,504
1975	BIMAS	527	6,313	6,840
	INMAS	803	664	1,467
	non-int.	4,264	11,774	16,038
1976	BIMAS	3,536	18,601	22,137
	INMAS	2,737	8,826	11,563
	non-int.	7,725	72,235	79,960
Average: BIMAS		1,750	17,679	19,429
INMAS		1,568	4,225	5,793
non-int.		5,173	47,656	52,834
(Period Oct. - Mar.)				
1974	BIMAS	3,084	1,015	4,099
	INMAS	3,858	133	3,991
	non-int.	18,755	8,786	27,541
1975	BIMAS	1,522	1,179	2,701
	INMAS	3,593	492	4,085
	non-int.	20,033	8,946	28,979
1976	BIMAS	8,331	3,009	11,340
	INMAS	4,333	1,819	6,152
	non-int.	24,809	6,530	31,339
Average: BIMAS		4,312	1,734	6,046
INMAS		3,923	315	4,743
non-int.		21,199	8,087	29,286

4) Production and yield of paddy/rice.

The average production of rice during the Pelita (1969 - 1976) is 1,181,000 tons, consisting of:

- a) production of the Rendengan: 897,000 tons,
- b) production of the Gadu: 250,000 tons and
- c) production of the Gogo: 34,000 tons.

Compared to; the production in 1969, the average production has increased by 21 %, i.e. from 971,000 tons of rice.

There is an unsteady and fluctuating developments due to a long dry season and the attack of stem-perforating pests in 1972 and the attack of "tungro" and drought in 1974. It contributed to the decrease in production by 20 % in 1972 and 17 % in 1974 compared to the average production.

The developments of production in 1975 and 1976 is quite encouraging. If the production obtained in 1969 was only 18 % beneath the average production, in 1976 it has increased to 18 % above the average production, at the amount of 1,404 tons of rice.

The decrease of production in 1972 and 1974 were much influenced by the production of the Rendengan which decreased sharply while production of the Gadu increased. The production of the Rendengan during the Pelita. Where as production of the Gadu 1972 was 36 % above the average production of the Gadu during the Pelita and 6 % lower in 1974.

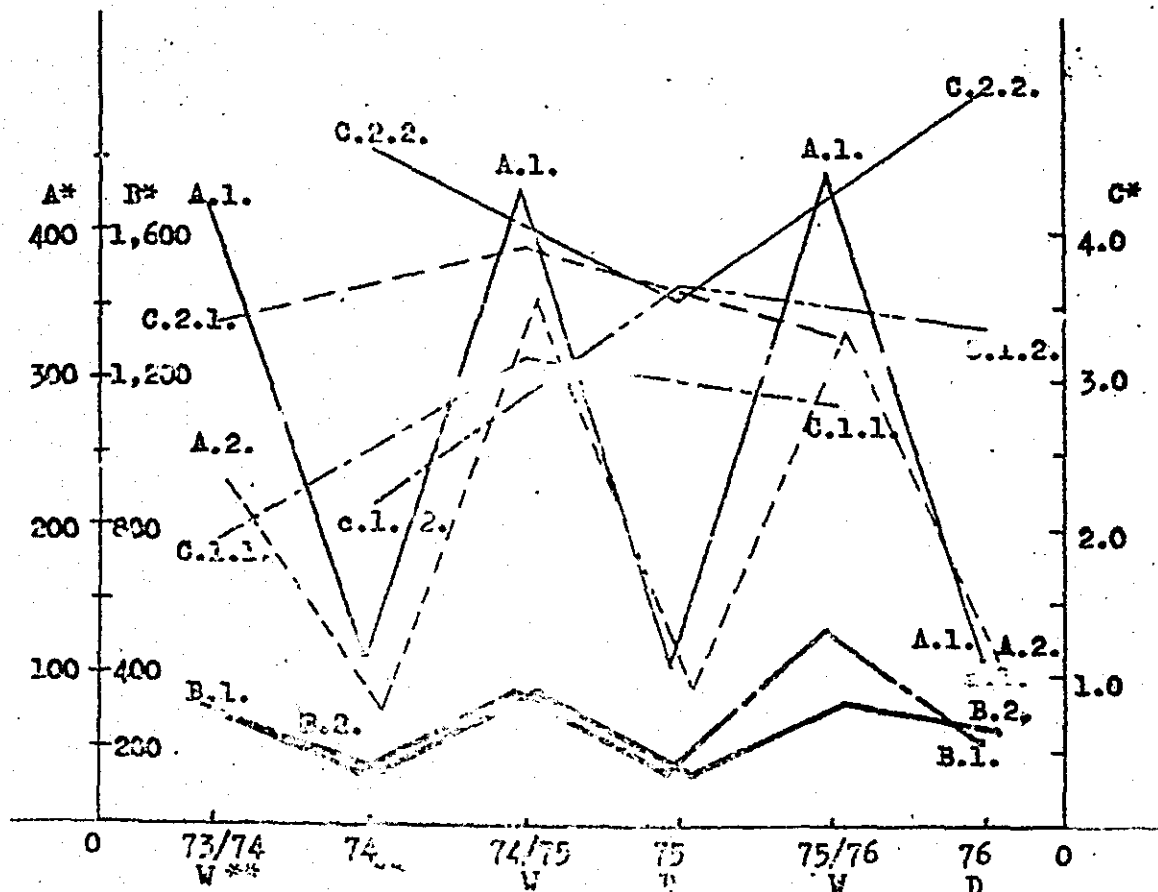
In total view, compared to the average production during the Pelita, the production of the Rendengan and the Gadu obtained in 1969 have increased respectively by 12 % and 106 %, i.e. respectively from 798,000 tons and from 121,000 tons to 250,000 tons. The production of the Gogo has decreased from 52,000 tons to 34,000 tons or 34 %.

The increase of the production of the Rendengan is only supported by the increase in productivity (15 %) due to the decreasing of harvested area. While the increase of the production of the Gadu is besides supported by the increase of harvested area also supported by the 33 % increase of productivity.

The average yield of the Gadu is shown about 2,7 t./ha. of dry stalk paddy, and average yield of the Rendengan is estimated as 3.1.t./ha. In the activities of BIRAS/INRAS, it is expected to high yield compare with cultivation of non-intensification. But the average yield by BIRAS/INRAS is not so different

from its by non-intensification way. In the wet season, the difference of average yield tend to be small year by year. On the contrary, in the dry seasons, the clear differences can be seen excepting the case in 1975, as shown on figure 9.1. and table 9.7.

Fig. 9.1. Production and yield of rice by season in South Sulawesi Province (1973/1974 - 1976)



Note: \*) A: Planted area (x 1,000ha.)  
 A.1. by non-intensification/A.2. by BIMAS/INMAS  
 B: Production (x 1,000 tons)  
 B.1. by non-intensification/B.2. by BIMAS/INMAS.  
 C: Yield: tons/ha.  
 C.1.1. by non-intensification in the wet season.  
 C.1.2. by non-intensification in the dry season.  
 C.2.1. by BIMAS/INMAS in the wet season.  
 C.2.2. by BIMAS/INMAS in the dry season.

\*\*\*) W: the wet season/D: the dry season.

Source: Sekretariat Badan Peningkat BIMAS of South Sulawesi; Laporan Perincian BIMAS/INMAS.

Table 9.7. Production of rice by season (1974 - 1976)

Period April - September.

		Unit: tons		
year		Wet season	Dry season	T o t a l
1974	BIMAS	72,913	24,026	96,939
	INMAS	12,398	740	13,138
	Non-int.	326,010	213,149	539,159
1975	BIMAS	138,518	27,021	165,539
	INMAS	28,442	5,903	34,345
	Non-int.	531,377	293,875	825,252
1976	BIMAS	149,121	12,052	161,173
	INMAS	92,221	12,350	104,571
	Non-int.	402,283	385,399	787,682

Period October - March.

year		Wet season	Dry season	T o t a l
1974	BIMAS	187,376	84,547	271,923
	INMAS	16,321	26,303	42,624
	Non-int.	337,613	68,718	406,331
1975	BIMAS	151,593	77,570	229,163
	INMAS	38,907	13,450	52,357
	Non-int.	465,682	89,681	555,363
1976	BIMAS	140,986	157,873	298,862
	INMAS	46,252	75,649	121,901
	Non-int.	504,747	82,779	587,526

Source: Sekretariat Badan Pembina BIMAS Prop. Dati I  
Sul - Sel. (Laporan Perincian BIMAS - INMAS).

Table 9.8. Production of the paddy gogo by Kabupaten and year in South Sulawesi Province (1969 - 1976)

Unit: tons

Kabupaten	1969	1970	1971	1972	1973	1974	1975	1976
1. Lar.	8,841	10,417	8,057	5,199	3,397	5,275	4,540	7,425
2. Tet.	12	6	4	-	2	2	-	16
3. Sop.	2,732	3,333	1,578	399	2,454	1,175	1,241	822
4. Waj.	8,064	7,482	12,538	192	3,816	2,351	1,925	3,561
5. Bon.	10,641	13,705	10,766	564	8,448	4,178	1,575	6,345
6. Sin.	1,242	568	918	50	617	18	57	-
7. Bul.	101	75	259	44	45	-	38	-
8. Sel.	3,482	3,758	3,816	3,816	3,401	497	513	677
9. Ban.	1,259	1,625	679	176	106	-	-	-
10. Jen.	857	156	108	225	273	127	205	185
11. Tak.	1,042	735	876	790	1,116	118	1,034	1,583
12. Gov.	1,854	1,420	623	817	2,073	1,965	2,920	1,201
13. U.P.	-	-	-	-	-	-	-	-
14. Mar.	1,341	158	366	407	379	126	139	62
15. Pan.	477	117	315	349	709	353	762	865
16. Bar.	3,392	2,004	2,964	3,387	3,215	635	1,389	1,601
17. P.P.	1,984	1,432	1,316	1,278	1,397	411	340	346
18. Sid.	260	165	239	31	168	148	105	10
19. Bur.	1,431	1,548	1,108	54	183	130	467	251
20. Pin.	268	497	130	226	297	69	170	89
21. Pol.	7,909	7,043	4,574	2,560	3,961	1,284	1,252,20	339
22. Waj.	3,191	3,321	4,063	4,396	3,940	2,496	3,908	2,005
23. Mam.	8,118	5,417	6,264	2,846	6,790	5,266	6,232	5,547
Tot.	68,498	65,786	61,561	27,397	44,024	26,641	31,920	32,930

5) Improvement for high production.

There is still an average acreage of 16 % of the whole paddy fields which are not cultivated in the wet season, or 32,000 ha. , additionally the acreage which can only be planted with Gadu, which is only 11 % or an acreage of 25,495 ha. of the whole of 213,967 ha.

By improvement of the tertiary and quaternary channel network system and good coordinations of irrigation water use in the wet season, the area of Rendengan can be increased.

Meanwhile the expansion of the Gadu area, which supports the increase of harvest area, must be accompanied by the forestation of catchment areas and it will be only successful when accompanied by an integrated counselling.

In the east coastal area of the Province, there is still 25 % of the whole paddy fields which is not planted in the wet season, or an acreage of 71,000 ha. , besides that which can only be planted with the Gadu, i.e. 28 % of 84,927 ha. of the whole of 294,851 ha.

Anyhow other productive elements that could be counted improvement of paddy production should be described on the following items:

a) Condition and availability of labor force.

South Sulawesi Province in 1976 has a population of 5,654,802 persons, consisting of 66,74 % of persons above 10 years of age, i.e. 3,774,015 persons as labor force and remaining 33,26 % or 1,880,787 persons is non-labor force. The employed in the labor force is 40,82 % or number of 1,540,553 persons (Census 1971; BPS), or 66.33 % or a number of 1,021,849 persons of the employed is occupied in agricultural sector.

The acreage of agricultural lands is 1,345,663.92 ha. ; according to the South Sulawesi Agricultural Extension Service (see table 9.9. and 9.10.).

b) Pesticides; during the Pelita I and II, the prevailing pesticides used in overcoming the attack of pests and diseases including the gulma is the insecticides. The use of fungicides and herbicides in the protection of food crops is relatively low. The developments of the using insecticides thus far is as follows:



i) during the Pelita I the use of pesticides (insecticides and rodenticides) has increased by 50.1 %, the average of annual increase being about 12.6 %,

ii) during the Pelita II the use of pesticides increased by 173.20 % where the annual increase is around 57.73 %, and

iii) during the few years in the beging the Pelita II, the use ofherbicides is apparent in a f. w Kabupaten-s Sidrap and Pinrang (see table 9.11. and 9.12.).

c) Seedlings and seeds.

It is realized that during the Pelita i and II high variety seeds for the commocities of paddy, secondary crops and vegetables have prevailed by means of the Agricultural Extention Service. Up to 1977, the high varieties recorded well is for paddy. The use of high variety sedds (Unggul Baru and Unggul Bogor) during the Pelita I has increased by approximately 172.3 %, with the annual rate of increase about 42.77 %. For 1976 - 1977 the use of high variety seeds is recorded as follows: Unggul Baru 334,993.49 ha. and

Unggul Bogor 66,987.74 ha.

The average use of high variety seeds annually during the Polita II is as follows :

Unggul Baru	251,813.33 ha. and
Unggul Bogor	60,029.58 ha.

