

3-2 Summary Report of Evaluation

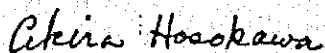
(日本及びインドネシア合同評価チーム評価報告)

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The Indonesian and Japanese Evaluation Teams for AP-4 Project have concluded evaluation with recommendations, as is given in the summary attached herewith.

Bogor, Indonesia

July 17, 1982



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Evaluation Team for AP-4 Project.



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SUMMARY REPORT OF EVALUATION ON THE TECHNICAL COOPERATION
FOR THE AGRICULTURAL PRODUCTS PROCESSING PILOT PLANT
PROJECT, IPB, JTA-9(a)(8)

1. Introduction

With the mutual agreement between the Japanese and Indonesian Government, the Government of Japan through the Japan International Cooperation Agency (hereinafter referred to as the "JICA") dispatched to Indonesia from 6 July to 23 July, 1982 (See Table 1) a team to evaluate the technical cooperation on the Agricultural Products Processing Pilot Plant Project (hereinafter referred to as the "AP-4 Project" or "Project"), the cooperation term of which will expire on 13 October 1982, (See Table 2).

Corresponding with it, the Government of Indonesia organized a team composed of officials concerned (See table 3) to conduct the evaluation study jointing with the Japanese Team.

The Joint Evaluation Team was organized to accomplish the evaluation study to grasp how far the Pilot Plant as well as supporting facilities had been established, and what extent they were being utilized for educational and research purposes at IPB in the past five years since 1977.

The evaluation study was assisted by the Japanese Expert Team led by Dr. A. Matsuyama and the Indonesian Working Committee members of the AP-4 Project, whose kindness and support were invaluable to evaluation.

During the course of study, the two parties of the Joint Evaluation Team worked together, discussed the difficulties and problems the AP-4 Project encountered, and arrived at mutual understanding and recommendations for the future of the Project.

This paper reports the findings on the Project, together with some recommendations as a result of the joint evaluation. The team sincerely hopes that necessary measures will be taken soonest by both governments taking into full accounts the lessons derived from this study for the Project in the future.

2. Evaluation Study

2-1 Objective

Prior to the termination of technical cooperation on 13 October 1982, both governments decided to review and evaluate the progress and achievements the AP-4 Project made during the technical cooperation period of five years in order to get first-hand information upon which to base decisions to be undertaken for the Project.

The evaluation study was conducted by the Joint Evaluation Team composed of both governments. The findings made in the study was the for the recommendations to be taken by both governments in the future.

It was agreed upon by the Joint Evaluation Team that all information on the Project and recommendations made be conveyed and reported to both governments who will make the final decision on the operation Project in the future.

2-2 Methodology

The study was carried out in three stages:

- 1) Consolidation and examination of data and information available at the headquarters of JICA and those prepared and furnished to the Team by the Project site.
- 2) Visit to and survey of the Project site.
- 3) Series of discussions with all officials and agencies involved in the Project.

In stage 2) particularly, the evaluation was conducted through

(a) collation of the progress and achievement in each of lines and supporting facilities as described in the Record of Discussions (hereinafter ref red to as the R/D) and the Plan of Operation (hereinafter referred to as the P/O) and (b) interviews and discussions with the Indonesian Working Committee members who were from the Faculty of Agricultural Engineering and Technology to which the Pilot Plant and the supporting facilities belonged.

The appraisal and evaluation were made as of 1st July, 1982, and the following items were specifically referred to in the light of the R/D and the P/O.

- a) In reference to "Establishment and management of the Pilot Plant" including supportive facilities; evaluation was conducted on each processing line in terms of installation and program imple-

mentation, and the utility of each line was assessed in regard to the range of applications and possible extension efforts.

b) In reference to "Upgrading the facilities and relevant function of those existing laboratories and research rooms; valuation was conducted in respect to the degree of utilization and maintenance efforts for those granted machinery and equipment.

c) Reorganization of the experimental and practical training programs on e.g. quality control of processed agricultural products: Evaluation was conducted on improved curricula and methods/contents of experimental courses and practices.)

d) Training of FATETA staff, students and teachers from technical and vocational schools engaged in agricultural products processing: Evaluation was conducted in regard with the frequency and contents of practical training for each processing line and supportive facilities.

e) Other activities necessary for the improvement and development of techniques related to agricultural products processing: Evaluation was conducted in terms of objectives, methods and results from joint research and survey activities.

f) The dispatch of JIKA experts was evaluated on the program implementation on the basis of tentative work plan 1977/82.

h) The participants programme in Japan was evaluated on the basis of the implementation and questionnaires replied from the individual participants.

i) The cooperative actions of Indonesian Government were evaluated in regard with counter-budget, counter-parts appointment, construction/installation of facilities/utilities.

j) Joint Committee, Working Committee and others.

2-3 Results of Evaluation Study

a. Establishment and management of the Pilot Plant including supportive facilities.

The AP-4 Buildings, processing lines installation and supportive facilities were completed or nearly completed as shown in Table 4, even though the construction of the Pilot Plant building was delayed by two years.

The AP-4 Product was given a 7,640m² site in Darmaga campus. The

Pilot Plant building occupies 1030m², and the office and lecture room, 210m². The building design and processline plan were assisted by Japanese experts dispatched by the JICA prior to the construction of the building and installation of the process lines. Electricity and water were made available as late as March, 1981, only when process lines (excepting rice line) and supporting facilities became operative.

On September 5, 1981, the AP-4 Pilot Plant was officially opened by President Soeharto. The inauguration ceremony was also attended by Ministry of Education and Culture, Ministry of Agriculture and other high ranking government officials as well as many distinguished scientists from various institutions. This honour and recognition from the President came before completion of everything. It may be said that before the opening ceremony the AP-4 Project was under preparation, and the President Soeharto set the intrinsic activities of the AP-4 Project in motion.

(i) Utilities: Gas is not available yet. Propane gas is being used. When electric power fails, a stand-by generator supplied by the JICA takes over to keep some of indispensable machines running for training and research. Since process lines were installed in stages, power source wiring to machines, some 110V, 220V and another 380V, became complicated. Rewiring of entire electric supply lines may be desirable as safety precaution.

(ii) Processing lines: Most of the lines have been installed and test run successfully with the help of short term experts, as planned in the R/D. Solvent extraction of edible oil, however, has not been run yet, and starch line is expected to be installed by the end of this year. Some additional equipment and machines to the listed ones in the R/D and the P/O were seen: Solvent extraction equipment, refinery apparatus in the edible process line and jar fermentors in the starch process line. A sorcher will be added to the tea line this year. This equipment were decided upon to be added through discussions and negotiations between the Japanese experts and Indonesian counterparts so that the lines would suit Indonesian needs and conditions better.

Some clumsiness was observed among staff in charge of lines in their operation of machines. Since the lines are new and have been operative only a little over one year, it is expected that staff members will acquire sufficient skill and experience in handling the equipment before

they will take up problems of new method development or modification of equipment.

Technicians showed great dexterity in making tahu and noodles, and workshop work. Good demonstration by those technicians will be an of the AP-4 Pilot Plant in training of students in the future.

(iii) Supportive facilities. Supportive facilities consist of three laboratories, i.e. Fermented Foods Laboratory, Storage Laboratory, Quality Control Laboratory and a workshop. All laboratories are well provided with instruments, equipment, glass wares, and chemicals by the JICA according to the R/D and the P/O. One rather costly addition to measuring instrument is a high speed liquid chromatograph to the Quality Control Laboratory. This advanced precision instrument will play an important role in chemical analysis of food stuff and other materials. Another change is the creation of a student laboratory next to the Fermented Foods Laboratory. This is solely used for student laboratory work in regard to the AP-4 related courses. The room will take up to 10-15 students at a time. One of the staff told us that he would use this laboratory for his classes next semester because microscopes, thermostats, and other measuring instruments were superior in quality to instruments found in other labs and were readily available here.

With two Japanese experts working full time in these laboratories, the laboratory seems a busier and livelier place than the process lines at the moment. They are well utilized as they were intended to.

A lathe and milling machine were installed in the workshop in this last April, with help of a short term expert. Also various tools were classified and put in order on shelves. The workshop is expected to serve well in modification of process machines as well as maintenance of machines in the AP-4 Pilot Plant.

Four manuals were prepared by Japanese experts and their counterparts on how to use machines and instrument. They are listed in Table 5. Several similar manuals on other lines and equipment are being arranged and will be made available before long.

(iv) Maintenance: Since all the machines and equipment are new, they are in good conditions and ready to use. There are, however, a few machines requiring replacement of parts, such as the hammer mill and the screw expeller in the edible oil line.

(v) Management of the Pilot Plant: Plant Manager appointed by the Project Head is wholly responsible for day by day management of the Pilot Plant. In April, 1982, the Working Committee (See j in the following) was reorganized, and the Plant Manager and the line heads were newly appointed to meet the needs of and to promote, the technology transfer in the nearly completed AP-4 Pilot Plant and the supporting facilities. They show up daily to the Pilot Plant, make contact and consultation with the Japanese leader and experts, hold weekly meeting for the better management of the Pilot Plant. They appeared earnest and eager in performing their duties for active utilization of the Plant in educational and research programs.