(see table 9.13. and 9.14.).

d) Progress of the use of agricultural machineries (see table 9.15.).

i) Machineries for land cultivation: The use of agricultural machineries which consist of power tillers, mini-tractors and tractors, during the Pelita II, are recorded (hte numbers in 1977) as follows:

Powers tillers	29 units,
Mini-tractors	508 units and
Tractors	71 units.

ii) Machineries for pest and disease control: The elimination of pests, disease and gulma is conducted by the use of hand sprayers, power sprayers (high volume) and mist blower (low - volume). The development, provision and use of those machine-ries until 1977 have been recorded as follows :

Hand sprayers	1,451 sets,
Power sprayers	248 sets and
Mist blowers	571 sets.

iii) Machinerics/equipments for processing: The main equipments used for paddy processing, which have been used during the Pelita II of the previous years, consist of trashers, rice milling units (RMU), dryers and cleaners, The progress of the use during the Pelita II is recorded as follows:

Rice Milling Units	4,172 units,
Dryers	7 units and
Cleaners	9 units.

iv) Others: Water pumps and transplanter have started to ; be introduced during the Pelita II. 39 units of 4 inches water pumps are used up to 1977, and only 1 unit of transplanter.

Table 9.9. Condition of the employed by age group in agricultural Sector in South Sulawesi Province (1977)

Age group	Percentage by Census 1971	The employed in whole sector	The employed in agricultural sec.
1. 10 - 14	5.35	82,420	54,669
2. 15 - 19	12.10	186,407	423,644
3. 20 - 24	11.71	180,399	119,659
4. 25 - 29	15.14	233,240	154,708
5. 30 - 34	11.96	184,250	122,213
6. 35 - 39	13.60	209,515	138,972
7. 40 - 44	9.04	139,266	92,375
8. 45 - 49	7.26	111,844	74,186
9. 50 - 54	5.30	81,649	54,158
10. 55 - 59	2.87	44,214	29,327
11. 60 - 64	2.79	42,981	28,509
12. 65 - 69	1.36	20,952	13,897
13. 70 - 74	0.97	14,943	9,912
14. 75 >	0.55	8,473	5,620
T o t a l: 100		1,540,553	1,021,849

Source : Perkiraan Masalah Pembangunan Pertanian Propinsi Sulawesi Selatan dalam Pelita III.-

Table 9.10. Estimation and number of labor employment in the South Sulawesi Province by region in 1961 and 1971 - 1978

Year	Labor Force 35.90 % L.F.	Rural 86.64 % L.F.	Urban 13.36 % L.F.
1961	1,621,439	1,404,815	216,624
1971	1,861,934	1,613,180	248,754
1972	1,888,351	1,636,067	252,284
1973	1,914,693	1,658,890	255,808
1974	1,941,403	1,682,032	259,371
1975	1,963,486	1,705,496	262,990
1976	1,995,346	1,729,388	266,658
1977	2,023,790	1,753,412	270,378
1978	2,052,031	1,777,871	274,150
1979	2,080,647	1,802,673	277,974
1980	2,109,672	1,827,820	281,852
1981	2,139,102	1,853,318	285,784
	1,395 %	1,395 %	1,395 %

Based on the table above, projection of labor employment by rural and urban areas will obtain numbers as shown on the table on next page.

Table 9.11. Development of the use of fertilizer in the South Sulawesi Province during the periods 1969-1970 through 1976 -1977.

No.	Y e a r	Urea (kg)	TSP/DAP (kg)	Total (kg)	Index
1.	1969 - 1970	4,320,321	1,614,213	5,934,543	100
2.	1970 - 1971	4,245,686	1,111,025	5,356,911	51.8
3.	1971 - 1972	3,261,840	1,330,437	4,529,277	77.4
4.	1972 - 1973	10,160,863	3,603,901	13,764,764	231.9
5.	1973 - 1974	7,746,605	1,998,906	9,745,511	164.2
6.	1974 - 1975	9,446,146	3,297,017	12,745,163	214.8
7.	1975 - 1976	9,353,799	4,610,390	13,972,189	235.4
8.	1976 - 1977	12,826	4,664,692	17,490,858	294.7

Source : Inspeksi Dinas Pertanian Rakyat Propinsi Sul - Sel.

Table 9.12. Development of the use of pesticides in the South Sulawesi Province during the periods 1969 - 1970 through 1976 - 1977.

No.	Period	Insecticide kg/ltr	Index	Rodenticide kg	Index	Total	Index
1.	1969 - 1970	61,863	100	3,520	100	65,383	100
2.	1970 - 1971	33,520	54.2	352	10	33,872	51.8
3.	1971 - 1972	22,087	35.7	1,017	28.9	23,104	35.3
4.	1972 - 1973	109,098	176.3	3,648	103.6	112,746	172.4
5.	1973 - 1974	93,026	150.4	5,123	145	98,149	150.1
6.	1974 - 1975	134,640	210.6	3,661	134	138,301	207.5
7.	1975 - 1976	127,424	206	3,111	113.8	130,535	199.6
8.	1976 - 1977	205,075	331	6,321	179.5	211,396	323.3

Table 9.13. Development in the use of top variety seeds during the Pelita I and Pelita II in South Sulawesi Province.

Year	Acreage of Top Variety Crops (Ha)			Index		
	Unggul Baru	Unggul Bogor	Total	Unggul Baru	Unggul Bogor	Total
1969 - 1970	30,024.00	117,568.00	147,602.00	100	100	100
1970 - 1971	167,987.76	120,264.85	288,252.69	559.9	102.3	195.3
1971 - 1972	95,822.34	62,882.10	158,704.44	319.0	53.5	107.5
1972 - 1973	179,220.22	94,234.95	273,455.17	596.7	80.1	185.3
1973 - 1974	247,911.22	98,363.58	346,274.80	825.4	83.7	234.6
Average	144,195.22	98,662.69	242,897.80	100	100	100
<u>Pelita II.</u>						
1974 - 1975	192,494.58	72,746.50	265,241.08	640.9	61.9	179.7
1975 - 1976	227,951.87	40,354.31	268,306.28	759	34.3	181.8
1976 - 1977	334,993.49	66,987.94	401,981.43	1,115.3	56.9	272.3
Average	251,813.33	60,987.94	311,842.91	174.6	60.8	128.3

Source : Inspeksi Dinas Pertanian Rakyat Propinsi Daerah Tingkat I Sul - Sel.  
Perkiraan masalah Pembangunan Pertanian Tanaman Pangan.

Table 9.14. Percentage of the use of top variety rice crops  
over the acreage of crops in South Sulawesi Province

<u>Pelita I.</u>			
<u>Y e a r</u>	<u>Total acreage of crops (ha)</u>	<u>Acreage of top Variety Crops (ha)</u>	<u>Percentage (%)</u>
1969 - 1970	556,366.00	147,602.00	26.52
1970 - 1971	556,339.06	288,252.69	51.81
1971 - 1972	605,352.00	158,704.44	26.22
1972 - 1973	445,251.25	273,445.17	61.41
1973 - 1974	629,043.01	346,274.80	55.04
Average	538,043.01	242,857.80	43.48
<u>Pelita II.</u>			
1974 - 1975	554,096.62	265,241.08	47.87
1975 - 1976	566,024.84	268,306.28	47.40
1976 - 1977	609,124.61	401,981.43	65.99
Average	576,415.36	311,842.93	54.10

Source : Inspeksi Dinas Pertanian Rakyat Propinsi Daerah  
Tingkat I Sul - Sel.  
Perkiraan masalah Pembangunan Pertanian Tanaman  
Pangan  
(Estimation of Food Crop Agriculture Development  
Problems).

Table 9.15. Developments in using the agricultural machinery in South Sulawesi Province (1973 - 1977)

No.	Kbnd	1973		1974		1975		1976		1977	
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
<b>I. Tractor</b>											
a.	Power Tiller	18	18	25	25	29	27	29	23	29	19
b.	Mini Tractor	-	-	42	42	100	100	251	251	508	508
c.	Tractor	62	62	62	62	-	73	78	71	71	-
<b>II. Spayer</b>											
a.	Hand Spayer	7,040	3,500	7,340	4,025	7,361	4,516	7,451	4,606	7,451	4,650
b.	Mist Blower	-	-	10	10	120	110	557	508	571	496
c.	Power Sprayer	348	300	348	225	248	250	348	250	248	78
<b>III. Water Pumps (4")</b>											
		25	25	34	34	34	28	38	34	39	33
<b>IV. Transplanter</b>											
		-	-	-	-	-	-	-	-	1	1
<b>V. Treaser</b>											
		15	15	46	46	51	51	51	51	51	45
<b>VI. Rice Milling Unit</b>											
		2,673	-	3,327	-	3,541	-	4,172	-	-	-
<b>VII. Dryer</b>											
		7	7	7	7	7	7	7	7	7	7
<b>VIII. Cleaner leaner</b>											
		9	9	9	9	9	9	9	9	9	9

Note : (1) Total number.

(2) Number of good condition's machine among the Total number

Source : Inspeksi Dinas Pertanian Rakyat Propinsi Dati I Sul - Sel.

9.1.2.        Secondary crops

9.1.3.        Vegetables and fruit

In regard to these articles, about the secondary crops, vegetables and fruit as a commodity group of farm products in South Sulawesi Province, the present condition and a orientation of development of those crops in the future have been analyzed in agronomic and economic aspects by the Team, especially by agronomist group and agro-economists group of the Team, therefore results of the analysis will be described on the First Quarterly Report of 1978 which besides this annual report will be submitted by the Team in the end of March 1978.

Hereat only basic data secondary data of those crops are compiled in this report for a appendix (refer to appendix IV).



## 9.2. Estate crops (Industrial crops)

The establishment of the estate sub-sector in South Sulawesi Province has started since the onset of the compulsory cultivation movement in 1966 and it is continued during the period of Polita. This compulsory cultivation movement is based on the fact that the monocultural agriculture pattern the economic development was apparently insignificant compared to other provinces applying the polycultural pattern. On the other hand, the South Sulawesi Province has quite a big productive potentiality of estate crops and it is technically feasible to conduct agricultural diversification.

### 9.2.1. Potential areas

According to the potentiality, the climate, soil conditions and soil survey findings of the Institute of Soil Investigation in Bogor, South Sulawesi Province can be developed into center of developments of estate crops farming such as the following commodities:

<u>Commodity</u>	<u>Kabupaten</u>
01. Coffee Arabica	Tator and Enrekang.
03. Cacao	Majene, Mamuju and Polmas.
04. Tobacco Virginia	Maros, Gowa and Takalar.
05. Tobacco (Local)	Soppeng, Wajo and Bone.
06. Clove	Luwu, Tator, Sinjai and Bulukumba.
07. Nutmeg	Selayar and Luwu.
09. Pepper	Sinjai, Bulukumba and Enrekang.
12. Coconut	Luwu, Bone, Wajo, Bulukumba, Selayar, Jeneponto, Majene, Polmas and Mamuju.
13. Oil Palm	Luwu.
15. Cotton	Jeneponto, Takalar, Bantaeng and Bulukumba.
16. Kapok	Bone, Wajo, Bulukumba, Jeneponto and Bantaeng.
20. Sasame	Wajo and Takalar.

### 9.2.2. Present land utilization for farming of estate crops

The farming of estate crops in South Sulawesi Province consists of the farming by the farmers and that by the enterprises, both Indonesia private and foreign ones.

1) Estate crops farming by the farmers.

The farming of estate crops by the farmers in South Sulawesi Province have a greater role than the other ones. The development of estate crops farming by the farmers in South Sulawesi Province during 1969 - 1976 can be seen on table 9.16. , 17. and 18.

In the table different variation of each commodity will be seen, e.g. for coconut, the acreage of planted area increases from 73,051 ha. in 1969 to 100,152 ha. in 1976, which means an increase of 43 %, and production increases from 57,357 tons in 1969 to 67,863 tons in 1976 by percentage of 18 %.

As for coffee, the acreage increases from 21,219 ha. in 1969 to 25,481 ha. in 1976, which is an increase of 20 %, while its production decreases from 6,429 tons in 1969 to 5,690 tons in 1976, i.e. 11 %. Its average production has also decreased from 303 Kg./ha. in 1969 to 223 Kg./ha. in 1976. It was mainly caused by the fact that about half of the planted area include young tree area that yet can not yield and old tree area that is already fruitless. The composition of tree's age influences the yield of production in general. On table 9.17. , it will be seen that among the 100,152 ha. of coconut planted area, only 65 % can yield. 32 % is young tree that can not yield yet and 3 % is old one which not yield any longer. Coffee has only 69 % of producible trees area, 27 % young trees area and 4 % old ones area.

Besides the high percentage of unproductive tree (the young and the old ones) area, there is another factor, i.e. the small acreage of estate crops possessed by each farmer. The situation can be seen in more detail on table 9.17. and 18.

Having seen table 9.18. , it is apparent that among the 13 commodities only one sort achieves the average effort of each farmer up to more than 1 ha. (local tobacco 1,82 ha.). Three sorts of commodity, i.e. coconut, candlenut and kapok have an average of a little bit more than 0.5 ha. The rest them have an average of less than 0.5 ha. , for and sugar cane it is even only 0.10 ha. and 0.09 ha. respectively.

The restricted acreage of each commodity for each farmer influences his income. The average income level of each household (farmer) on each commodity can be seen on table 9.18. It is to be seen that the farmer's income level is not only determined by the acreage of planted area but also the unit price level of each commodity. For coffee, the average acreage for each household is only 0.34 ha.; it can give a higher income level, besides the commodities local tobacco and candlenut. It also shows in the development of commodities, besides the technical factor, the economic factor has to be considered, too, which is not less significant, especially in the prospect of each commodity's marketing.

Table 9.16. Acreage of planted area, production and yield of estate crops by the farmers in South Sulawesi Province (1969)

No.	Commodity	Planted area <sup>1)</sup> (ha.)	Production (tons)	Yield <sup>2)</sup> Kg./ha.
01/02.	Coffee	21,219	6,429	303
03.	Cacao	-	-	-
04.	Tabacco (Virginia)	-	-	-
05.	Tabacco (local)	-	-	-
06.	Clove	286	23	1
07.	Nutmeg	179	425	24
08.	Citronella grass	-	-	-
09.	Pepper	342	46	135
10.	Castor oil plant	-	-	-
11.	Candle-nut tree	22,750	4,739	208
12.	Coconut	70,051	57,357	819
15.	Cotton	-	-	-
16.	Kapok	17,741	1,719	0.97
17.	Roselle	-	-	-
18.	Sugar cane	571	9,492	16,623
20.	Sesame	-	-	-

Note: 1) Total acreage of planted area in ha., including (a) Planted area of young trees which can not yield, (b) Planted area of old trees which is fruitless already and (c) planted area yields products.

$$2) \text{ Yield Kg./ha.} = \frac{\text{Production}}{\text{Acreage of planted area .}}$$

Source: Dinas Perkebunan Sulsel.

Table 9.17. Acreeage of planted area of estate crops by the farmers in South Sulawesi Province (1976)

No. Commodity	Unit: ha. & (%)			
	Total	Producible	Unproductive area	
	Planted area (1)	area (2)	Young tree area (3)	Old tree area (4)
01/02. Coffee	25,481(100)	17,427(69)	7,005(27)	1,049(4)
03. Cacao	183	-	-	-
04. Tabacco Virginis	1,332	-	-	-
05. Tabacco Local	13,671	-	-	-
06. Clove	8,454(100)	152(2)	8,297(98)	5(-)
07. Nutmeg	877(100)	16(1.5)	857(98)	4(0.5)
08. Citronella grass		-	-	-
09. Pepper	758(100)	286(38)	441(58)	31(4)
10. Castor oil	275	-	-	-
11. Candle- nut	27,295(100)	19,342(71)	6,869(25)	1,084(4)
12. Coconut	100,152(100)	65,049(65)	31,948(32)	3,155(3)
15. Cotton	892	-	-	-
16. Kapok	25,304(100)	9,419(37)	13,165(52)	2,720(11)
17. Roselle	586	-	-	-
18. Sugar cane	551	-	-	-
20. Sesame	368	-	-	-

Note: (1) = (2) + (3) + (4).

Source: Dinas Perkebunan Sulsel.

Table 9.18. Production, yield and number of household of estate crops by the farmers and average gross income per household by production of estate crops in South Sulawesi Province (1976)

No. & Commodity	Production (tons) (5)	Yield (average) (Kg/ha) (6)	Number of household (7)	Average acreage (ha.) (8)	Unit Price (Rp/Kg) (9)	Average gross income (Rp) (10)
01.) COF	5,690	223	75,068	0.34	700	53,074
02.) CAC	10	555	-	-	425	36,014
03. TOB/V	1,100	950	4,323	0.31	-	-
04. TOB/L	3,623	338	7,530	1.82	132	81,251
05. CLO	30	4	22,661	0.38	3,750	5,700
06. NUT	12	13	3,410	0.26	708	2,393
07. CIT	-	-	-	-	-	-
08. PEP	129	170	7,562	0.10	650	11,050
09. CAS	82	298	914	0.30	-	-
10. CAC	10,129	352	45,231	0.60	267	56,390
11. COC	67,862	678	162,325	0.62	95	39,934
12. COT	217	243	4,668	0.19	175	8,080
13. KAP	2,176	86	40,462	0.63	310	16,796
14. ROS	418	713	1,864	0.31	-	-
15. SUG	1,384	2,512	1,608	0.09	-	-
16. SES	111	302	415	0.89	171	45,961

Note: (6) yield Kg./ha. = Production (tons) (5) ÷ Total acreage (column 1. in the table 9.17.)

(8) Average acreage per household = Total acreage (column 1 in table 9.17.) ÷ (7).

(10) Average gross income per household = (6) × (7) × (8).

Source: Dinas Perkebunan Sulasel.

2) Large scale farming of estate crops.

Large scale farming of estate crops in South Sulawesi Province have quite a high potential, although they are as yet not entirely cultivated. 93 estates<sup>1)</sup> with a total acreage of 118,261 ha. are recorded in South Sulawesi Province, but only 9,627 ha. or 8 % has been cultivated, such as seen on table 9.19.

It will be seen that among the 90 private estates of 109,152 ha. , only 7 % is cultivated, while of the foreign estate only 25 % is cultivated; and the 2,000 ha. joint venture estate are on trial cultivation. The distribution of those estates in 16 Kabupaten-s will be seen on table 9.20.

According to table 9.20. the highest potential estate in South Sulawesi Province is found in Kabupaten Luwu, with 39 estates at an acreage of 40,753 ha. and only 5 % of them is cultivated, and in Kabupaten Mamuju, where only 2 % is cultivated among 5 estates at an acreage of 21,431 ha. On the cultivated land which is 9,627 ha. of acreage, various crops are planted such as rubber, coconut, clove, candlenut, coffee, etc. The acreage of planted area with each commodity will be seen on table 9.21.

No complete data is found yet about the condition about the composition of crops age and the production, but it is estimated that it would not be much different from that of the farming by the farmers for each commodity. There is a notable difference between the the farming by the farmers and farming of the estates. In farming by the farmers the acreage of each farm household, including four family members of his, is only 0.54 ha. , which is a very small amount, compared to the minimal acreage which has to be possessed by each farmer household, i.e. 2 ha. , to afford a decent living for a family consisting of 5 people. On the contrary in estates, they are only able to cultivate 8 % of the land in their possession while the rest (92 %) is not cultivated yet.

The main commodities of estate crops in South Sulawesi Province are coconut and coffee. The coconut treer are spread throughout the Kabupaten-s in South Sulawesi Province, and in many Kabupaten-s such as Polmas, Majene, Mamuju and Selayar they are even still monocultural crops which are the main source of income for the local community. The second main commodity is coffee. The coffee producing Kabupaten-s Luwu, Enrekang, Tator, Polmas, Sinjai, Bulukumba and Bantaeng.

Note : 1) Estate means large farm by the large scale farming of estate crops, not by the farmers.

These two commodities have been cultivated since decades ago, and it showed a decreasing productivity recently.

Table 9.19. Number of estate and average in South Sulawesi Province (1977).

Status	Number	Total acreage (ha./%).	Cultivated area (ha./%).	Uncultivated area (ha./%).
National management	90	109,152 (100 %)	7,849 (7 %)	101,303 (93 %)
Foreign management	1	7,109 (100 %)	1,778 (2 %)	5,331 (75 %)
Joint venture	2	2,000 (100 %)	-	2,000 (100 %)
<b>T o t a l</b>	<b>93</b>	<b>118,261</b> (100 %)	<b>9,627</b> (9 %)	<b>108,634</b> (92 %)

Table 9.20. Distribution of estate by Kabupaten in South Sulawesi Province (1977).-

Kabupaten	Number of estate	Total average	Cultivated area	Uncultivated area
01. Luwu	39	40,753	1,920 (5)	38,833 (95)
02. Tator	5	2,365	219 (9)	2,146 (91)
03. Soppeng	1	202	100 (50)	102 (50)
04. Wajo	7	1,541	207 (13)	1,334 (87)
05. Bone	4	14,404	2,510 (10)	12,894 (90)
07. Bulukumba	5	8,115	2,007 (25)	6,108 (75)
10. Jenepono	2	250	-	250 (100)
11. Takalar	3	641	109 (17)	532 (83)
12. Gowa	3	16,050	1,450 (9)	14,600 (91)
14. Maros	4	1,191	144 (12)	1,047 (88)
16. Barru	1	2,000	500 (25)	1,500 (75)
18. Sidrap	7	7,384	435 (6)	6,949 (94)
19. Enrekang	2	225	76 (34)	149 (66)
20. Pinrang	2	549	157 (29)	392 (71)
21. Polmas	4	1,261	377 (30)	884 (70)
23. Mamuju	5	21,431	416 (2)	21,015 (98)
<b>Total</b>	<b>93</b>	<b>118,261</b>	<b>9,267 (8)</b>	<b>108,634 (92)</b>

Source : Dinas perkebunan Sul - Sel.-



Table 9.21: Acreage of planted area by commodity in South Sulawesi Province (1977).

No.	Commodity	Acreage. (ha.)
01.)	Coffee	895
02.)		
03.	Cacao	28
06.	Clove	915
07.	Nutmeg	520
08.	Citronella grass	44
10.	Castor oil plant	100
11.	Candle-nut tree	1,012
12.	Coconut	3,040
14.	Rubber	1,913
16.	Pepper	83
17.	Rosella	200
18.	Sugar cane	450
:-	Others	229
T o t a l		9,627

Source : Dinas Perkebunan Sul-Sel.

### 9.2.3. Productive elements.

The estate sub-sector of the farming industry is handled by the farmers in small scale, with the average of 0.54 ha. , employing quite traditional techniques of farming. Thus the management of estate crops farming by the farmers is generally undertaken by the owner himself. They only use laborer on harvesting, which they cannot do themselves. The cost of packing coconut fruits is, for example, 5% - 10% of the whole cost. In addition to the deficient farming techniques make the production rate low. The deficient use of fertilizers and pesticides is one of the indications that they are employing inadequate agricultural techniques.

The tables 9.22. and 9.23. will describe a very low amount of the use of fertilizers and pesticides compared to the real need for the two main commodities. From table 9.22. it is seen that the requirement fertilizers for coconut cultivation in 1976 is 30,045 tons. The amount used was only 1,500 tons. The requirement of pesticides for coffee during the same period was 28,304 tons while the amount used was only 1,800 tons.

Table 9.23. shows that in 1976 the requirement of pesticides for coconut is 901,368 tons, and the amount being used is only 8,100 tons (0.8 %). The requirement of pesticides for coffee is 159,849 tons, the amount used is only 1,045 tons (0.63 %).

Table 9.22. Amount of fertilizer requirement and used for cultivation of coconut and coffee in South - Sulawesi Province (1974 - 1978).

Year	Planted (ha.)	Requirement (ton)	Used (ton)
<u>For Coconut :</u>			
1974	92,058	27,617	1,000
1975	97,479	29,241	1,000
1976	100,152	30,045	1,500
1977	104,000	31,200	-
1978	106,000	31,800	-
Total		149,903	3,500
<u>For Coffee :</u>			
1974	24,652	19,721	3,000
1975	25,276	20,221	1,650
1976	25,481	20,381	1,800
1977	27,433	21,946	-
1978	23,221	22,577	-
Total		104,850	6,450

Source : Dinas Perkebunan Sul - Sel.

Table 9.23. Amount of pesticide requirement and used for cultivation of coconut and coffee in South Sulawesi Province (1974 - 1978).

Year	Planted area (ha.)	Requirement (tons)	Used (tons)
<u>For coconut :</u>			
1974	92,058	828,522	4,880
1975	97,479	877,230	6,300
1976	100,152	901,368	8,100
1977	104,000	936,000	-
1978	106,000	954,000	-
Total	-	-	19,250
<u>For Coffee :</u>			
1974	24,652	151,658	0,764
1975	25,276	155,810	0,230
1976	25,481	159,849	1,045
1977	27,433	164,590	-
1978	28,221	169,325	-
Total	-	-	2,166

Source : Dinas Perkebunan Sul - Sel.

9.2.4. Income distribution, farm price and marketing cost

The farmers of estate crops farming in South Sulawesi Province are farm-owners, so that cost spent on outside laborers is only a picking cost of 5 - 10 %. One of the factors which also strains the real income of farmers is the high marketing costs, especially transportation cost. This is chiefly because the estate crops farming in South Sulawesi are scattered in distribution, while the roads are in bad condition.

For instance we take the marketing cost of copra in Kabupaten Polmas and Selayar, which is 47 % and 48 %. The average marketing cost of copra in South Sulawesi is 45 %. The price of the farmers as producers and the market price in Ujung Pandang as accumulation center are quite different and the farmers price is very low (see table 9.24).