Table 6 shows the procedure and regulation on utilization of AP-4 facilities and utilization of products obtained from processing lines.

b. Upgrading the facilities and relevant function of existing laboratories and research rooms.

This programme started prior to the construction of the AP-4 Pilot Plant. The laboratories belong to Department of Food Science and Technology and Department of Industrial Technology which are still located in the old campus in Bogor city. Supply of machinery, instruments and equipment was completed in July, 1979 as planned in the R/D. They have been in frequent use by the staff members and students of the department both in education and in research.

c. Reorganization of the experimental and practical training programs on e.g. quality control of processed agricultural products.

List of courses offered by three departments in the Faculty of Agricultural Engineering and Technology (FATETA) is given in Table 7. Also list of names of staff in each department and courses they teach is provided in Table 8. These tables show that the following percentage of courses make use of either the process lines or supporting laboratories or both.

14% in Agricultural Engineering Department

21% in Industrial Technology Department

25% in Department of Food Science and Technology

We may be able to conclude that the impact the AP-4 Pilot Plant and the supporting facilities gave upon the curricula of the FATETA is considerable along the line of the national targets in promoting and upgrading the techniques of agricultural products processing in Indonesia.

d. Training of FATETA staff, students and teachers from technical vocational schools engaged in agricultural products processing.

Table 9 shows the training given to S_0 and S_1 students of IPB at the AP-4 Pilot Plant up until 1 July, 1982. The frequency of utilization increased sharply since 1982. This seems due to the near completion of the Pilot Plant itself and reorganization of the managing body of the Plant.

Table 10 shows thesis programs for undergraduate students (S_1), master's students (S_2) and doctor's candidates (S_3). The program seems just getting under way, and it will be expanded further in the near future.

e. Other activities necessary for the improvement and development of techniques related to agricultural products processing.

Improvement and development of techniques of agricultural products processing can only be achieved through research activities which are carried out in the AP-4 Pilot Plant as well as in the supporting facilities. Table 11 shows the research activities which were/are being undertaken jointly by the Japanese expert and his Indonesian counterpart or counterparts. The AP-4 laboratories and workshop are being utilized even after office. A glance at the table will suggest that research projects should preferably be more directly the process line and its products oriented, including engineering problems such as modification of machines.

f. The dispatch of JICA experts

Table 12 gives the names of all of long term and short term experts dispatched by the JICA for the AP-4 project. They are according to the R/D plan, and dispatched also as schedules in the R/D, as shown in the table.

Long term experts and coordinators were provided with Indonesian counterparts respectively. The first two long term experts were implemented the Project, but due to the delay of building construction before mentioned, they had rather difficult time in performing their missions. The short term experts were mainly to install processing line machines. After finishing installation and before returning home, they test run the line and gave seminars on how to operate the machines in the line to the line head and technicians of the line, thus rendering great service to the AP-4 Project.

The leader and experts now in duty are successfully assisting and advising their counterparts in managing Pilot Plant as well as research work.

g. The supply of machinery/equipment in terms of the profile of utilization and maintenance of the supplies 1977/82.

Table 13 shows the supply of machinery/equipment in terms of yearly expenditure and Table 14 shows the total cost for each line. The supply was carried out as planned in the R/D and the P/O with some additional equipment as is explained in a.(ii) and (iii) of this chapter. Maintenance so far is excellent with a few machines needing repair or replacement of spare parts as is explained in a.(iv) of this chapter.

The supply which will be made for 1982 will finish the scheduled supply of materials and will enable to install the starch line to completion, and also to modify the realine. As stated before in a.&e. of this chapter both the Pilot Plant and the supporting facilities are being used, especially after April this year, with fair frequency in education and research.

h. The participants programme in Japan.

The evaluation team requested all the participants to fill in questionnaire how they evaluated the training they had received in Japan. Also the team members interviewed the participants while they were in Bogor.

Table 15 is a list of participants and their fields of training. Seventeen staff members of the Faculty of Agricultural Engineering and Technology participated in eighteen training programs. Ten participants turned in the questionnaire. Out of ten questionnaires, all of them answered that the training was useful, and 50% answered that the duration of training was too short. The programme seemed to have contributed to the smooth implementation and operation of the Ap-4 Project.

Three participants out of sixteen (not counting one observation tour) do not resume any responsibility in the AP-4 Project at present. But this is because two of them were promoted and transferred to other positions. The training in Japan was meant for active, effective and direct involvement of participants in the AP-4 Project upon returning. Before sending trainees to Japan, an emphasis may be made that privilege and obligation always go together.

i. The cooperative actions of Indonesian Government

Table 16 shows the amount of counter rupiah provided by the Indonesian Government to implement and to run the AP-4 Project. Also IPB provided the AP-4 Project with necessary site in Dramaga Campus. Counterparts in all levels, such as Joint Committee, Working Committee, Evaluation Team, and also to Japanese leaders and experts were also provided by Indonesian side (Table 17). Commitments given by Indonesian and Japanese Governments materialized and operated the Project successfully, tiding over many difficulties the Projects faced in the making and running.

j. Joint Committee, Working Committee and others

The member list of both Joint Committee and working committee is given Table 18. The Joint Committee commissioned as early as November, 1977, and has been functioning just as described in the R/D. The joint Committee meetings held in the past are listed in Table 19.

The Working committee is established at IPB according to the R/D. The meeting is now held monthly. The present operational organization chart showing the relation among the Joint Committee, Working Committee, IPB, FATETA, the Project, and the Pilot Plant is given in Fig. 1.

When two charts are compared with one another, slight modification is noticed in the present organization from the original one. The change was made in order to meet the reorganization done in April, 1982. See Fig 1(2). These two committee are indispensable in decision making for the proper operation and management of the AP-4 Project.

Programming Team, Guidance Team and Evaluation Team were dispatched by the JICA for the AP-4 Project as shown in Table 20.

2-4 Conclusions

Eventhough there was two year delay in construction of the building, the AP-4 Project has been implemented and achieved it's targets as is evaluated in the following Table.

As can be seen in the Table, buildings were completed, process lines were installed except the starch line, supply of equipment to supporting facilities was almost completed. If we call the physical and structural side of the Project the hardware of the Project, supply of hardware to the Project is nearly completed. Therefore activities of the Project a. (i) and b. in the Table maybe said to have been accomplished.

Curriculum in the Faculty of Agricultural Engineering and Technology (FATETA) was reorganized to utilize the AP-4 Pilot Plant and facilities as indicated in Table 7. Training for students, technical and vocational school teachers and diploma students are well underway as is seen in Table 9.

FATETA staff are invited to make themselves available to train themselves so that they will be well versed in operation of any of the process lines. It may be said, therefore, that the activities of c.(i) and d. have been accomplished. We notice however that very little has been done in the improvement and development of techniques in agricultural products processing, modification of process itself and modification of the machines used to suit Indonesian raw materials and socio-economic conditions. These are, what we call, the transfer of technology or software side of the Project. In this regard we see C grade in the Table. Activities with C grade, therefore, have to be grappled with in order to achieve the Projectives.

Some of the staff from the FATETA were sent to Japan for training, Japanese experts were dispatched as scheduled, counter budget and counterparts were provided and Joint committee and Working Committee have been functioning as were expected in the R/D. These programs worked satisfactorily for the AP-4 Project.

All things considered, the hardware side of the Project is almost satisfactory but the software side remains short of targets.

3. Recommendations

The cooperation term of the AP-4 Project will expire on 13 October, 1982. In the light of the spirit, background and targets expressed in the R/D of this project, the follow up cooperation for two years is recommended to both the Japanese Government and the Indonesian Government in order to ensure the fulfillment of the Project objectives, especially in the areas of management and maintenance of the Pilot Plant, in activities of practical and experimental work as well as training on such as quality control and in activities of the improvement and development of techniques related to the AP-4 Pilot Plant.