Table 9.24 Average prices of coconut, copra and coffee by type of price in South Sulawesi Province (1969 - 1976)

Commodity/ Types of Price	Unit: Rp/Kg.							
	1969	1970	1971	1972	1973	1974	1975	1976
<u>01. Coffee/Arabica</u>								
Farmers	248.5	290.0	285.0	267.5	283.5	308.0	345.0	700.0
Kabupaten's	325.0	400.0	350.0	350.0	375.0	425.0	510.0	800.0
U. Pandang's	390.0	455.0	450.0	420.0	445.0	485.0	540.0	1,010.0
<u>02. Coffee/Robusta</u>								
Farmers	135.0	175.0	200.0	195.0	190.0	230.0	255.0	475.0
Kabupaten's	195.0	250.0	275.0	280.0	280.0	300.0	295.0	650.0
U. Pandang's	215.0	280.0	310.0	300.0	300.0	360.0	310.0	700.0
<u>12. Coconut</u>								
Farmers	6.5	8.5	10.5	14.0	18.5	26.0	18.5	28.5
Kabupaten	10.0	11.5	20.0	25.0	25.0	42.5	27.5	40.5
U. Pandang's	12.5	16.5	22.5	35.0	35.0	50.0	35.0	55.0
<u>21. Copra</u>								
Farmers	25.0	32.5	45.0	50.0	70.0	86.5	64.5	95.0
Kabupaten's	35.0	47.5	55.0	57.5	80.5	120.0	69.5	110.0
U. Pandang's	45.5	55.0	70.0	90.0	135.0	166.5	85.5	175.0

### 9.2.5. Marketing

Besides to fulfill needs of local consumers, estate products are also to be shipped for inter-insular trade and export and to be used as main materials for industrial purpose. The supplying regions are scattered throughout the area, while the consumers demanding the products are located in the cities, so that transportation has a significant role.

Consumptive level of fresh coconut per capita of South Sulawesi farmers is 22.88, converted into approximately 5 kg. of copra. (Seminar on coconut estates in South Sulawesi, 1976). For the consumption of 5,654,802 people in South Sulawesi Province, 28,274 tons of estate crops products are needed. Comparing with production of coconut in 1976 which has 67,862 tons of copra, South Sulawesi has a marketable supply of 39,588 tons for inter-insular trade as raw material for oil refining. Following list will show the amount volume of inter-insular trade of copra, during 1969-1976.

#### Copra amount volume of inter-insular trade of South Sulawesi Province (1969-1976)

<u>Year</u>	<u>V o l u m e</u>
1969	2,558,874 Rupiah-s.
1970	13,374,005 --
1971	12,662,988 --
1972	16,193,991 --
1973	8,142,151 --
1974	8,211,422 --
1975	14,967,815 --
1976	11,148,590 --

Coffee, which is the second main commodity for local consumption, according to the survey findings of the SAE in 1974, has an average amount of 2.31 kg. for the supplying regions, and for consuming regions 1.23 kg per capita each year. For coffee export in 1978, South Sulawesi gets a supply of 2,310 tons.

### 9.2.6. Extension and other services

There is lack of facilities for the development and maintenance of estates in South Sulawesi Province, concerning both the physical and fiscal. There are only 6 extension services placed in the blocks, which will extend

service to the community, so that each unit covers 2 to 5 Kabupaten-s ; those are as follows :

<u>Location</u>	<u>the territory</u>
a) Palopo	Iaua and Tator.
b) Bone	Bone, Soppeng and Wajo.
c) Bulukumba	Bulukumba, BantaEng, Sinjai and Selayar.
d) Ujung Pandang	Ujung Pandang, Pangkep, Maros, Gowa, Takalar and Jeneponto.
e) Pinrang	Pinrang, Enrekang, Barru, Sidrap and Pare-Pare.
f) Majene	Majene, Mamuju and Polmas.

In some Kabupaten-s a estate crop farming center has been established in each Kabupaten which will function as a experimental station and as a seed center for the farmers, but it does not function properly yet, especially concerning the seeds. The location of the centers in South Sulawesi is shown on table 9.25.

Two kinds of main commodities in South Sulawesi Province have decreased in their productivity due to old age. It is estimated that more than 50 % of coconut trees in South Sulawesi Province are more than 50 years of age. Coffee also there are many old, unproductive trees. For these two commodities, special countermeasures has been operated such as the establishment of a kind of experimental station unit. For coconut, 17 units have been established, each unit including a farm on an acreage of 5,000 ha. Replanting is done gradually on 300 ha. of coconut trees each year, that is 10 % by units.

Table 9.26. shows the location of Project Management Unit - Coconut Working Centres (P.M.U.C.W.C.) in South Sulawesi Province.

To replanting coffee trees, 3 units have established, i.e. the Management Unit Renewal Project. Each unit covers 500 ha. An acreage of 100 ha. are renewed each year, i.e. 10 %.

The location of each unit is as follows :

<u>Unit</u>	<u>Kecamatan</u>	<u>Kabupaten</u>
1.	Rinding Allo	Tator
2.	Tompobulu	BantaEng
3.	A l l a	Enrekang

Besides the endeavor to replanting of coffe, another unit has been established, i.e. the Project Management Unit Coffee Processing Centre (P.M.U.C.P.C.) in Kabupaten Tator to improve the quality of coffee in South Sulawesi Province.

9.2.7. Conclusion and suggestion

1) Conclusion

a) The extremely limited acreage of estate crops farm by the farmers (0.54 ha) for each commodity, while in the estates, 108,634 ha of land is recorded to be uncultivated.

b) The average income of the farmer from each commodity is very low, because in addition to the very small acreage, the average production per ha. is very low, due to many unproductive trees and also due to insufficient maintenance. The farmer's level price out of the market price is very low due to the weak position of the farmers.

c) Two main commodities in South Sulawesi Province i.e. coconut and coffee, have had a decrease in their productivity due to many old tree which are fruitless. Some efforts have been undertaken to handle the situation, i.e. by establishing the P.M.U.C.W.C. for the renewal of coconut and coffee trees.

2) Suggestion

a) The acreage of estates which thus far has not been cultivated by the owner has been handed over to someone who are able to cultivate it, whether they are farmers or resettler (e.g. in Maruju). That of estate crop farming by the farmers is aimed at the intensive management (the use of fertilizers and pesticides). The intensive way of improvement will rapidly improve the production of renewal. Besides the expansion of young trees, the renewal is conducted on old trees which do not produce any longer. On productive crops, intensive maintenance is established.

b) To overcome the weak position of the farmers in the marketing of their crops, the BUUD/KUD ought to be improved including their capital/credit availability, so that they are able to tackle not only food stuffs or rice, but also other commodities.

c) The renew estate commodities, especially long-time ones, selected seeds are used. For the development of each commodity, their marketing prospects have to be taken care of.

Table 9.25 Seed gardens of Industrial Crops Extension Service

No.	Name of the estate crop farming center	Acreage of farm (ha)	Location/ Kabupaten	Commodity
1.	Bone-bone	20.00	L u w u	coconut
2.	S a r i t i	5.00	L u w u	pepper
3.	Buntuasa	3.50	Tator	clove
4.	Tampangeng	1.00	W a j o	sugar cane
5.	Batu Karopa	14.00	Bulukumba	clove, nutmeg, coffee, coconut
6.	B i k e r u	1.90	Sinjai	nutmeg, pepper, coconut, coffee, clove, cacao, oil-palm
7.	B i r u e	1.00	Barra	clove
8.	Salubarani	5.72	Enrekang	clove
9.	Tiktok	5.00	Enrekang	coffee (Arabica)
10.	R e a	6.00	Polmas	coconut (local), clove, cacao
11.	Paeeda	5.00	Polmas	coconut (local, Mapanget)
12.	Bangkala	1.00	Jeneponto	cacao
13.	S i w a	1.00	W a j o	
14.	Larompong	1.00	L u w u	



Table 9.26 P.M.U.C.W.C. in South Sulawesi Province

No.	Location of units/Kecamatan	Kabupaten	Established year
1.	Bupon / Bojo	L u w u	1975
2.	Larompong	L u w u	1976
3.	H e r l a n g	Bulukumba	1975
4.	K a j a n g	Bulukumba	1976
5.	Ujung Bulu	Bulukumba	1976
6.	Bontotene	Selayar	1975
7.	Bontoharu	Selayar	1975
8.	Tinambung	Polmas	1975
9.	Campalagian	Polmas	1975
10.	Polewali	Polmas	1976
11.	Banggae/ Pamboang	Majene	1975
12.	Malunda	Majene	1976
13.	Tellusiatinge	B o n e	1976
14.	Parrana	W a j o	1976
15.	Binamo	Jeneponto	1976
16.	Sawitto	Pinrang	1976
17.	Tappalang	Mamuju	1976

9.3. Animal husbandry

9.3.1. Development of feeding the cattle and poultry

1) The kinds of cattle run by people in South Sulawesi Province are horses, cows, buffaloes, goats, sheep, pigs, and chicken/ducks. In the year 1976/1977 there are:

1) horses	171,112
2) cows	539,686
3) buffaloes	383,199
4) goats	486,052
5) sheep	11,388
6) pigs	364,641
7) chicken	12,629,945
8) ducks	3,482,529

2) The rate of growth of cattle year by year during the period of 1969 - 1975 has risen by 12.22 %. The increase of cattle included herein are classified as follows: horses 3.56 %, cows 15.17 %, buffaloes 2.49 %, sheep 25.77 %, goats 9.18 % and pigs 17.16 %. When it connected with annual rate increase, which is percentage of new born and imported cattle subtracted by the dead, the slaughtered and exported ones each year, it turns out that the annual rate average of increase during the period of 1969 - 1976 for large cattle is 5.68 % and small cattle 13.32 %. This data originated in detail from the annual rate of increase of large cattle: horses 3.69 %, cows 10.91 %, buffaloes 2.44 %, and that of small cattle: goats 7.66 %, sheep 21.07 % and pigs 11.23 % (refer to Appendix V).

The feeding of cattle is divided into 3 classification: large cattle, small cattle, and poultry. During the Pelita the feeding of cattle has risen from year to year for the large cattle, the small cattle as well as poultry. The feeding of large cattle has increased from 703,165 in 1969 to 1,093,997 in 1976, which means an increase of 390,832 or 55.58 % (average of 8 %).

The feeding of small cattle has increased from 4,334,545 in 1969 to 12,629,945 in 1976, which means an increase of about 8,295,400 or 191.38 % (annual rate 27.34 %). The attempts to improve the quality of the breed are only aimed at cow/beef for the group of large cattle, and chickens for the poultry.

The amount of cattle and poultry have been introduced during the Pelita II is as follows:

cows from abroad	3,799
frozen sperm from abroad	6,000 ampouls
chicken D.O.C.	135,389
alabio ducks	1,200

Small cattle such as goats, sheep and pigs have not received attention.

The cows introduced from abroad in South Sulawesi during the Pelita II by:

P.T. Bina Mulya Ternak	3,035
P.T. United Livestock	750
President's Aid	14
In the form of frozen sperm	6,000 ampouls

The development of private feeding corporations, in the form of small, medium size and big ranches as well as in intensive poultry farms in them Pelita II gives us a good hope for the future, yet at present time most part of the development, is still unsatisfactory, due to some factors e.g.:

- very restricted finance and credit procedures which are quite complicated to be fulfilled by the entrepreneurs.
- tax system which put a strain to the business men because they are already charged before they start production.
- the license of land use is also one of the requirements which is quite hard for the businessmen.

There are 40 ranches which are separated in South Sulawesi and which are always expecting support in guidance and management.

Attempts of the government in increasing husbandry products are e.g.

- the protection of cattle against infections animal diseases.
- the upgrading of cattle quality by importing high quality cattle breed, both in the form of livestock and frozen sperms in the activity of artificial insemination.
- the realization of the PUTP.
- the realization of the poultry BIMAS.

The response of the community towards the PUTP project is quite good as there is plenty of demands from the Kabupatens which want to be PUTP locations.

9.3.2. Demand and supply of the husbandry products

1) The channel of distribution in the marketing of livestock follows the line: producer - middlemen - export or interinsular tradesmen/butcher - consumer. The livestock marketing centres in South Sulawesi are Ujung Pandang municipal for local consumption (slaughter houses ) and Pare-Pare municipal for interinsular and export trade.

In addition to that, the harbours of Palopo, Baje, Ujung Pandang, Awarang and Majene act as ports for interinsular shipments of livestock to other province e.g. Java, Kalimantan, Central Sulawesi, Southeast Sulawesi and Irian Jaya. For a clear description,

2) The products of the husbandry sector in 1976, which also constitute the supply of livestock products for the community needs as consumption and commercial commodities. The source of the livestock supply is the rate of birth, the rate of incoming livestock through interinsular shipments and imports subtracted by the death rate, while demand is the total of domestic consumption plus the number of livestock sent out through interinsular trade and export.

During the year 1976 a supply of livestock has been obtained, i.e. 85,606 cows, 43,332 buffaloes, 8559 horses, 61,272 goats, 3,191 sheep and 110,904 pigs. Out of the above mentioned numbers, the community has consumed of 22,646 cows, 951 horses, 2,186 goat, 135 sheep and 20,768 pigs. The number of livestock shipped out in interinsular trade is respectively 21,300 cows, 6250 buffaloes, 146 horses, 1960 goats and 136 pigs; exported: 1750 cows and 920 buffaloes.

3) We can see the development of poultry farming, specially race chicken during the Pelita II by the amount of D.O.C. imported to South Sulawesi, from year to year that is:

19605	in	1974
43691	in	1975
and 93093	in	1976

With the estimation of production in 1974 to be 252 tons (about - 5.040,000 eggs), in 1975, 375 tons (+ 7,500,000 eggs), in 1976, 816 tons (+ 16,320,000 eggs).

Other attempts implemented in relation to the development of poultry in South Sulawesi within there years of Pelita II are

preparation of realization of poultry Bimas, which is a feasibility study of prospective areas of poultry Bimas in the town of Ujung Pandang and its surroundings within 31 km radius. This survey was established by the Institute of Economy and community of the Faculty of Economics, Un. Indonesia in cooperation with the Institute of Management of the UnHas.

The results of this survey show that Ujung Pandang and its surrounding are feasible enough, technically as well as economically to be poultry Bimas areas.

Besides that, the survey has also found a performance of poultry farming in Ujung Pandang and surroundings which is as follows:

egg production potential, average.....	68.70 %
mortality of D.O.C. 0 - 6 weeks old....	23.89 %
" " grower 6 -24 " "	7.16 %
" " layer.....	1.93 %

4) Estimation of meat availability in 1976 and 1981.

According to the estimation of meat consumption in 1976 and the estimation of livestock population and meat consumption in 1981, as is shown on table V.11, the meat consumption in the Province of South Sulawesi in 1976 is  $\frac{13,395,367}{5,654,802} = 2.36$  kg per capita

each year. So the lack of meat for the South Sulawesi residents viewed from the national standard is  $8.1 \text{ kg} - 2.36 \text{ kg} = 5.74 \text{ kg}$ .

According to the present livestock potential and the estimation of community potential to develop husbandry in the future, the potential meat consumption for 1981 is estimated to be

$$\frac{18,241,052}{6,186,054} = 2.95 \text{ kg per capita each year.}$$

Viewed from the national standard of meat requirement, the South Sulawesi province still lacks  $8.1 \text{ kg} - 2.95 \text{ kg} = 5.15 \text{ kg}$ .

Thus during the following 5 years' period, an increase of meat consumption of  $2.95 \text{ kg} - 2.36 \text{ kg} = 0.59 \text{ kg}$  is obtained.

The estimation on the population in 1981 is obtained by using the Cohort method.

The explanation concerning the estimation of livestock population and the estimation of availability of meat in 1981 can be seen on table.

9.3.3. Improvement of feeding

1) The acreage of grassland in South Sulawesi Province is 590,000 ha. In regard to the grass as feed stuffs, estimated average yield of grass per hectare and per year is about 7.3 tons

(365 days  $\times$  20 kg/ha. = 7,300 kg). Based on the number, of production of grass in whole South Sulawesi Province per year is estimated 4,307,000 tons. And compared to the population of cattle, it is estimated that the requirement of grass for feeding the cattle in South Sulawesi is 9,214,000 tons per year. Those estimation shown that the shortage amount of grass as feed stuffs in South Sulawesi is 4,907,000 tons for one year.

Thus this deficiency of stuffs is made up by the production of areas outside the grassland, because the feeding in South Sulawesi also graze outside the grasslands, i.e. in forest areas, greenery areas, paddy fields and home yards. Based on the calculation above, the estimated acreage of grazing spot outside the grasslands is  $\frac{4,907,000}{7.3} = 672,191$  ha. To protect the areas outside the grasslands from damage by cattle, it is necessary to increase the availability of the existing grasslands by improving the grass using high quality pasture grass and pasture legumes. According to the experience of the P.T. Bina Mulya Ternak, the improved availability of grasslands is estimated to be 2.5 heads per ha. So if grasslands in South Sulawesi is improved with pasture grass and pasture legumes, it is estimated to produce 10,767,500 tons, of grass and the Production show the surplus of feed stuffs by an amount of 1,553,500 tons of grass or approximately 17%. It means that the improvement of grasslands by pasture grass and pasture legumes will protect 672,191 ha. of land outside the grasslands from disturbance by livestock; with the grassland at an acreage of 590,000 ha., the population of cattle can be raised by 17%.

In order to achieve a planned and directed improvement of grassland and grass, it has to be correlated to the Impres on Greening and Reforestation. Without improving grassland and grass, the feeding cattle will be an obstruction against the success of reforestation and greening (see table V.7./appendix v).

What needs to find a solution through the government's policy is the attempt to handle the deficiency of grass as feed stuffs. The introduction of pasture grass and pasture legumes is as yet only at beginning stage)

The utilization of fertilizers in improvement of grasslands and for the increasing production of feed stuffs has been done but it is not so significant yet, because only

a small part of the ranch owners have done it.

Other food materials such as rice waste production, corn cake and legumes are adequately available to the feed stuffs.

2) We use of medicine and vacccin to prevent and to cure cattle discases show quite a high improvement. It can be seen from the fact that in 1969 the use of vacein amounted to 254,476 dosis. This amount has increased to 2.158.000 dosis in 1976, which means an increase of about 748 % or the average of 94 % each year. The availability and utilization of disease prevention apparatuses such as injection needles, canules, microscopes, coolcases, pincets, scissors, laboratory equipments etc, have also increased along with the increase of the use of medicines and vacein. The amount of utilization of those equipments has increased from 1,000 in 1969 .to 2,021 in 1976, which means an increase of about 102 % or averagely 13 % each year. The use of soil processing equipments at the subsector of husbandry has also risen, especially its use in the imple- mentation of grass plantations.

#### 9.4. Fisheries

The South Sulawesi Province lies in the position of 1-8 degree of South Latitude and 117-120 degree of East Longitude ; it has potential resources of fishery, such as seen on table 9.27. This potential places South Sulawesi in 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.

The annual average of production achieved during the period 1969-1976 is 126,203 tons, which constitute only about 27 % of the whole production potential of South Sulawesi, i.e. 440,000 tons. (see table 9.28. and 29). Those fishery resources have not been cultivated intensively due to the following reasons :

- a) the use 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.

The lack of potential, which is 440,000 tons minus 146,538 tons equals 293,000 tons, constitute the aims of the fishery development which will be achieved in the future, and it demands a solution including several aspects e.g. technical, economic and social aspects.

##### 9.4.1. Inland fishery

The resources of inland fishery include the following :

- 1) cultivation in brackish water fish ponds at the available acreage of 150,000 ha; estimated production 120,000 ton a year,
- 2) fish cultivation in fresh water,
- 3) fish capture in common waters (lakes, rivers, swamps) at available acreage of about 103,000 ha, production 20,000 tons, and
- 4) fish cultivation in paddy fields.



1) Brackish water fish culture

In 1974, the relation of the brackish water, and fresh water fish cultivation to the fish cultivation in paddy fields in South Sulawesi was 30:1:4.5 while the relation among the productions was 60:1:10. This quantitative data gives an obvious description of the role of brackish water fish culture in the fishery sub-sector of construction in South Sulawesi at the present time and in the future. Table 9.30 shows the acreage of brackish water fish ponds being cultivated in South Sulawesi and the present types of cultivation.

In general view, the brackish water cultivators in South Sulawesi Province have quite a good level compared to other provinces in Indonesia, whether it concerns the constructional aspect, irrigation system or the technique of management and processing. At the present time, South Sulawesi Province has achieved an average production rate of 437 kg per ha per year, while that of the entire Indonesian region is about 300 kg. Seeing table 9.30 we got the acreages of the cultivated fish ponds, i.e. 29 % the traditional way, 49 % semi-intensively, and 22 % intensively, and the average production amount for type A: 200 - 400 kg/ha/year, type B: 400 - 600 kg, and type C: 600 - 800 kg.

By means of further improvements in kabupaten Pangkep and Maros, the types C and D are projected with special cultivation of shrimp, and milkfish, with the estimated production rate of about 1,200 kg/ha/year in three harvest times at the acreage of 3,000 ha. In addition to the following factors :

- a) technical factor : different processing,  
construction and shape of dikes,  
sluices,  
parallel/serial irrigation,  
the use of nursery ponds,  
the use of fertilizers and pesticides, and  
the efficient system of seed spreading.
- b) socio-economic factor :  
the distance to marketing centres,  
the lack of investment capitals,  
the difficulty in obtaining production device, and  
the level of knowledge of the brackish water fish farmers themselves.

Since a few years ago, the following steps have been followed to promote the productivity of brackish water fish ponds :

- a) credit assistance from the World Bank extended to brackish water fish farmers in two kabupaten-s i.e. Pangkep and Maros with the areal target of 3,000 ha till the end of Pelita II and the product estimation of 800 - 1,200 kg per ha, in the monoculture of milkfish and mix-culture of milkfish and shrimp, 3 times a year's harvesting. The credit term is 5 years at the interest of 1 % a month, and
- b) Small-scale investment credit from the Bank Indonesia through the BRI in several brackish water potential areas, exclusively those having undergone severe damage due to security disturbance a few years ago.

By this method it is expected to promote productivity and the improvement of living standards for the fish farmers in the future. Table 9.31 shows the comparison between production costs and the profit obtained in each type of cultivation. It is described here that the traditional type of culture has practically no input, while in the C type there is quite a large sum of input costs though it also has quite a large amount of profit.

	<u>Type A</u>	:	<u>Type B</u>	:	<u>Type C</u>
Comparison of input	1	:	10	:	34
Comparison of output	1	:	5.5	:	19.5

By the conditions mentioned above, the improvement of brackish water fish ponds productivity in whole South Sulawesi Province is aimed at the intensification, namely the upgrading from the low level to the higher one by means of counselling and credit extension to the brackish water fish farmers.

The credit assistance from the World Bank since the year 1974/1975 was limited only to 2 Kabupaten-s, but in the future it will be expanded to other potential kabupaten-s.

The first endeavor in those regions is the construction of demonstration ponds (dempond) as a counselling means to the fish farmers, with its additional function as a means of comparison between ponds cultivated rationally and those irrationally (old-fashioned).

The interesting problem in the development of brackish water production is the problem of fry and shrimp, which have always increased from year to year in the brackish water ponds and the corresponding increase of demand from other regions (Java), (see table 9.32). For the solution of this problem the following way needs to be found :

- a) the search and expansion of new capturing areas in coastal region,
- b) the improvement of techniques in the cultivation of fry to lessen mortality so that fry can be utilized rationally, and
- c) the utilization of the BPU (Agency of shrimp nursery ponds) of Ujung Pandang in accordance with its function in providing the needed facilities.

2) Fresh water fish cultivation

The development of production in fresh water fish cultivation is emphasized on the rural lands to get cheap fish as they do not have shores and it is hard for them to get fresh sea fish.

The main objectives are the provision of fry for the following needs :

- a) fish cultivation in people's fish ponds,
- b) fish cultivation in rice fields, and
- c) the spreading in common waters (lakes, rivers, water reservoirs and swamps).

Table 9.33 shows the production of fresh water fish fry by the BBI (Hatchery) in the region of South Sulawesi, besides the people's Fish Culture in ponds. Compared to the available area of cultivation, the production of those fry is still unable to overcome the deficiency of fry; thus it has to be accompanied by the following steps :

- a) construction of new hatcheries in potential areas,
- b) rehabilitation and improvement of the hatcheries already existing by means of improvement in facilities, and
- c) encouragement and improvement of people's own culture as source of fish fry.

The most outstanding fresh water fish cultivation in South Sulawesi Province is found in Kabupaten Tator with the fish cultivation in farmers fish ponds, in paddy fields in other stagnant waters, not ignoring the other

Kabupaten-s e.g. Polmas, Enrekang, Soppeng, Sidrap, Luwu and Gowa. This is caused by :

- a) the local condition which fulfills the prerequisites of fishery techniques,
- b) the fish farmers who are already fish minded, and
- c) the far distance of those areas from sea fish production centres and the difficulty in communication.

Table 9.34 shows the fresh water fish culture in kabupaten Tator. The obstruction felt at the present time on the expansion of fishery culture areas and in the promotion of fish culture in rice fields is the use of pesticides in the destroying of rice pests.

Tempe Lake and Sidenreng Lake have an aggregate acreage of 30,000 ha. in the wet season. These waters constitute a resource of conserved fish to be traded in inter-insular shipment to Java since a few decades ago. Table 9.35 shows the production of the Tempe Lake and the delivery of products through the Kabupaten Wajo since 1961 - 1972. The highest level of production ever obtained was in 1948, to the amount of 25,000 tons. Viewing the data on production above, the production has decreased from year due to the shallowing of the lake bottom at the rate of 10 cm per year. These waters are practically abounding in the months June and July at the acreage of 30,000 ha and depth of 6-7 m, and in December - May at the acreage of 9,000 - 10,000 ha and depth of 2 - 3 m. During the dry season, part of it is planted with corn, sesame and other second are crops.

The composition of fish species captured in Tempe Lake and its surrounding :

- |  |      |
|--|------|
| a) Puntius   | 50 % |
| b) Trichogaster  | 20 % |
| c) Cyprinus  | 10 % |
| d) Helostoma   | 5 %  |
| e) others, including Opius cephalus, Clarius batrachus, mullets, flat-headed goby etc. |      |

The spreading of fresh water fish fry in lakes and in the swamps surrounding Tempe Lake is conducted by two Kabupaten-s, i.e. Soppeng and Sidrap which own hatcheries according to the table. The average annual capacity of spreading since 1968 to 1973 was 50,000 up to 1,075,000.

#### 9.4.2. Coastal fisheries

The scattered distribution of fishing grounds in the sea of South Sulawesi, i.e. the Makassar Strait, the Bay of Bone, and the Flores Sea, influence the formation of fishermen concentration along the coast, on the islands, at the estuary and the rivers. These places are deliberately used as living quarters within a short distance from the places of capture. The operational grounds of coastal fisheries in South Sulawesi are only 5 to 10 miles away from the coast by using small or medium sized sailing boats. Table 9.36 shows the number of fishermen boats and fishing equipments during the period 1968 - 1975. On this table we see the decrease in the use of sailing boats and the increase in use of engine boats.