Evaluation Result of activities of the Project	Progress	Technology transfer
a. Establishment and management of the Pilot Plant		
(i) Establishment of the Pilot Plant	A	-
(ii) Management and maintenance of the Pilot Plant	B	C
b. Upgrading the facilities and relevant function of those existing laboratories and research rooms	A	A
c. Reorganization of the experiment and practical training programmes on e.g. quality control of processed agricultural products		
(i) Reorganization and programmes	A	A
(ii) Practical and experimental work on quality control, etc.	A	C
(iii) Training quality control, etc.	A	C
d. Training for the FATETA staff, students and the technical and vocational school teachers engaged in products processing		
(i) Training for staff including technicians	B	A
(ii) Training for students	A	A
(iii) Training for technical and vocational school teachers and diploma students	A	A
Other activities necessary for the improvement and development of techniques related to agricultural products processing		
(i) Survey for traditional food processing	B	A
(ii) Research related to agricultural products processing	B	C

Note: Progress A > 80%
 B 50% - 80%
 C < 50%

Technology transfer

A > 80%
 B 50%-80%
 C < 50%
 D 0%

Table 1. Itinerary of Evaluation Study

7/6	TUE	17:40	Arrive at Jakarta halim JL711
7/7	WED	9:00	Courtesy Call to Secretariat Cabinet
		11:00	Courtesy Call to Embassy of Japan and JICA
7/8	THU	9:00	Courtesy Call to Directorate General of Higher Education
		11:00	Move to Bogor
		14:00	Courtesy Call to Rector/Vice-Rector of IPB
		16:30	Meeting with Japanese Expert's at Wisma Srigunting
7/9	FRI	9:00	First Joint Evaluation Meeting at Darmaga
		14:00	Study on Achievement of the Project.
7/10	SAT	9:00	Study on Achievement of the Project.
7/11	SUN		Report Writing.
7/12	MON	9:00	Demonstration of the Pilot Plant (Ir. John Kumendong) Storage, Work Shop, Rice Processing
7/13	TUE	9:00	Demonstration of the Pilot Plant (Ir. Zein Nasution) Tahu, Noodle, Oil, Sugar, Tea, Boiler, Generator.
7/14	WED	9:00	Demonstration of the Pilot Plant (Dr. Ir. Moech. Aman) Laboratory, Fermentor
7/15	THU	9:00	Meeting with Participants Trainees, Doctorated Candidated, Other Staffs from the Faculty Visit TEP, TIN.
7/16	FRI	10:00	Preparation for Joint Evaluation Meeting.
7/17	SAT		Second Evaluation Meeting in IPB
7/18	SUN		Report writing
7/19	MON		Report to Embassy of Japan and JICA
7/20	TUE		Report writing
7/21	WED		Report writing
7/22	THU		Leave for Tokyo (JL 712 p.m. 19:10).
7/23	FRI		Arrive at Tokyo.

Table 2. Japanese Evaluation Team for Agricultural Products Processing
Pilot Plant Project. I. P. B.

1.	Dr. Akira Hosokawa	Team Leader	Professor, Department of Agricultural Engineering, Faculty of Agriculture, University of Tokyo
2.	Dr. Michio Kozaki	Research Cooperation	Professor, Department of agricultural Chemistry, Tokyo University of Agriculture
3.	Mr. Hiroshi Ito	Agricultural Products	Chief, Microbiology Utilization Division, National Food Research Institute, M.A.F.F.
4.	Mr. Takashi Nakane	Cooperation and Planning	Senior Officer, Science Division, Science and International Affairs Bureau, M.E.S.C.
5.	Mr. Suguru Aoyama	Coordinator	Deputy Chief, Livestock Development Division Agricultural Development Cooperation Department, J.I.C.A.

Note: M.A.F.F. : Ministry of Agriculture, Forestry and Fisheries

M.E.S.C. : Ministry of Education, Science and Culture

J.I.C.A. : Japan International Cooperation Agency

Duration : July 6, 1982 - July 23, 1982

Table 3. List of Indonesian Team for AP-4 Evaluation

1.	Prof. Dr. Dedi Tisna Amidjaja	Director general of high Education, Ministry of Education and Culture.
2.	Prof. S. Pramoetadi	Director for Academic affairs Ministry of Education and Culture.
3.	Mr. Arcjad	Directorat general of High Education, Ministry of Education and Culture.
4.	Mr. Widodo	Secretary for National Cabinet Office, representative
5.	Mr. Komaruzaman	National Development Planning Board, Representative.
6.	Prof. Dr. A. H. Nsution	Rector of IPB

Conterpart:

1.	Dr. Edi Guharfja	Vice Rector for Academic Affairs - IPB
2.	Dr. Eriyatno	Dean of Faculty of Agricultural Engineering and Technology-IPB
3.	Dr. Komaruddin	IPB-Japan Cooperation Coordinator
4.	Dr. Tonny Ungerer	Head of IPB's Research Institution
5.	Dr. M. Aman W.	AP-4 - Manager

Table 4.

Building/Line	Date of Completion	Head/Coordinator
Building	<u>August 1980</u>	
Gas Supply		
Electricity supply	March 1981	
Water supply	March 1981	
Essential/Edible oil	March 1981	Mr. S. Ketaren, Mr. Hariyatono
Tea	March 1981	Mr. Mosdijarto P., Mr. Basith
Brown Sugar	August 1981	Mr. Djumali, Mr. S. Ma'arif
Rice	April 1980	Mrs. Tuty Priyanto Mr. W. Ciptadi
Tabu	April 1980	Dr. Monang M., Mr. Slamet Ma'oen Mrs. Liesbetini
Noodle	April 1980	Mr. A. Basuki, Mrs. Ingrid S.
Starch	—	
Fermented Foods	July 1981	Dr. Srikandi F. Mrs. Jenny Saono Mrs. Lien Lerlina
Storage	July 1981	Mr. Kamaruddin A., Mr. Soesarsono W., Mr. John Kumendong
Quality Control	July 1981	Mr. M. Zein Nasution Dr. M. Aman W., Dr. Dedi F.
Work Shop	April 1982	Mr. Susilo Srwono, Mr. Kusen, Mr. H. Suhardijanto
Generator Boiler	May 1981	
Upgrading THP Laboratory	July 1979	Dr. Dedi Fardiaz

Table 5. List of Manuals

K. Tsujimura, T. Baba and Slamet Ma'oen (1980):

Tahu Processing

T. Baba (1981): The Chemical Analysis of Foods and Feeds

S. Kamiya (1982): The Function and Safety Operation of AP-4
Workshop machines (2 page sheets)

AP-4 Working Committee (1981): Tea Processing

Table 6 (1). PROSEDURE AND REGULATION ON UTILIZATION OF AP-4 FACILITIES
FACILITIES FOR IPB STAFFS AND STUDENTS

A. INDIVIDUAL RESEARCH

1. Applicants must fill out an application form and submit a tentative schedule of their activities which will be proved by the management of AP-4.
2. Together with point 1., the applicant are required to submit a project proposal of their research/work.
3. Regular hour in using AP-4 facilities is from 8:00 a.m. to 3:30 p.m. Beyond these hours a special request has to be submitted and a technician must accompany the applicant during these hours.
4. All dispensable chemicals, glasswares and other materials will be paid by the users.
5. Technical assistant given by technicians beyond regular working hour will be charged as much as Rp250/hr/technician.
6. Every user must put a deposit (Rp.25.000) before start working at AP-4. The deposit will be returned after they finished their work.
7. Any items which are not included in the above points will be discussed exclusively.

B. CLASS PRACTICE

1. Planning on using AP-4 facilities must be submitted to the management by the instructor at the beginning of the semester. A fixed schedule must be given at least 7 days prior to the practice.
2. Instructor and users will be responsible for need of raw materials, fuels and other additives.
3. Utilization of the facilities beyond regular hours will be charged for Rp 1000,- per practice and given to the attending technicians.

Table 6(2). UTILIZATION OF PRODUCTS OBTAINED FROM PROCESSING LINES

Prior to June 1982, all products made by the AP-4 processing lines were distributed among the staffs and technicians or donated to visitors, whom attended the demonstration of a specific processing lines. At present, the management has tried to find out better solution in disposing the products, if possible these products will be used to generate income for the AP-4. To accomplish this objective, a good system that is able to take care of organization as well as financial and marketing must be established. A trial has been conducted on tobu line and the products were sold around IPB campus in Darmaga. A small survey will be conducted to collect information on consumers response of tofu product. Based on this study, the production of tofu line may not be limited for demonstration only but will be extended as a routine activities. Further trial on other production such as noodle and edible oil will be conducted. Hopefully, after termination of the project, the AP-4 will function not only to serve the needs for educational purposes, but also able to generate income and become self supporting in its financial problem.

Table 7(1). AGRICULTURAL ENGINEERING DEPARTMENT

Code	Course	Credit	Lecturer/Instructor
<u>3rd Semester</u>			
STK 201	Calculus I	3 (3-0)	Dep. of statistics
TEP 201	Introduction to Agricultural Engineering	2 (2-0)	Dr. Moeljarno Djojmartono, MSA and Ir. R. G. Sitompul
TEP 202	Statistics & Dynamics	3 (3-0)	Ir. D. Pakpahan
TEP 203	Fluid Machanics	3 (2-3)	Dr. Ir. Azron Dalhar
TEP 204	Engineering Drawing	3 (2-3)	Ir. Namaken Sembiring
	Agricultural Climatologi	3 (2-3)	
<u>4th Semester</u>			
STK 202	Calculus II	3 (3-0)	Statistical Dept.
TEP 205	Construction Material Science	2 (2-0)	Ir. Frans J. D., M. Sc.
STK 211	Statistical Methods I	3 (3-0)	Dept. of Statistics
ATEP 208	Shopwork	3 (3-3)	Ir. Kusen
TEP 211	Surveyng	3 (2-3)	Ir. Sukandi
<u>5th Semester</u>			
TEP 207	Introduction to Computer Science	3 (2-3)	Dr. Moeljarno Djojmartono, MSA
TEP 301	Strength of Material	3 (3-0)	Ir. Frans J. D., M. Sc.
ATEP 302	Instrumentation	3 (2-3)	Ir. Soesilo Sarwono
ATEP 351	Rural Electrification and Energy	3 (2-3)	Dr. Kamaruddin Abdullah
TEP 311	Tractor & Power Unit	3 (3-0)	Ir. R. G. Sitompul and Ir. Tineke
TEP 321	Hydrology	3 (3-0)	Dr. Ir. Soedodo H., M. Sc.