The advantages of this matter are :

- a) the expansion of operational range,
- b) the longer conservation of fish freshness, and
- c) the trips to and from the fishing grounds do not depend on wind and weather any longer.

The fishermen's enthusiasm to produce increase owing to the introduction of modern technology (equipments and techniques of capture) accompanied by the availability of marketing facilities (ice, vehicle etc). Additionally, the government makes available the following device for fishery :

- a) fish landing spots,
- b) improvement of the roads connecting the regions of consumers and producers,
- c) credit agencies and their facilities,
- d) conservation facilities (cool room), and
- e) fishermen utilities (electricity, drink water, medicines).

In the endeavor to improve the welfare, income and living of the fishermen as the weak economy class, the government has projected the development of fishermen villages unit area (Wilud) with the following aims :

- a) to organize the activities within a common unity, to recognize new technology in the field of fish capture, product processing and marketing, and

- b) to organize fishermen activities within a cooperative bond, tied together through efficient cooperation, the zest for which is deeply rooted in the souls of the villagers.

Basically a fishermen area covers one or more surrounding administrative villages, which possess the following devices :

- a) Rural unit banks, i.e. the B.R.I. - a credit agency serving the fishermen's needs,
- b) Village store, selling tools and equipments of fishermen,
- c) Fish auction, regulating proper prices for fishermen,
- d) BUUD/KUD (Village Unit Cooperation village Unit Cooperatives), functioning as an organization arranging the business,
- e) drink-water, electricity, sanitary clinics for fishermen, and
- f) Fish landing spots.

Location of fishermen's Wilud-s are as follows :

- a) Wilud of Ranges, kabupaten Majene.
- b) " " Suppa, " Pinrang.
- c) " " Lappa, " Sinjai.
- d) " " Bajoe, " Bone.
- e) " " Takkalala, " Luwu.
- f) " " Beringin, " Polmas.
- g) " " Cambaya, Ujung Pandang municipal.
- h) " " Bonto lanra, kabupaten Takalar.
- i) " " Biangkeke, " BantaEng.
- j) " " Tanalemo, " Bulukumba.
- k) " " Bonto sunggu, " Selayar.
- l) " " Tunikamaseang, " Maros.

Table 9.37 shows the composition of fish species captured in South Sulawesi waters, the equipments used, the number of crew and the percentage of fish captured in the waters.

#### 9.4.3. Off-shore fisheries

Off-shore fisheries resources with an acreage of about 73,000 square miles have not been run intensively by the fishermen except using old-fashioned tools. Off-shore fishery and the species of fish captured are shown on table 9.37 along with the equipments, the types of boats used, and the number of crew. Off-shore fishery resources are possible to be promoted by means of the following action :

- a) upgrading of the equipments quality and
- b) upgrading of the fleet's quality.

Concentration of off-shore fishery activities are located in the following place :

- Rangas, Kabupaten Majene, fishing ground the Makassar Strait,
- Ujunglerom, Kabupaten Pinrang, fishing ground Makassar Strait,
- Kajang, Kabupaten Bulukumba, fishing ground Bay of Bone,
- BajoE, Kabupaten Bone, fishing ground Bay of Bone,
- Beringin, Kabupaten Polmas, fishing ground Makassar Strait, and
- Galesong, Kabupaten Takalar, special capture of Torani (flying fish).

The distance to the fishing ground is about 20 - 40 miles from the coast, covered by sailing vessels in 6 - 10 hours. The capturing time is relatively short, because they have to take into account the time required for the return trip which is only assisted by the wind. Consequently the fish undergo a deterioration. At present there are fishermen using engine boats as transportation device to the fishing ground.

Off-shore fishermen generally apply a product distribution system, with authorities as boat-and-tool owner who finances the capturing operation. Table 9,38 shows the average income of a capturing unit and the percentage of product sharing. These off-shore fishery products are sold as fresh fish in Ujunglerom, then they are sent to Pare-Pare and its surroundings, and to other regions in the form of smoked or processed fish. The boat-owner himself handles the sale to other middlemen, who are chiefly women. The fish are processed and then carried in trucks or on horseback to be taken to the inland at a few kilometers distance. The fish sale using ice is restricted only the big tons, where the roads are in better condition to be covered by vehicles.

#### 9.4.4. Recommendations

Nearly 98 % of the whole activity of fishery in Indonesia consists of people's fishery culture, while the rest 2 % consists of industrial fishery. With these fishery patterns the developmental point in Pelita II is emphasized on traditional fishery culture, viewing two aspects :

- a) promoting fishery products, both for domestic consumers and for export, and
- b) upgrading the position of people's fishery so they can obtain a higher level in their economical standard.

The obstructional factors consist of the following weaknesses :

- a) old-fashioned mental attitude,
- b) financial disability,
- c) the condition of the environment which is still isolated from the outside situation,
- d) ineffective system of credits, and
- e) inadequately developed counselling activity.

We needed to find solutions to overcome these weaknesses, involving several aspects, such as production, marketing, management and protection.

##### 1) Production

The promotion of fishery products during the Pelita implementation period shows a fluctuating trend. The average rate of production increase in the sector of sea fish capture is 4.4 % a year, and in the brackish water culture sector 14.1 % a year. Viewing the acreage being cultivated at this time, including sea capture and inland capture, they have not achieved the optimum level of the potential source. The promotion of fishery products is still feasible by means of:

- a) the intensification of brackish water culture techniques and the upgrading to higher level culture, with credit assistance as incentive,
- b) expansion of culture acreage to new regions,
- c) assistance to the fish farmers and fishermen in the form of small scale credit investment from the World Bank and other financial institution.



- d) intensification of sea fish capture, especially off-shore, by improving the quality of the fleet and fishing equipments and fishermen skill, and
- e) provision of fish fry.

For shrimp and milkfish fry, expansion of fry catching areas is required besides the utilization by the BPU. The development of new hatcheries of fresh water fish fry is urgently needed; also the rehabilitation of already existing hatcheries for the development of :

- a) cheap fish in rural lands,
- b) improvement of productivity of the lakes Tempe and Sidenreng and other waters, by spreading new species and the introduction of pen-culture, and
- c) availability of production device in amounts as required by fishermen/fish farmers at the exact time of need.

## 2) Marketing

The channel of distribution for the marketing of fish needs to be improved because it is disadvantageous to the fishermen. The availability of ice and coolroom in production centres is urgently needed to maintain the quality of fish as a perishable commodity. The cold chain system of fish marketing needs to be expanded.

The development of fish landing spots in production centres is needed to accelerate the fish marketing process. Fish auction needs to function correctly, aiming at the real objective, and not as a place of taking retribution payments.

## 3) Management of resources

In coastal fisheries which are densely captured, they need to be transferred to off-shore fish capture with the stimulation of recognizing new technology, to prevent over-fishing:

- a) prohibition of the use of explosives and poisons in capturing fish, especially at sea,
- b) prohibition in using nettings of certain mesh-sizes, both at sea and in other common waters,
- c) prohibition to take rocks (coral reefs) in bulks from the sea, and the pollution of waters,

- d) the destruction of wild plants which are disadvantageous for the common waters.

4) Protection

It is urgent to maintain and manage the resources so well that these waters can continually yield products. Waters not optimally cultivated need to be protected from damage, and waters of dense capture need to be maintained and managed by means of :

- a) the limitation of the number of units and designated capturing tools in designated areas; especially traditional fishery operating regions need to be protected against the use of trawls,
- b) the limitation in the use of large mesh-eyes,
- c) the prohibition to take rocks in bulks,
- d) the maintenance of green belts along the shore against mangrove (about 200-400 meters from the shore),
- e) strong prohibition to use explosives and poisons which will damage the fish potential source in any water, and
- f) reforestation at lake Tempe's environment to prevent erosion, which will cause annual shallowing of the lake, accompanied by an effort to excavate the bottom of the lake.

Table 9.27. Present land utilization and potential area and estimation of production.

No.	Types of fisheries	Availability (1)		Present condition (2)		Potentiality (3)	
		Area (ha.)	Production (ton)	Area (ha.)	Production (ton)	Area (ha.)	Production (ton)
1.	Brackish water ponds (Salty marshes)	150,000	120,000	46,000	22,800	104,000	97,200
2.	L a k e s			15,000	5,800		
3.	Fresh water ponds			1,521	350		
4.	Paddy field	103,000	20,000	13,117	1,986	49,660	8,582
5.	S w a m p s			14,636	2,526		
6.	R i v e r s			8,190	706		
7.	Water reservoir			375	50		
8.	Coastal fisheries	3,700	100,000	3,700		3,700	
		sq. miles		sq. miles		sq. miles	187,680
9.	Off-shore fisheries	73,000	200,000	73,000		73,000	
		sq. miles		sq. miles		sq. miles	
	T o t a l	253,000	440,000	99,339	146,538	153,660	293,462
		76,700		76,700		76,700	
		sq. miles		sq. miles		sq. miles	

Note : (1) Availability = (2) + (3)  
 (2) Expansion of brackish water ponds. Area : Kabupaten Luwu, Wajo and Bone.  
 (3) Expansion of Fresh water ponds. Area : Luwu, Tator, Gowa, Soppeng and Sidrap.  
 (4) Off-shore fishery area : Makassar strit, Bone Bay and Flores Sea.

Source : Dinas Perikanan Sul - Sel.

Projection :

Table 9.28. Development of fishery production in South Sulawesi Province (1973 - 1983).

Unit : tons

Year	Total production	Increasing	Total average of consumption	Exported	Inter-insular trade	Annual Rate of increase (%)
1973	130,271	-	121,425	5,106	3,740	-
1974	136,638	6,367	127,960	5,438	5,240	4
1975	152,574	15,936	140,996	4,838	6,740	11
1976	163,091	10,517	100,000	4,851	8,240	6
1977	176,890	13,799	162,300	4,800	9,740	8
1978	192,530	15,640	175,590	5,200	11,740	8
1979	200,020	7,490	180,980	5,300	13,740	3
1980	219,870	19,850	198,530	5,600	15,740	9
1981	234,100	14,230	210,560	5,800	17,740	6
1982	249,000	14,900	223,160	6,100	19,740	6
1983	267,650	18,650	236,350	8,300	21,740	7

Source : Dinas Perikanan, Sul - Sel.

Table 9.29. Production of fishery sub-sector in South Sulawesi Province.

Unit : Tons.

Year	C a p t u r e			C u l t u r e			G r a n d T o t a l
	S e a	Common Waters	Total	Brackish water	Fresh water	Paddy field	
1969	85,000	9,802	94,802	12,061	432	1,813	109,108
1970	92,000	7,599	99,599	11,348	439	2,114	116,500
1971	97,000	8,056	105,056	15,102	468	3,694	124,330
1972	90,000	5,705	95,705	14,346	327	2,615	111,994
1973	94,000	7,721	101,721	16,769	320	2,615	121,425
1974	107,799	9,298	117,038	21,214	325	1,921	140,498
1975	112,320	9,076	121,396	22,375	335	1,986	146,092
1976	105,887	8,697	114,584	22,714	350	2,055	139,703
Average	98,800	8,237	106,238	17,362	375	2,351	126,205

Source : Dinas Perikanan, Sul - Sel.

Table 9.30. Acreage of brackish water fish ponds by type of  
in South Sulawesi Province (1975).

Unit : ha.

Kabupaten	Acreage	Type - A Traditional	Type - B Semi intensive	Type - C Intensive
1. Luwu	2,529	2,428	101	-
04. Wajo	6,439	6,181	258	-
05. Bore	4,810	4,281	529	-
06. Sinjai	435	-	435	-
07. Bulukumba	3,672	-	3,562	110
08. Selayar	58	58	-	-
09. Bantaeng	63	-	63	-
10. Jenepono	1,861	-	1,600	261
13. Ujung Pandang	1,499	-	1,298	210
14. Maros	4,345	-	-	4,345
15. Pangkep	6,224	-	-	6,224
16. Barru	1,939	-	1,881	58
17. Pare-Pare	31	-	31	-
20. Pinrang	6,396	-	5,884	512
21. Polmas	2,770	-	2,770	-
22. Majene	135	135	-	-
23. Mamuju	65	65	-	-
12. Gowa	63	-	63	-
11. Takalar	1,969	-	1,870	100
Total	45,304	13,148	20,338	11,820
(%)	(100)	(29)	(49)	(22)

Note : 1). Type A : no spreading of fry, no fertilizer and no pesticide.

2). Type B.: Spreading of fry, no fertilizer and no pesticide.

3). Type C : The Five Fishery Principles.

Source : Laporan tahunan, Dinas Perikanan, Sul - Sel.

Table 9.31. Comparison of cost and benefit in the management of brackish water fish ponds by types of management per ha. each year in the South Sulawesi Province.

Sorts of activity	Type - A (traditional)		Type - B (semi-intensive)		Type - C (intensive)			
	Amount	Input	Output	Amount	Input	Output		
1. Improvement of dikes	-	-	-	-	30,000	-	40,000	-
2. Improvement of sluices	-	5,000	-	-	10,000	-	40,000	-
3. Preparation of - nursery ponds	-	-	-	-	10,000	-	-	-
4. Purchase of fry : - milkfish fry - fingerling - shrimp fry	-	-	-	15,000 @ Rp.3	45,000	-	-	-
5. Fertilizers	-	-	-	-	-	1,500 @ Rp.20	30,000	-
6. Pesticides	-	-	-	-	-	20,000 @ Rp.8	160,000	-
7. Wages for worken	-	10,000	-	-	-	300 kg @ Rp.70	21,000	-
8. Products sale	200 kg fish	-	-	-	50,000	-	200,000	-
	mixed : @ Rp.	-	-	shrimp 10kg @ Rp.2,000	-	20,000 Shrimp : 300 x Rp.2,000	-	600,000
		-	40,000	milkfish 500 kg @ Rp.400	-	200,000 milkfish 450 x Rp.400	-	180,000
T o t a l		15,000	40,000		155,000	220,000		506,000
Profit :		25,000			65,000			274,000

Source : Survey production cost and datas of PPS Budi daya Dinas Perikanan Propinsi Sulawesi Selatan (1977).

Table 9.32. Potentiality of coastal aquaculture in South Sulawesi Province

(1) Area of brackish water ponds (1971/Unit : ha.)

<u>Province</u>	<u>Developed</u>	<u>Potential</u>	<u>Total</u>	<u>%</u>
A c e h	16,254	75,400	91,654	23,5
Jakarta	1,530	-	1,530	0.4
West Java	28,548	10,000	38,548	9.9
Central Java	25,496	1,600	27,096	7.0
East Java	52,362	2,000	54,362	13,9
South Sulawesi	38,761	132,000	170,761	43,8
Others	5,953	(x)	5,953	1.5
T o t a l	168,904	221,000	389,904	100.00

(x) No data available

Source : Review of coastal water resources in relation by R. Djajadiredja and A. Purnomo, Inland Fisheries Research Institute, Bogor, Indonesia

(2) Production of milkfish fry: Indonesia (1970)

<u>Province</u>	<u>Number of fry (x 10<sup>3</sup>)</u>	
	<u>Chanos</u>	<u>Prawn</u>
A c e h	41,220	x
West Java	24,476	x
Central Java	10,065	500
East Java	173,950	x
B a l i	4,052	-
West Nusa Tenggara	280	-
East Nusa Tenggara	-	-
East Kalimantan	182	-
North Sulawesi	117,973	3,450
South-east Sulawesi	750	-
T o t a l	372,948	3,950

Source : Exploration of new Chanos fry resources, A trial for overcoming seed shortage in Java.

(3) Supply and need of Chanos fry 1970

<u>Province</u>	<u>Area:ha</u>		<u>Production</u>		<u>Need</u>		<u>Shortage/ surplus</u>
			<u>East monsoon</u>		<u>West monsoon</u>		
	<u>Brute</u>	<u>Netto</u>	<u>1000 fry</u>	<u>1000 fry</u>	<u>1000 fry</u>	<u>1000 fry</u>	
West Java & Jakarta	30,900	21,630	24,476	30,900	54,075	84,975	-60,499
Central Java	24,700	17,290	10,065	24,690	43,225	67,915	-57,850
East Java	52,200	36,540	173,950	32,850	91,350	124,200	49,750
South Sula.	37,600	26,320	117,973	37,590	65,800	103,390	14,583
Others			46,484			46,484	-
T o t a l			326,464				

Source : Ditto.



Table 9.33. Total Number of governmental hatchery and farmers hatchery and its production of fry in South Sulawesi Province

Kabupaten	Governmental hatchery			Farmers hatchery	
	Total Number	Average (ha.)	Produc. of fries (1,000)	Total Number	Produc. of fry (1,000)
01. Luwu	7	10.84	743	-	4,000
09. Bantaeng	1	1.30	30	-	-
14. Maros	1	4.17	75	-	-
15. Pangkep	1	3.60	35	-	-
20. Pinrang	-	-	-	-	50
21. Polmas	2	2.40	762	-	250
22. Majene	-	-	-	-	-
02. Tator	7	9.11	452	-	12,453
19. Enrekang	2	4.75	112	-	300
18. Sidrap	1	4.17	75	-	800
12. Bowa	3	7.00	173	-	49
03. Soppeng	4	4.99	872	-	169
T o t a l	30	52.33	3,329		17,771

Source : Laporan Tahunan, Dinas Perikanan, Sul -Sel.

Table 9.34. Condition of fishery in Kabupaten Tator

Year	Water fish ponds		River		Paddy field		Number of Fish farmers
	Acreage (ha)	Production (tons)	Acreage (ha)	Production (tons)	Acreage (ha)	Production (tons)	
1972	28.95	2.12	200	11.62	2,126	151.07	11,034
1973	43.30	5.64	200	11.72	2,804	349.77	14,144
1974	36.73	6.58	190	7.69	5,731	845.00	2,444
1975	35.54	4.32	186	5.24	6,389	891.00	2,439
1976	25.50	3.11	166	3.06	6,225	712.00	2,531
Total	173.7	18.62	942	3	28,665	2,949.00	

Source : Dinas Perikanan, Kabupaten Tator.

Table 9.35. Fishery Production and Exported Fish in Wajo

Y o a r	Production in Tempe Lake (tons)	Production in whole Kabupaten (tons) A	Exported fish in raw fish weight (tons) B	Ratio B / A (%)
1961	11,749	14,000	5,631	41
1962	9,060	12,010	4,398	37
1963	5,847	7,955	3,108	39
1964	6,851	9,993	3,792	38
1965	3,393	4,492	2,607	58
1966	1,350	2,314	1,769	76
1967	1,248	1,935	975	50
1968	2,676	4,810	1,989	41
1969	2,177	3,212	1,683	52
1970	1,539	2,748	1,534	56
1971	1,987	2,707	872	32
1972	1,454	1,939	635	33
Average	4,112	5.67	2,416	46

Source : Prelimery Survey Report of Central South Sulawesi  
water Resource Development Project (DPUTL/1974).

Table 9.36.

Condition of fish capturing equipments, the types of vessels used and the amount of fishery products in the waters of South Sulawesi

Year	Number of equipments			Type of vessels					Production (tons)		
	Nets	Trap	fishing rod	others	Total	Small	Medium	Large		Engine	Total
1960	10,995	16,602	42,672	68	70,019	26,295	1,959	3,669	-	36,923	86,000
1961	10,573	16,732	42,682	752	79,739	26,514	7,955	4,354	6	39,899	85,000
1970	12,490	19,773	25,055	619	64,507	26,382	3,419	4,309	36	38,906	92,000
1971	13,750	20,000	47,959	6,250	87,954	26,490	8,600	4,050	108	39,248	97,000
1972	10,863	20,100	44,347	13,180	88,490	26,510	8,615	4,055	150	39,350	90,000
1973	15,161	20,653	50,156	11,582	97,552	27,320	9,334	4,030	526	41,210	94,000
1974	15,500	50,300	20,800	11,000	97,000	22,500	8,000	4,050	550	41,500	105,520
1975	16,345	8,201	8,421	17,790	57,818	18,480	6,307	2,553	2,376	29,731	112,320

Source: Laporan penelitian Pemasaran hasil2 perikanan SulSel oleh Unhas (1973)

Table 9.37.

Composition of fish species captured in the waters of  
South Sulawesi Province

No.	Species captured	Percent- tage	Fishing equip- ment	Waters	Type of vessels	Number of crew
1.	Tonjol and cakalang ( <i>Euthynnus</i> Sp)	10	Bag nets, fish- ing rod	off-shore	Medium size/large boat	5 - 15 persons
2.	Tuna ( <i>Katsuwonus</i> Sp)	8	Fishing rod	off-shore	Large boats	6 - 15 persons
3.	Layang ( <i>Decapterus</i> Sp)	15	Bag nets	off-shore	Large boats	6 - 15 persons
4.	Ikan terbang ( <i>Cypsilurus</i> Sp)	9	Traps	off-shore	Large boats	8 - 10 persons
5.	Kembung ( <i>Rastrolliger</i> Sp)	10	Net	Coastal- waters	Medium sized/large boats	2 - 6 persons
6.	Peri, tembang ( <i>Sto- lephoris</i> Sp)	17	Cast net	idem	Small/medium sized boat	2 - 6 persons
7.	Udang ( <i>Peneus monodon</i> )	3	Other nets	idem	idem	2 - 6 persons
8.	Mixed fish	27	Other equip- ments	idem	idem	2 - 6 persons

Source: Laporan penelitian Pemasaran hasil2 SulSel oleh Unhas (1973)

Income per unit of equipment and fishermen

Unit: 1,000 Rp.

No.	Kinds of equipment	Product ton/ha.	Value	Operational Cost	Product owner 1) fisherman	Product owner 2) fisherman	Income (%)	Income owner 1)	Income owner 2)	Number of fishermen per unit	Income per capita/year
1.	Bag net	14.4	1,440.0	423.0	50	50	513.5	513.5	513.5	10	51.3
2.	Cast net (P)	8.0	600.0	190.0	50	50	205.0	205.0	205.0	6	34.2
3.	Cast net	2.6	130.0	27.1	60	40	61.7	41.2	41.2	2	20.6
4.	Other net	2.4	120.0	18.0	50	50	51.0	50.0	50.0	3	17.0
5.	Fishing rod (IP)	3.8	273.5	98.7	50	50	87.4	87.4	87.4	3	29.4
6.	Fishing rod (P)	0.4	40.0	10.0	40	60	12.0	18.0	18.0	2	9.0
7.	Capture	24.0	120.0	13.0	60	40	64.2	42.8	42.8	2	21.4
8.	Trap	4.0	530.0	108.0	50	50	211.0	211.0	211.0	8	26.7

Note: 1) owner means owner of the equipment.

Source: Laporan penelitian Pemasaran hasil2 Perikanan SulSel oleh UNHAS Ujung Pandang.

9.5. Forestry

9.5.1. Condition of the forests in South Sulawesi Province

1) National Forests.

The national forests in South Sulawesi can be classified as follows:

Fixed forest areas	2,058,102 ha.
Reserve forest areas	1,162,991 ha.
Reservation forest areas	1,618 ha.
Total	3,222,111 ha.

Also national forests have the following composition :

Absolut protection forests	1,408,689 ha.
Productive protection forest	1,418,290 ha.
Production forests	394,114 ha.
Reservation forests	1,018 ha.
Total	3,222,111 ha.

2) Distribution and utilization of forest lands in South Sulawesi Province can be seen on table 9.39.

3) Nature reservation and maintenance (Perlindungan dan Pelestarian Alam/P.P.A.)

The P.P.A. is a forest area including the nature reservation, wild life reservation, hunting parks, and picnic parks, having objectives such as for education, culture, and to maintain a good living environment. At present there are only two reservation forests, located both in Kabupaten Maros, as a nature reservation of an acreage of 1,618 ha. This reservation forest will be developed until it reaches 10 % of the entire coverage of the national forests.

4) Forest management.

The Forestry Service of South Sulawesi Province is a Provincial Autonomous Service. (Dinas Kehutanan Daerah Tingkat I Sulawesi Selatan) is administratively responsible to the Governor of South Sulawesi Province and technically responsible to the General Directorate of Forestry, ministry of Agriculture.

At present the division of the Forestry regions is still accommodated to that of the Kabupaten government. According to the referred to division, there are 22 regional forestries in South Sulawesi. The largeness and the potential of the regional forestries depend on the largeness of the Kabupaten (Daerah Tingkat II Kabupaten), so there is a variety of them.

Table 9.39. Distribution and utilization of forest lands in South Sulawesi Province

Kabu- paten	Absolute Protection forests	Production protection forests	Production forests	Nature reser- vation forests	To- tal
01. Luw	822,177	175,450	399,500	-	1,337,127
02. Tat	154,595	-	-	-	154,595
03. Sop	45,000	4,000	-	-	49,000
04. Waj	44,214	-	3,000	-	47,214
05. Bon	140,000	16,680	4,315	-	160,995
06. Sin	-	22,938	-	-	22,938
07. Bul	-	67,241	-	-	67,241
08. Sel	-	-	18,000	-	18,000
09. Ban	-	8,535	-	-	8,535
10. Jen	-	15,916	-	-	15,916
11. Tak	15,624	-	3,825	-	19,449
12. Gow	19,919	24,930	25,474	-	70,323
13. U.P	-	-	-	-	-
14. Mar	23,510	-	-	1,018	24,528
15. Pan	-	17,450	-	-	17,450
16. Bar	9,585	80,000	-	-	89,585
17. P.P	4,300	-	-	-	4,300
18. Sid	68,635	2,510	-	-	71,145
19. Fmr	60,130	-	-	-	60,130
20. Bin	-	63,640	-	-	63,640
21. Pol	-	248,000	-	-	248,000
22. Maj	-	70,000	-	-	70,000
23. Mam	-	600,000	-	-	600,000
Total	1,408,689	1,418,290	394,114	1,018	3,222,111

Source : Dinas Kehutanan Sulsel.



The smallest forest region division unit is divided into the Division of Regional Forestry and the Forest Police Resort according to the acreage and potential of the Kabupaten, a preparation is being made for the division of the South Sulawesi Forest Regions, accommodated to the management of the River course regions (Daerah Aliran Sungai/DAS). Thus the management of the forests is in accordance with the DAS units in South Sulawesi. The forest administration is adapted to the DAS units, because the DAS has distinct borders consisting of mountain-edges or hilltops. A DAS also covers many aspects of the human life, among other things in creating natural resources of soil, water and forest products.