Δ indicates that the course uses AP-4 Pilot Plant and/or laboratories

Code	Course	Credit	Lecturer/Instructor
<u>6th Semester</u>			
TEP	Mechanization System & Management	3 (3-0)	Dr. Moeljarno Djojmartono, MSA
TEP	Mechanics of Machine	3 (3-0)	Prof. Dr. Siswadhi S
	Collateral course	3 (3-0)	
	Collateral course	3 (3-0)	
	Collateral Course	3 (3-4)	
<u>7th Semester</u>			
TEP/ TIN	401 Engineering Economics	3 (3-0)	Ir. Kohar Irwanto, Ir. John
T	402 Engineering Analysis	3 (3-0)	Prof. Dr. Siswadhi S. Kumendong
	Elective Course	3	
	Elective Course	3	
	Elective Course	3	
	Elective Course	3	
<u>8th Semester</u>			
TEP	999 Enterprennership	2 (2-0)	Ir. Soesarsono Wijandi, M. Sc.
KKN	399 Productive Field Work (Students Rural Services)	6	
TEP	497 Field Work	3	
TEP	498 Seminar	1	
TEP	499 Special Problem	8	
	Grant total	148 Credits	

Code	Course	Credit	Lecturer/Instructor
<u>Elective Courses:</u>			
TEP 411		3 (2-3)	Ir. Kusen
TEP 412	Farm Power and Machinery Management	3 (3-0)	Dr. Moeljarno Djojmartono, MSA
TEP 413	Soil and Machien Relati-on	3 (3-0)	Prof. Dr. Siswadi S.
TEP 421	Agricultural Irrigation	3 (3-0)	Dr. Ir. Soedidi H., M. Sc.
TEP 422	Agricultural Drainage	3 (3-0)	Ir. Achmadi P.
TEP 423	Irrigation System and Design	3 (3-0)	Ir. H. Aris P., M. Sc.
ATEP 341	Food Industry System Analysis	3 (3-0)	Dr. Ir. Eriyatno, MSAE
ATEP 432	Post Harvest Technology	3 (3-0)	Dr. Hadi K. Purwadaria
TEP 433	Refrigeration	3 (3-0)	Dr. Kamaruddin Abdullah
TEP 441	System Analysis	3 (3-0)	Ir. Nirwan Siregar
ATEP 451	Alternative Energy	3 (3-0)	Dr. Kamaruddin Abdullah
TEP 461	Fungtional Design of Farm Structure	3 (3-0)	Dr. Gardjito
TEP/			
STK 501	Applied Mathematics	3 (3-0)	Dr. Kamaruddin Abdullah
STK	Experimental Design	3 (3-0)	Dept. of Statistics
TIN 342	Industrial Environment Sanitation Engineering	3 (3-0)	

Cllateral Courses:

5th Semester

TNH 212	Soil Science	3 (2-3)	Soil Dept.
101	Introduction to Food Technology	2 (2-0)	Dr. F. G. Winarno

6th Semester

Group I

AGR	Agronomy	3 (2-3)	Dept. of Agronomy
TEP 322	Soil, Water & Plant Relationship	3 (3-1)	Ir. H. A. Privanto, MSAE
TEP 312	Agricultural Machinery	3 (2-3)	Ir. R. G. Sitompul
TEP 323	Soil & Water Management	3 (2-3)	Ir. Achmadi P.

Code	Course	Credit	Lecturer/Instructor
<u>Group II</u>			
TIN 311	Plant Location & Lay Out	3 (3-0)	Dr. Irawadi and Ir. Zein Nasution
TEP 331	Food Engineering	3 (2-3)	Dr. M. Aman W., M. Sc.
TEP 332	Introduction to Agricultural Product Processing Engineering	3 (3-0)	Dr. Hadi K. Purwadaria
TEP 361	Farm Structure and Environment	3 (3-0)	Dr. Gardjito

Table 7 (2) INDUSTRIAL TECHNOLOGY DEPARTMENT

Code	Course	Credit	Lecturer/Instructor
<u>3rd Semester</u>			
STK 201	Calculus	3 (3-0)	Dep. of Statistics
TIN 201	Introduction to Industrial Engineering	2 (2-0)	Dr. Ir. Eriyatno, MSAE and Ir. Soesarsono Wijandi, M. Sc.
TIN 213	Engineering Design	3 (2-3)	Dr. Ir. Eriyatno, MSAE and Ir. Eaqih Udin
TIN 214	Physical Chemistry	3 (2-3)	Drs. Chilwan Pandji, Apth and Dr. Ir. Aziz Darwis, M. Sc.
TIN 215	Engineering Chemistry	3 (2-3)	Dr. Ir. M. Aman, M. Sc. and Ir. Illah Sailah
TIN 223	Industrial Product Chemistry	3 (2-3)	Ir. Wakhyuddin Ciptadi, MS and Dr. Ir. Aziz Darwis, M. Sc.
<u>4th Semester</u>			
FIS 102	Physics II	3 (2-3)	Science & Math. Dep.
STK 211	Statistical Method	3 (3-0)	Statistics Dep.
KIM 221	Analytical Chemistry	3 (2-3)	Dep. of Chemistry
TEP 201	Introduction to Computer science	3 (2-3)	Dr. Moeljarno Djojmartono, MSA
TIN 212	Time and Motion Study	2 (2-0)	Ir. Machfud and Dr. Irawadi
TIN 221	Unit Operation	4 (3-3)	Ir. Djumali and Ir. Zein Nasution
TIN 301	Personell Management	2 (2-0)	Drs. Fachidin
<u>5th Semester</u>			
TEP 208	Shopwork Engineering	3 (2-3)	Ir. Kusen
TIN 301	Strength of Material	3 (2-3)	Ir. Bambang Pramudia, M. Sc.
TIN 222	Unit Process	3 (2-3)	Dr. Chang Mushadji
TIN 241	Industrial Instrumentation	3 (2-3)	Ir. Soesilo Sarwono and Dr. Ir. Erivatno, MSAE
TIN 311	Plant Location and Lay Out	3 (2-3)	Dr. Irawadi and Ir. Zein Nasution
TIN 341	Fundamental of Quality Control	3 (2-3)	Ir. Zein Nasution and Ir. Lien Herlina
	Elective B	3 (2-3)	

Code	Course	Credit	Lecturer/Instructor
<u>6th Semester</u>			
TIN 302	Industrial Sosiology	2-0	Suhadi Hardjo, M. Sc.
TIN 312	Operational Research I	3-0	Dr. Ir. Eriyatno, MSAE and Ir. Machfud
TIN 314	Project Planning	2-0	Ir. Soesarsono Wijandi, M. Sc.
TIN 342	Industrial Environmental and Sanitation Engineering	2-3	Drs. R. Hardi Soeprapto and Ir. Ingrid Surono
TIN 343	Labour Management and Safety	2-0	Drs. R. Hardi Soeprapto
	Elective A		
	Elective A		
	Elective B		
<u>7th Semester</u>			
SEP 341	Industrial Management	3-0	Dep. of Agric. Ec.
PWD 511	Regional Development Planning	3-0	School of Graduate Study
TIN/ TEP 401	Engineering Economics	3-0	Ir. Kohar Irwanto
TIN 403	Industrial Planning	2-0	Dr. Ir. Aziz Darwis, M. Sc.
	Elective A		
	Elective B		
<u>8th Semester</u>			
TIN 491	Product Field Work (Student Rural Service)	6	
TIN 497	Field Work	3	
TIN 498	Seminar	1	
TIN 499	Special Problem	6	
	Elective A		
	<u>Elective A</u>		
TIN 321	Pulp and Paper Technology	3 (2-3)	Ir. A. Basith
TIN 322	Fat and Oil Technology	3 (2-3)	Ir. S. Ketaren and Dr. Bambang Djatmiko
TIN 323	Beverage Technology	3 (2-3)	Ir. Zein Nasution and Ir. Samsul Maarif
TIN 324	Leather Technology	3 (2-3)	Drh. Moeljono J.
TIN 325	Starch and Sugar Technology	3 (2-3)	Ir. Wakhyuddin Ciptadi, MS Ir. Djumali

Code	Course	Credit	Lecturer/Instructor
TIN 326	Farmatocical Technology	3 (2-3)	Drs. Chilwan Pandji, Apth
TIN 327	Cosmetics and Aromotics Technology	3 (2-3)	Ir. S. Ketaren and Drs. Chilwan Pandji, Apth
TIN 328	Ceramics Technology	3 (2-3)	Ir. Soesarsono Wijandi, M. Sc.
TIN 332	Cottage Technology	3 (2-3)	Ir. Soesarsono Wijandi, M. Sc.
<u>Elective B</u>			
TIN 331	Packaging Science	3 (2-3)	Ir. Soesarsono Wijandi, M. Sc.
TIN/ STK 441	Industrial Statistics	3 (2-3)	Dr. Ir. Hidayat Syarief
TIN 411	Decicion Theory and Optimization Technics	3 (2-3)	Dr. Ir. Irawadi
TIN 412	Operational Research II	3 (2-0)	Dr. Ir. Eriyatno, MSAE
TEP 402	Engineering Analysis	3 (3-0)	Prof. Dr. Ir. Siswadhi S.
TEP 331	Food Engineering	3 (2-3)	Dr. Ir. Aman W.
ITP 412	Storage	3 (2-3)	Ir. Soesarsono Wijandi, M. Sc.
TIN 415	Organoleptics Test	3 (2-3)	Ir. Lien Herlina and Ir. Zein Nasution
SEP 351	Introduction to Account- ing	3 (3-0)	Dep. Agric. Ec.
SEP 362	Agricultural Marketing	3 (3-0)	Dep. Agric. Ec.
TEP 332	Agricultural Product Processing	3 (2-3)	Dr. Hadi K. Purwadaria
STK 331	Experimental Design	3 (2-3)	Dep. of Statistics

Table 7 (3) FOOD SCIENCE AND TECHNOLOGY DEPARTMENT

Code	Course	Dredit	Lecturer/Instructor
<u>3rd Semester</u>			
STK 201	Calculus I	4 (3-2)	Dept. of Statistics
	Applied Physics	3 (2-3)	Dept. of Physics
	Humanity	2 (2-0)	Dr. Ir. Darwis Gani
ITP 201	Principles of Food Technology	2 (2-0)	Dr. F. G. Winarno
IPA 221	Physical Chemistry	3 (2-3)	Dr. Ir. Aman W., M. Sc.
PSL	Environmental Sciences	2 (2-0)	Dept. of Marine Biology
<u>4th Semester</u>			
ITP 341	Nutrients Metabolism	3 (3-0)	Dr. Ir. Dedi Fardiaz Dr. Ir. Srikandi Fardiaz
ITP 311	Basic Engineering	3 (3-0)	Prof. Dr. Soewarno T. Soekarto
STK 211	Statistical Methods	3 (3-0)	Dept. of Statistics
BIK 212	Biochemistry	4 (3-3)	Dr. Ir. Maggy T.
ITP 311	Food Chemistry I	2 (2-0)	Dr. Monang Manullang
ITP 312	Food Microbiology	4 (3-3)	Dr. Ir. Srikandi Fardiaz Ir. Betty Sri Laksmi J., M. Sc.
<u>5th Semester</u>			
ITP 331	Flour and Baking Technology	4 (3-3)	Ir. Adil Basuki
ITP 312	Food Chemistry II	2 (2-0)	Dr. F. G. Winarno
ITP 313	Food Analysis	3 (1-4)	Dr. Ir. Dedi Fardiaz
ITP 337	Principles of Food Engineering	3 (2-3)	Dr. Ir. Aman W., M. Sc.
ITP 333	Fruits and Vegetables Technology	3 (2-3)	Dr. Ir. Aman W., M. Sc. Ir. Sumiati
SEP 362	Agricultural Marketing System	3 (2-2)	Dept. of Agricultural Economics
<u>6th Semester</u>			
ITP 334	Meat, Egg and Fish Technology	4 (3-3)	Drh. Djundjung Daulay, M. Sc. Drh. Slamet Ma'oen
ITP 421	Fermentation Technology	3 (2-3)	Ir. J. K. Dewipadma, M. Sc.
ITP 435	Quality Control	3 (2-3)	Prof. Dr. Soewarno T. Soekarto
ITP 415	Sensory Evaluation	3 (2-3)	Prof. Dr. Soewarno T. Soekarto Ir. Betty Sri Laksmi J., M. Sc.

Code	Course	Credit	Lecturer/Instructor
<u>7th Semester</u>			
ITP 332	Dairy Technology	3 (2-3)	Drh. Djundjung Daulay, M. Sc.
SEP 341	Production Management	3 (3-0)	Dept. of Agricultural Economics
TIN 331	Packaging	3 (2-3)	Dept. of Industrial Technology
ITP 423	Industrial Sanitation	3 (2-3)	Dr. Ir. Srikandi Fardiaz
TEP 202	Economic Engineering	3 (3-0)	Dept. of Agricultural Engineering
	Elective	3	
<u>8th Semester</u>			
KKN 399	Productive Field Work (Students Rural Service)	6	
ITP 497	Field Practice	3	
ITP 498	Seminar	1	
ITP 499	Special Problem	6	
TIN 202	Enterpreunership	1	
<u>Elective Courses</u>			
<u>A. Research</u>			
STK 331	Experimental Design	3 (3-0)	Dept. of Statistics
STK/ TED 501	Applied Mathematics	3 (3-0)	Dept. of Statistics
<u>B. Planning</u>			
TIN 311	Plant Lay Out and Design	3 (2-3)	Dept. of Industrial Technology
TIN 314	Project Planning	2 (2-0)	Dept. of Industrial Technology
<u>C. Managerial</u>			
SEP 241	Principles of Management	3 (3-0)	Dept. of Agricultural Economics
<u>D. Extension</u>			
SEP 332	Extension Methods	3 (2-2)	Dept. of Agricultural Economics

Table 8 (1) DEPARTMENT OF AGRICULTURAL ENGINEERING
LIST OF STAFF'S COURSES *) AND AP4 UTILIZATION

No.	Name	Courses Teaching	Utilization AP4	
			Yes	No
1.	Hadi K. Purwadaria/ John K/ Imam H.	Computer Application in Agric. Engr.	Yes	
2.	Moeljarno D.	Strength of Materials	Yes	
3.	Soesilo S.	Environmental Meas.	No	
4.	Kammaruddin A/ D. Pakpahan	Agric. Electrification and Anergy	Yes	
5.	N. Sembiring/ Tineke L.	Agric. Tractor and Internal Comb. Engine.	No	
6.	Dedi Kusnadi	Hydrology	No	
7.	Siswadhi S.	Engineering Analysis	Yes	
8.	Moeljarno D.	System Analysis	Yes	
9.	Frans J. D./ R. G. Sitompul	Land Clearing	No	
10.	B. Pramudya/ Kohar Irwanto	Agric. Machinery and Power Management	Yes	
11.	Siswadhi S.	Design of Agric. Machinery and Tools	Yes	
12.	Achmadi Pw/Sukandi S	Soil Conserv. Engr.	No	
13.	Aris P./Soedodo H.	Design of Irrigation System and Structures	No	
14.	Soesili S./ Nirwan S.	Electronics and Auto- mation	Yes	
15.	Moedjijarto P.	Drying Engineering	Yes	
16.	Kamaruddin A.	Refrigeration Engineering	Yes	

*) To be given in the 5th and 7th Semester 1982/1983.

Table 8 (2) SUBJECT AND STAFF LIST OF INDUSTRIAL TECHNOLOGY DEPARTMENT USING AP-4 PROJECT

No.	Staff Name	Courses Teaching	Semes- ter	Using AP-4 Facilities (Yes/No)
1.	Suhadi Hardjo	Project Planning	6	No
		Sociology Industrial	6	No
2.	R. Muljono J.	Industrial Chamistry	3	Yes
		Leather Technology	6	Yes
3.	Wakhyuddin C.	Healt techniques of Industrial environmental	6	Yes
4.	Soesarsono W.	Introduction to Industry	3	
		Packaging	6	Yes
		Storage	6	
5.	R. Hardi S.	Material Environmental and Sanitation Enginee- ring	6	No
		Labor Management and Safety	5	
6.	M. Zein Nasution	Unit Operation	3	
		Quality Control	5	Yes
		Agriculture Product Technology	6	
		Organoleptic Test	6	
7.	Fahidin	Personell Management	5	No
8.	Eriyatno	Design of Equipment and Machine	3	Yes
		Introduction Industry	3	
		Decicion Theory and Optimization Techniques	6	
		Operational Research II	6	
9.	Djumali	Starch and Sugar Technology	6	Yes
10.	A. Aziz Darwis	Industrial Product Chemistry	3	No
11.	Semangat Ketaren	Fat and Oil Technology Aromation and Cosmetion Technology	6	Yes
			6	Yes
12.	Macfud	Paln and Lay out Prosedure techniques	5	Yes
			4	No
14.	Chilwan Pandji	Fisical Chemistry	3	No
		Medicine Technology	6	Yes
15.	Liesbetini H.	Organoleptic Test	6	Yes
16.	M. Aman Wirakartakusuma	Engineering Chemistry	3	No