#### 9.5.2. Erosion control and conservation of water resources

##### 1) Bare and critical lands

Bare lands which have generally reached the physically, chemically and economically critical stage distributed throughout the region of South Sulawesi. These are the lands being forestated and groomed since the pre-Repelita times and they are intensified during the Pelita I and II. Table 9.4 shows the acreage and distribution of critical bare lands.

##### 2) Reforestation.

The object reforestation is the bare and critical forest lands within the river course regions (DAS). The acreage of reforestation during the Pelita I and II is shown on table 9.4.

The reforestation costs are mostly obtained from the National Budget and the Provincial Budget.

The acreage of reforestation up to the fourth year of the Pelita II is 38,077 ha distributed throughout all Kabupaten-s and Kotamadya-s in South Sulawesi Province. The reforestation is planned by the DAS Project and executed by the Bupati and the Camat Head of Kecamatan.

##### 3) Erosion control and conservation of water resources.

The erosion control and conservation of water resources have been done by the Forest Soil and Water Salvation Project implemented by means of the Project of Reforestation, greening and soil conservation. Reforestation is implemented in the forest areas, while greening and soil conservation is implemented outside the forest areas, i.e. in dry fields and people's home gardens.

Table 9.10. Area and distribution of bare/critical lands  
in South Sulawesi Province

Kabupaten	Unit : ha.		
	Bare lands	critical lands	Total
<b>I. DAS SADDANG :</b>			
02. Tat	63,460		
19. Enr	22,960		
21. Pol	11,800		
20. Pin	23,880		
Total	122,100	432,000	554,100
<b>II. DAS WALENNE/BILA :</b>			
03. Sop	19,000		
05. Bon	24,227		
14. Mar	4,000		
18. Sid	10,500		
Total	57,727	268,000	325,727
<b>III. DAS JENEBBERUNG/TELARA :</b>			
10. Jen	25,097		
12. Gow	15,715		
Total	40,812	336,000	376,812
<b>IV. Other DAS-es :</b>			
01. Luw	19,132		
04. Waj	10,000		
06. Sin	14,715		
07. Bul	2,000		
08. Sel	4,000		
09. Pan	7,000		
11. Tak	7,000		
15. Pan	3,380		
16. Bar	29,670		
17. P.P	4,300		
22. Maj	19,432		
Total	136,556	164,000	300,556
<b>Grand Total</b>	<b>357,195</b>	<b>1,200,000</b>	<b>1,557,195</b>

Source : Dinas Kehutanan Sulsel.

Table 9.41. Acreege and distribution of reforestation in South Sulawesi Province during the Pelita I and II

DAS/Kabupaten	Unit : ha.		
	Pelita I	Pelita II*)	Total
<b>I. DAS SADDANG :</b>			
02. Tat	7,000	13,000	20,000
19. Enr	2,350	6,100	8,450
20. Pin	906	3,800	4,706
21. Pol	1,002	3,500	4,502
Total	11,258	26,400	37,658
<b>II. DAS WALANAE/BILA :</b>			
03. Sop	1,325	4,700	6,025
05. Bon	3,250	5,500	8,750
14. Mar	2,050	4,250	6,340
18. Sid	1,700	2,750	4,450
Total	8,365	17,200	25,565
<b>III. DAS JINEBERANG/KELAPA :</b>			
10. Ter	750	400	1,150
11. Gov	18,741	13,300	32,041
Total	19,491	13,700	33,191
<b>IV. Other DAS-es :</b>			
01. Luw	976	1,376	2,352
04. Maj	750	25	775
06. Sin	1,035	850	1,885
07. Sel	100	125	225
09. Sel	12	25	37
09. Ren	997	900	1,797
11. Tak	475	630	1,105
15. Pan	2,755	700	3,455
16. Bar	809	325	1,134
17. P.P	955	525	1,480
22. Maj	726	700	1,426
25. Mm	..	225	225
Total	9,580	6,330	15,910
Grand Total	35,554	63,630	99,224

Note : \*) Reforestation up to the fourth year of Pelita II.

Source : Dinas Kehutanan Sulawesi

The IPM is chiefly implemented on critical lands within the DAS. The DAS unit is the project's choice because it is the DAS that involves many living environment of people, among others agricultural lands, water supply for agriculture, harbour, industry and drinkwater, while the DAS-es have undergone an acute erosion due to forest stripping which has occurred for long.

9.5.3. Forestry products

1) Forestry products.

The forests in South Sulawesi generally belong to the class of wet tropical forests and some swamp-forests. The various products of the forests include wood and non-wood as follows :

- a) The kind of wood : Ebony (*Diospyros celebica*), Nato (*palauquim sp.*), Agathis (*Agathis sp.*), Sipate (*Alstonia sp.*), Dalapi (*Madhuka philipinensis*) and mixed woods, and
- b) The kind of non-wood : Cinnamon bark, Tannery bark, Copal, Resin, Rattan, Bamboo and Candle-nuts.

2) Hak Pengusahaan Hutan/H.P.H. (The forest concessions).

Approximately 633,500 ha. of production forests have been privately managed in the form of the H.P.H. This acreage is entirely situated in Luwu and Mamuju, with detailed specification as shown in table 9.42.

Table 9.42. Acreage and location of H.P.H. forests by concessionaire in South Sulawesi Province

No.	Name of IPM owners	Location	Acreage (ha)
1.	P.T.Zedsko Indonesia	L u w u	125,000
2.	P.T.Serdid Co	L u w u	47,500
3.	P.T.Palopo Timber	L u w u	15,000
4.	P.T.Gemini Timber	L u w u	50,000
5.	P.T.Gulat	L u w u	10,000
6.	P.T.Sulhad	M a m u j u	120,000
7.	P.T.Bina Serekte	M a m u j u	70,000
8.	P.T.Gemini Timber Jack I	M a m u j u	45,000
9.	P.T.Hayam Wurdak	M a m u j u	54,000
10.	P.T.Intan Permata	M a m u j u	47,000
11.	P.T.Maskumbang	M a m u j u	50,000
<u>Total</u>			<u>633,500</u>

3) Forest industries.

The forest industries in South Sulawesi include the Paper Factory, Ply wood Factory, Wood Sawyers and Rattan Processing.

a) The Gowa Paper Factory

It is situated at the district of Borongloe, Kabupaten Gowa, about 17 km from Ujung Pandang. This factory was established in 1962 and it started production in 1967. The raw materials are bamboo and mixed soft woods (mangrove and accacia). Its capacity is 60 tons a day. As resource of raw materials, the Gowa Paper Factory has a 24,000 ha of forest concession, located near by the factory within the Kabupaten of Gowa. The rate of production at the present time is 30 tons a day.

b) The Palopo Fly Wood Factory

It is situated in the Kabupaten of Luwa and it was established in 1967. As resource of raw material, this factory has not produced any longer since the beginning of 1975.

c) Sawyer factory

Sawyers factories in South Sulawesi are distributed throughout the Kabupaten and municipals in various sizes. Their raw materials are obtained from interinsular wood, concession wood and people's wood. The products of those factories are to be provincial utilities, except the products of the P.T. Jaya Buana Sawyer Factory, which is ebony and to be exported to Japan.

d) Rattan Processing

The only business of non-wood forest product processing being pioneered by the Provincial Forestry Service in the processing of rattan. Its objective is to promote the quality of rattan for export and interinsular trade. This processing company is expected to start producing within short period.



9.6. Construction of irrigation systems

The construction of irrigation system in South Sulawesi Province covers 4 main activities, i.e.:

- 1) the survey of the development of water resources,
- 2) the construction of new irrigation systems,
- 3) the rehabilitation of irrigation systems, and
- 4) the protection of rice field areas against floods.

In addition to those 4 main activities, the already functioning activities of exploitation and maintenance of irrigation areas are not less significant.

9.6.1. The survey on the development of water resources

This activity is centered in the central part of South Sulawesi, known with its Project of water resource development in central part of South Sulawesi, which includes an irrigation area plan of 1,1,000 ha. vast. Within the budget year 1977/1978 a bird's eye view photograph has been prepared along with the ground control; by this time the process is being executed in Japan. (This project is in cooperation with the Japanese government). A further study is planned to be undertaken in the year 1978-1979 concerning the arrangement of a master plan.

9.6.2. The construction of new irrigation systems

This activity includes the following projects:

- 1) Lawa Irrigation Project for the acreage plan of 100,000 ha. This project has the technical assistance of the Dutch Government during the composition of the master plan and design of irrigation network within the Project area.
- 2) Kelasa Irrigation Project at the Kabupaten Jeneponto. This irrigation area covers an acreage of 6,490 ha. The weir and part of the main network have been completed and the whole main network is planned to be completed in the year 1978/1979. In first and second year of the Pelita III it is planned to complete a supplementary weir which is expected to supply this irrigation area in the dry season for an acreage of about 1,000 ha.
- 3) Tabotabo Irrigation Project in Kabupaten Pangkep. This area includes an acreage of 11,538 ha. The potential expected for the year 1977/1978 is 7,510 ha. It is expected to complete another 473 ha's network in 1978/1979. The entire network is planned to be completed by 1981/1982.
- 4) Pangluku Irrigation Project in Kabupaten Takalar.

This irrigation area is estimated to have a potential of a 5,141 ha's acreage. The construction of a weir has been commenced in 1977/1978 and it is planned to be completed in 1978/1979. The completion of the main network is planned for an acreage of 3,406 ha. in the Pelita III and the remainder will be completed in Pelita IV. When it is financially feasible, we will complete the entire network in Pelita III.

5) Small medium-size Irrigation Project. This project includes as yet the following irrigation areas:

a) Padang Sappa for the acreage plan of 6,573 ha. By this time it is still the stage of survey and design. The implementation is expected to commence within the coming Pelita III.

b) Kambu for the acreage plan of 2,496 ha. It is the same as the irrigation acreage of Padang Sappa.

c) Lekopancing. The acreage is 3,611 ha. In the weir of the Ujung Pandang. Drinkwater Company and up to the budget year 1977/1978 it is planned to complete the main network for an acreage of 1,003 ha. The entire network is expected to be completed during the Pelita III.

d) Bantimaran. This irrigation area was constructed during the Dutch regime, and its completion is included within the Small Medium-size Irrigation Project, the acreage of which is 6,698 ha. The entire main network is also expected to be completed within the coming Pelita III.

6) Simple Irrigation Project/SADIRAMA Irrigation Project has irrigation areas scattered throughout the South Sulawesi Province including a plan acreage of 52,126 ha. The whole acreage is planned to be completed in the coming Pelita III. Up to the year 1977/1978 an acreage of 13,073 ha. is planned to be completed.

#### 9.6.3. The rehabilitation of irrigation systems

For irrigation areas constructed before the war, its rehabilitation is planned by means of the following projects:

1) the Sadding Sub Project (Frosida), for an acreage of 63,330 ha. including the north Sadding area.

2) the South Sulawesi Rehabilitation Project. Due to restricted finance, it has only covered 10 irrigation areas at the acreage of 67,115 ha. It is planned to cover an acreage of 37,913 ha. at the end of the fiscal year 1977/1978. There are

actually many irrigation areas which have to be rehabilitated, e.g. Bulo Tinorang in Sidrap, Lannan in Barru, Lajaroko in Boppeng, and others, but they cannot be included within the short term plan due to lack of finance.

#### 9.6.4. The protection of rice field areas against floods

This project includes the activities of flood defense, especially in rivers:

- 1) The Jeneberang river, a special team is expected to make a study on this matter in 1978/1979.
- 2) The Labassang river. The main activity is the making of embankments.
- 3) The Walahe river. Flood control and it is expected to be included in the development plan of the central part of South Sulawesi.
- 4) The Saddang river.
- 5) The Bija river, etc.

To maintain the already constructed network, and to fulfill their functions efficiently, exploitation and the irrigation maintenance have been started, according to the financial capacity. Exploitation is actually a new matter for DPUP South Sulawesi, yet with the existing power at the present time DPUP try to catch up and make for DPUP's arrears concerning the exploitation of irrigation which in Java have been built and implemented continuously since the Dutch occupation. It is a pleasure that the Government has planned to assist DPUP in constructing tertiary networks in the coming years, which will support the implementation of a better irrigation exploitation.

The South Sulawesi Province expect to get a budget for the construction of a tertiary network of 30,000 ha. in the coming three years. The problems faced in the tertiary construction plan is the absence of an adequate map (scale 1/5,000), i.e. a map produced from a bird's photography where the paddy field spots will be obviously seen. Besides, DPUP is also short of technical forces who will work for the Irrigation Section. Yet DPUP will still make efforts consistent without ability and try to implement the program of the tertiary construction.

Other activities which are not less significant are the compilation of hydrological data and hydrometrical one, which have been started since the recent two years by the Irri-



section Section of the DPUP. Further it is explained that since 1978/1979 the Irrigation Section of the DPUP has got a technical assistance from the Dutch Government in the field of survey and design. It is expected to yield proposal projects for the future. Thus DPUP made this brief explanation in a very short time. DPUP hope it will be consistent with the BARPEDA's intention through their letter dated January 6, 1978 no. 06/ADA - 140/78, which received on January 21, 1978.

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