DEPARTMENT OF FOOD SCIENCE & TECHNOLOGY

NAME OF LECTURER	COURSES GIVEN	UTILIZATION OF AP4, Yes/No
Dr. Ir. Dedi Fardiaz	◦ Food Analysis	Yes
	◦ Nutrient Metabolism	No
Dr. Ir. Srikandi Fardiaz	◦ Food Microbiology	Yes
	◦ Sanitation of Food Industry	Yes
Dr. Monang Manullang	◦ Food Chemistry I	No
Dr. F. G. Winarno	◦ Introduction to Food Technology	No
	◦ Food Chemistry II	No
Prof. Dr. Soewarno T. Soekarto	◦ Sensory Evaluation	No
	◦ Food Quality Control	No
Dr. Ir. M. Aman Wirakartakusumah	◦ Principles of Food Engineering	No
	◦ Fruit & Vegetable Technology	Yes
Ir. Jennie D. Saono M. Sc	◦ Fermentation Technology	Yes
Ir. Adil Basuki Ahza	◦ Flour & Bakery Technology	Yes
Drh. Djundjung Daulay M. Sc	◦ Technology of Meat, Eggs, and Fish	No
	◦ Milk Technology	No
Ir. Betty S. L. Jenie M. S	◦ Food Microbiology	Yes
	◦ Fermentation Technology	Yes
Ir. Yadi Haryadi M. Sc	◦ Conservation & Storage	Yes
Ir. Sumiyati	◦ Fruit & Vegetable Technology	Yes
Drh. Slamet Maoen	◦ Technology of Meat, Eggs, and Fish	No

Table 9 UTILIZATION OF AP4 FACILITIES FOR CURRICULUM
ACTIVITIES, FATETA-IPB

Department (level)	March-August 1981			September-February 1982			March-August 1982			September-February 1983		
	Course Name (Credits)	Lab/ Line dents Used	Stu- dents	Course Name (Credits)	Lab/ Line dents Used	Stu- dents	Course Name (Credits)	Lab/ Line dents Used	Stu- dents	Course Name (Credits)	Lab/ Line dents Used	Stu- dents
ITP (S ₁)	-	-	-	Basic Engi- neering (3)	Tour 70	70	Flour Tech- nology (3)	7	70	Basic Engi- neering (3)	Tour 70	70
				Intro to Food Engi- neering (3)	Tour 70	70	Food Micro- biology (4)	1,2	70	Fermenta- tion Tech- nology (3)	2,8	70
							Food Analy- sis (3)	1,3	70	Quality Control (3)	1,3	70
							Fruits and Vegetables Technology (3)	9	70	Storage (3)	4	70
THP (S ₁)	Agric. Pro- duct Pro- cess Engi- neering (3)	6-13	70	Instru- menta- tion (2)	1,3	55		-	-		-	-
	Agric. Pro- duct Pro- cess Tech- nology (3)	6-13	70									

March-August 1981 September-February 1982 March-August 1982 September-February 1983

Department (Level)	Course Name	Lab/ Line Credits	Stu- dents Used	Course Name	Lab/ Line Credits	Stu- dents Used	Course Name	Lab/ Line Credits	Stu- dents Used
TIN (S1)	Engineering Design (3)		Tour 55	Time and Motion Study (2)		6-13 55	Engineering Design (3)	Tour 70	6-13 70
	Unit Operation (4)		6-13 55	Workshop Engineering (3)		5 70	Unit Operation (4)		6-13 70
				Industrial Instrumentation (3)		1,3 55	Edible Oil and Fat Technology (3)		11,13 15
				Plant Lay Out and Design (3)		6-13 55	Beverages Technology (3)		6 20
				Quality Control (3)		1,3 55	Rice and Sugar Technology (3)		10,12 20
				Unit Process (3)		6-13 55			
TEP/MP (S1)				Energy and Rural Electrification (3)		6-13 90	Food Engineering (3)		6-13 40
				Shopwork Engineering (3)		5 90	Agricultural Process Engineering (3)		6-13 40

September-February 1983

March-August 1982

September-February 1982

March-August 1981

Department (level)	September-February 1983		March-August 1982		September-February 1982		March-August 1981	
	Course Name (Credits)	Lab/ Stu- Line dents Used	Course Name (Credits)	Lab/ Stu- Line dents Used	Course Name (Credits)	Lab/ Stu- Line dents Used	Course Name (Credits)	Lab/ Stu- Line dents Used
TPP (S ₀)	Food Pro- cessing (3)	6-13 35	Food Pro- cessing (3)	6-13 35	Food Pro- cessing (3)	6-13 35	Food Pro- cessing (3)	6-13 35
	Agric. Pro- duct Pro- cessing (3)	6-13 35	Agric. Pro- duct Pro- cessing (3)	6-13 35	Agric. Pro- duct Pro- cessing (3)	6-13 35	Agric. Pro- duct Pro- cessing (3)	6-13 35
TPP (S ₀)	Intro to Agricultural Microbiology (3)	4 35	Intro to Agricultural Microbiology (3)	4 35	Intro to Agricultural Microbiology (3)	4 35	Intro to Agricultural Microbiology (3)	4 35
	Storage (3)	4 35	Storage (3)	4 35	Storage (3)	4 35	Storage (3)	4 35
TPP (S ₀)	Process Engineering (4)	6-13 35	Process Engineering (4)	6-13 35	Process Engineering (4)	6-13 35	Process Engineering (4)	6-13 35
	Commodi- ties (4)	1,3 35	Commodi- ties (4)	1,3 35	Commodi- ties (4)	1,3 35	Commodi- ties (4)	1,3 35

NOTES :

Lecture Room is fully occupied all semester (capacity : 80)

- ITP = Food Science and Technology
- TIN = Industrial Technology
- TPP/TEP/ = Agricultural Engineering
- MP = Agricultural Product Technology
- THP = Agricultural Product Technology
- 1. Student Lab
- 2. Microbiol, Lab
- 3. Q.C. Lab
- 4. Storage
- 5. Workshop
- 6. Tea line
- 7. Noodle line
- 8. Fermentor line
- 9. Tofu lab
- 10. Sugar line
- 11. Edible Oil line
- 12. Rice Processing line
- 13. Oil Extraction line

Table 10. S1, S2, S3 Thesis Programs

Name of Student	Title of Thesis	Advisor
<u>Graduation Thesis (S1) Program</u>		
Gde Handi (1981)	: Thermal properties of Fruits	Dr. Kamaruddin A.
Denny M (Current)	: Fruit Storage	Dr. Kamaruddin A.
<u>Masters Thesis (S2) Program</u>		
Herasztuti (current)	: Stability of Provitamin (Japansc Expert)	Dr. Soewarno T. S. Dr. Tomomatzu
Tirza Zoelfikar (current)	: Purification of Polyphenol oxidaze from SALAK (Japanese expert)	Dr. Dedi Fardiaz Dr. A. Tomomatsu
<u>Doctors Thesis (S3) Program</u>		
Ridwan (current)	: Thermal properties of rough rice	Dr. Kamaruddin A.
<u>S1 program coming in next semester</u>		
Darmawida	: Isolation and characterization of rice starch	Dr. Aman
Duhita	: On microorganism from Ikan Peda	Dr. Srikandi F.
Antonius Suanto	: Anti microbiotic components in Tuneric	Dr. Srikandi F.
Rizal	: Freeze drying	Dr. Kamaruddin A.
Reza	: Freeze drying	Dr. Kamaruddin A.

Table 11. Research works concerned 20 AP-4 Pilo Plant

1. Tofu (bean card) line
 - i. R. Muljono J. and A. Matsuyama: "Studies on some traditional fermented and non fermented proteonous food in Indonesia" on going
2. Starch line
 - i. K. Kato: "High-fructose liquid sugar process to be developed in Indonesia"
Buletin penelitian IPB 2, (3) Dec. 1981.
3. Sugar manufacturing line
 - i. Z. Nasution & S. Tomomatsu: "Mempelajari jenis gula pada nira aren"
Buletin Penelitian IPB 2 (3) Dec. 1981
 - ii. Z. Nasution, A. Tomomatsu, A. Hosono & A. Matsuyama:
"Biochemical and microbiological studies on "NIRA"
On going.
4. Quality Control room
 - i. A. Matsuyama: "Studies on microflora of soil and water in Indonesia with special reference to Psychrophiles, Holophiles and Thermophiles ecological aspects".
At Regional workshop on research advances in agricultural microbiology in Southeast asia.
24-27 Nov. 1981
 - ii. S. Ma'oen: F. G. Winarno and A. Matsuyama: "Mutagenicity tests on Indonesian foods in bacterial systems". Kongres National Microbiologi ke-III 26-28 Nov. 1981.
5. Fermented Foor lab. (line)
 - i. Jenny D. Saono, T. Baba and A. Matsuyama: "Some problems to be assessed on traditional food fermentation in Indonesia" at 8th ASCA conference 4-15 Feb. 1981.
 - ii. Jenny D. Saono: "Microflora of ragi and related fermented".
AP-4 Seminar 7, Sep. 1981.

- iii. Jenny D. Saono and Katoh: "Pengembangan glukose, isomerase dan gula cair berfruktose tinggi". Bulletin penelitian IPB 2 (3) Dec. 1981.
- iv. K. Katoh: "Development of industrial fermentation and enzyme industries in tropical Asia" Regional workshop on research advances in agricultural microbiology in Southeast Asia. 24-27 Nov. 1981.
- v. Monang Manullang, S. Ma'oen, K. Katoh and A. Matsuyama: "Selection and development of industrial microflora. On going.
- vi. T. Zoelfikar, M. Judoamidjojo, A. Hosono, A. Tomomatsu and A. Matsuyama "Chemical and microbiological studies on Dadih in Indonesia. On going.
- vii. Jenny D. Saono, A. Hosono, A. Tomomatsu, K. Katoh, A. Matsuyama and T. Baba: "Studies on the microorganisms and improvement of ragi in Indonesia. On going.
- viii. Jenny D. Saono, A. Hosono, A. Tomomatsu, A. Matsuyama: "Ragi and its utilization for the manufacture of fermented foods in Indonesia". in print.

Table 12.

Duration of the cooperation - October 14, 1977 - Oct. 13, 1982

Year	1977	1978	1979	1980	1981	1982	Remarks
Month	10 12 1 4 7 10 12 1 4 7 10 12 1 4 7 10 12 1 4 7 10 12 1 4 7 10 12						

Japanese experts

1. Long term

1) Team Leader

K. Tsujimura

A. Matsuyama

8.1 ----- 7.31

7.23 ----- 10.13

2) Pilot Plant Management

T. Aoiike

K. Katoh

6.22 ----- 6.20

10.28 ----- 10.27

3) Food analysis/microbiology

T. Baba

A. Hosono

5.31 ----- 5.30

11.20 ----- 11.19

4) Essential oil/Edible oil

A. Tomomatsu

12.16 ----- 10.13

5) Coordinator/Liaison officer

K. Miura

Y. Tanaka

8.10 ----- 3.31

3.2 ----- 10.13

Note: ----- Plan achievement

Duration of cooperation - October 14, 1977 - October 13, 1982

Year	1977	1978	1979	1980	1981	1982	Remarks
Month	10 12 1 4 7 10 12 1 4 7 10 12 1 4 7 10 12 1 4 7 10 12 1 4 7 10 12						

2. Short Term

1) Advice of the documents and detail design of pilot plant

M. Kon 2.21-3.18 7.6-7.15
 K. Tanabe 7.8-7.22

2) Planning of agricultural products processing lines

S. Matsumoto 2.21-3.18

3) Marketing / / Processing

K. Omura 9.1-10.31

4) Installation of tofu equipment

Y. Fujita 4.9-4.30

5) Fermented food processing

A. Matsuyama 4.9-5.8

6) Cereal Processing

Y. Seo 3.28-4.27

7) Installation of Boiler

S. Ishikawa 3.2 - 4.25

Duration of the cooperation - October 14, 1977 - October 13, 1982

I T E M	1977		1978		1979		1980		1981		1982		Remarks
	10	12	1	4	7	10	12	1	4	7	10	12	
8) Installation of oil processing													
S. Sagawa													
9) Instalation of tea processing													
S. Akabori													
S. Toyota													
10) Installation of sugar processing													
S. Taniguchi													
K. Hori													
11) Installation of fermentor													
Y. Itoh													
12) Installation of workshop													
S. Kamiya													
13) Cerall processing/storage													
Y. Sagara													

Table 13. Equipment Machinery and Materials by the Government of Japan

1 st year	32,267,000	yen
2 nd year	51,649,000	
3 rd year	82,846,000	
4 th year	59,294,000	
5 th year	67,322,000	

Table 14.

Quality control room	102,816,000	yen
Bean curd line	5,481,000	
Noodle line	1,933,000	
Starch line	28,269,000	
Tea manufacturing line	8,064,000	
Sugar manufacturing line	2,700,000	
Fermented food line	7,092,000	
Rice Processing line	8,925,000	
Edible Oil Esstial		
Oil line	49,351,000	
Workshop	21,693,000	
Existing laboratories		
and research room	24,005,000	
Others	27,869,000	

Table 15.

ITEM	Field of specialization	Name of participants	Duration
Technical training in Japan	1. Essential oil edible oil production and their waste utilization	Ir. Semangat Ketaren	2 months (Mar. 22 - May 20, 1979)
	2. Estate crops production and processing (Tea and Sugar)	Ir. Goutare Ir. M. Zein Nasution	1 month (Jan. 28 - Jul. 28, 1979) 2 months (May 9 - July 10, 1978)
	3. Cereal and tuber processing and their waste utilization	Ir. P. Rangkuti	1 month (Oct. 11 - Nov. 10, 1979)
	4. Fermentation of agricultural products and microbiological studies	Ir. M. Machfud Ir. Jenny K.D. Saono, M. Sc. Ir. Ansori Rachman Ir. Betty S.L.J, MSc.	1 month (Oct. 11 - Dec. 6, 1979) and 26 days. 2 month (Jan. 26 - March 24, 1979) 3 weeks (Jan. 26 - Feb. 16, 1979) 1 month (Oct. 11 - Dec. 6, 1979) and 26 days.
	5. Storage	Ir. Tuti Priyanto	3 months (Oct. 30 - Jan. 30, 1980/1981)
	6. Quality Control	Ir. Darwin K Drh. Muljono J Ir. Basuki	1 month (Jan. 26 - Feb. 26, 1979) 3 months (Sept. 18 - Dec. 20, 1980) and 2 days. 3 months (Mar. 20 - Jun. 20, 1981)
	7. Work Shop	Ir. Kusen	3 months (Apr. 24 - Jul. 24, 1982)
	8. Food Processing	Drh. Slamet Ma'oen Drh. Hardi Suprpto	5 months (Jan. 14 - June 15, 1982) 3 months (Jun. 29 - Sep. 30, 1982)
	9. Observation trip	Ir. Soesarsono W, M.Sc. Drh. Slamet Ma'oen Suhadi Hardjo, MSc.	3 weeks (May 9 - May 29, 1978) 1 month (Nov. 28 - Dec. 25, 1978) 24 days (Oct. 30 - Nov. 23, 1980)

Table 16. COUNTER BUDGET FOR THE AGRICULTURAL PRODUCT PROCESSING PILOT PLANT PROJECT, IPB

JTA-9 (a) (8) FOR FISCAL YEAR 1978/1979 TO FISCAL YEAR 1982/1983

(IN 1000 RUPIAH)

No.	ITEM	1978/1979	1979/1980	1980/1981	1981/1982	1982/1983
1.	Pilot Plant Construction	84.500	110.000	35.000	0	0
2.	Furniture	0	25.000	5.000	0	0
3.	Transportation	2.500	3.500	5.000	8.000	3.000
4.	Material					
	- Office supply	1.500	1.500	3.000	3.500	3.000 *
	- Raw material	0	4.000	6.000	8.000	3.000
5.	Fee and Salary	2.160	3.540	5.000	6.000	6.000
6.	Handling cost	3.000	4.000	8.000	2.000	0
7.	Miscellaneous	6.340	9.540	9.000	14.000	17.000 **)
	Total	100.000	161.080	76.000	41.500	32.000

*) Office Supply Rp 1.500.000

Chemicals Rp 1.500.000

**) Including handling costs.

Table 17 (1). C. TIM COUNTERPARTS - JICA

1. Drh. R. Muljono Judoamidjojo for Prof. Dr. Matsuyama
2. Ir. M. Zein Nasution for Dr. Tomomatsu
3. Dr. Monang Manullang for Mr. K. Katoh
4. Ir. Jenniy K. Saono, M. Sc. for Hosono
5. Ir. A. Basith, Ir. Syamsul Ma'arif and Drh R. Muljono Judoamidjojo for Mr. Y. Tanaka.

Table 17 (2). List of AP-4 Technicians

No.	Name	Qualification of Education +)	Position
1.	Kosasih	SMEA	Administration
2.	Subagio	STMP	Processing line
3.	Ibnu Wachid	STMP	Processing line
4.	Dedi Rachmat	STM	Boiler
5.	Mansyursyah	STM	Machineries
6.	A. Hendra Kesenja	STM	Electrician
7.	Endang Jayadi	SD	Jonitor
8.	Hasan Basri	SD	"
9.	Mamad	SD	"
10.	Tatang	SD	Driver

- +) 1. SMEA : Vocational School for Economic
 2. STMP : Vocational School for Agric. Product Processing
 3. STM : Vocational School for Engineering
 4. SD : Elementary School.

Table 18 (1) MEMBERS OF THE JOINT COMMITTEE

Prof. Dr. Ir. Andi Nasution	: Rector of IPB
Dr. Ir. Eriyatno	: Dean of FATETA, IPB/Project Head
Prof. Ir. S. Pramoetadi	: Director for Academic Affairs, Directorate-General for Higher Education, Ministry of Education and Culture
Ir. Hadiwiratama M. Sc.	: Director for Technical and Vocational Education, Directorate- General for Primary and Secondary Education, Ministry of Education and Culture
	: Head, Bureau for International Cooperation, Ministry of Education and Culture
Dr. Kamaruddin Abdullah	: Coordinator in charge IPB - Japan Cooperation, IPB.
Dr. Ir. A. Darwis	: Head, Department of Industrial Technology, Fateta-IPB
Dr. Ir. Dedi Fardiaz	: Head, Department of Food Science and Technology, Fateta-IPB
Dr. Ir. M. Aman Wirakartakusuma	: AP-4 Plan Manager
Prof. Dr. A. Matsuyama	: Leader of Japanese Expert
Mr. J. Tanaka	: Coordinator, JICA Expert Team

Note:

1. An Official of the Embassy of Japan, a member for the Jakarta office of JICA and other related (s) recognized necessary by the Chairman be able to attend the Joint Committee ting as observer.
2. The Cairman may call responsible person (s) other related organization as reporteur and/or commentator on the major issues.

Table 18 (2). Working Committee Members

Chairman : Dr. Ir. Hadi K. Purwadaria (ex officio, Vice Dean
for Academic Affairs)

Members :

- Dr. Ir. Dedi Fardiaz M. Sc. (ex officio, chairman of Food Science,
Technology Dept.)
- Dr. Ir. Aziz Darwis M. Sc. (ex officio, chairman of Industrial
Technology Dept.)
- Dr. Ir. Soedodo M. Sc. (ex officio, chairman of Agricultural
Engineering Dept.)
- Dr. Ir. Eriyatno
- Dr. Ir. M. Aman Wirakartakusumah
- Dr. F. G. Winarno
- Prof. Dr. Siswadhi Soepardjo MSAE
- Ir. Soesarsono Wijandi M. Sc.
- Dr. Kamaruddin Abdullah
- Suhadi Hardjo M. Sc.
- Ir. B. Sri Laksmi MS.
- Ir. R. G. Sitompul

Japanese Experts :

Prof. Dr. A. Matsuyama (Leader)
Mr. Y. Tanaka (Liason officer)
Dr. Tomomatsu, Dr. Hosono, Mr. K. Katoh
Short-term experts.

Table 19. Joint Committee

- 1 st. Joint Committee Meeting
Date 30 November 1979
Place Ministry of Education and Culture
- 2 nd. Joint Committee Meeting
Date 15 December 1979
Place Rector's Office's IPB, Bogor
- 3 rd. Joint Committee Meeting
Date 8 March 1979
Place Rector's Office's IPB Bogor
- 4 th. Joint Committee Meeting
Date 25 July 1980
Place Meeting Room IPB Bogor
- 5 th. Joint Committee Meeting
Date 19 December 1980
Place IPB Bogor
- 6 th. Joint Committee Meeting
Date 15 April 1981
Place IPB Baranangsiang, Bogor
- 7 th Joint Committee Meeting
Date 3 February 1982
Place IPB Baranangsiang, Bogor

Table 20.

I T E M	Duration	Name of team member	Remarks
Teams			
1. Programing Team	1) Mar. 28 - Apr. 11, 1976	Prof. Dr. J. Sugi Prof. Dr. A. Hosokawa Prof. Dr. M. Kozaki Mr. T. Yabe Mr. J. Hashiguchi	
	2) Jun. 10 - Jun. 25, 1977	Prof. Dr. J. Sugi Prof. Dr. A. Hosokawa Dr. S. Matsuura Prof. Dr. M. Kozaki Prof. S. Matsumoto Mr. H. Suzuki	
	3) Oct. 9 - Oct. 19, 1977	Prof. Dr. J. Sugi Prof. Dr. A. Hosokawa Mr. M. Yoneyama	
2. Guidance Team	4) Mar. 3 - Mar. , 1979	Prof. Dr. M. Kozaki Mr. Kamoi Dr. H. Morishima Mr. M. Yoneyama	
	5) Sep. 1 - Sep. 15, 1979	Prof. Dr. A. Hosokawa Mr. S. Matsumoto Mr. M. Yoneyama	
	6) Apr. 5 - Apr. 16, 1981	Prof. Dr. A. Hosokawa Dr. T. Ohta Mr. I. Munakata Mr. T. Maeda	
	7) Mar. 24 - Mar. 31, 1982	Prof. Dr. M. Kozaki Mr. H. Ono	
3. Evaluation team	8) Jul. 6 - Jul. 23, 1982	Prof. Dr. A. Hosokawa Prof. Dr. M. Kozaki Mr. H. Itoh Mr. T. Nakane Mr. S. Aoyama	

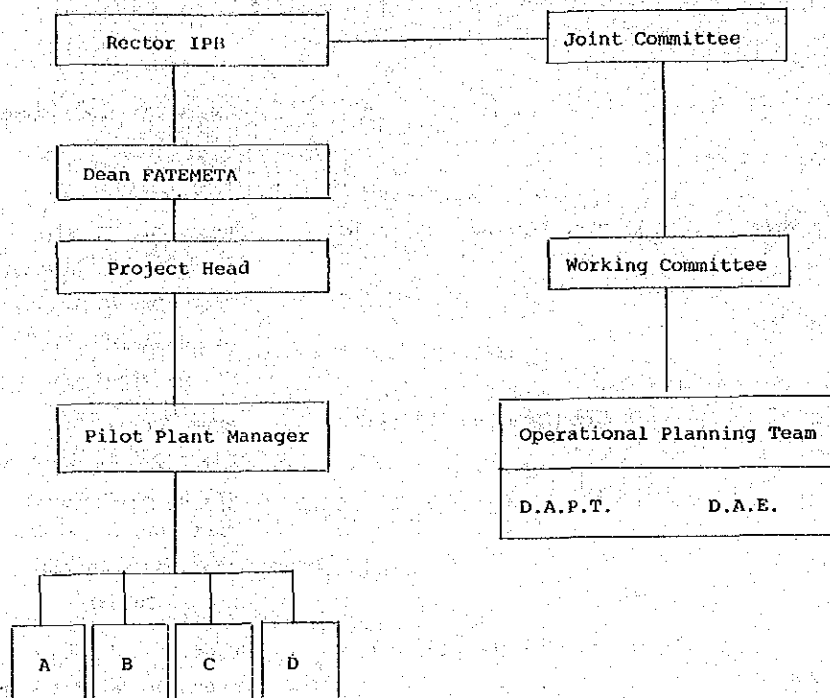


Fig. 1(1). Operational Organization Chart (old)

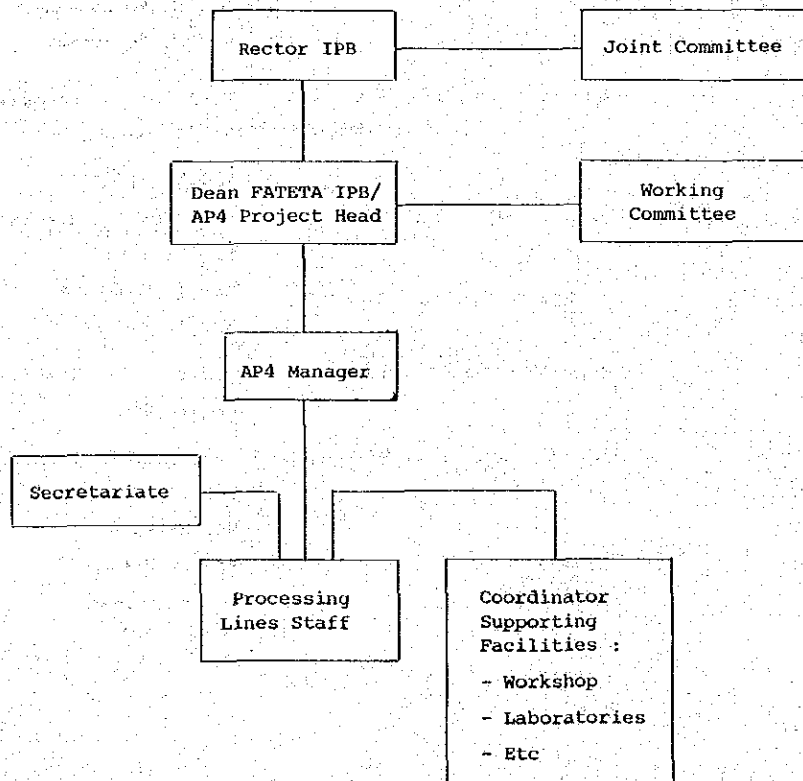


Fig. 1 (2). Operational Organization Chart (new)

3-3 部門別実績と評価

3-3-1 パイロットプラントの設置運営

(1) 現状及び問題点

ポゴール農科大学農産加工実験施設強化の目的で昭和52年10月14日に討議事録(R/D)が署名され、それに基づき技術協力が実施された。

昭和53年にパイロットプラントの設計が行なわれ、昭和54年9月にパイロットの建物が完成し、昭和55年7月に事務棟、講義室、ボイラー室、製油抽出棟が完成し、昭和55年8月にポゴールキャンパスからDARMAGAのパイロットプラントに移転が完了した。

なお、動力関係は昭和55年5月にボイラーやジェネレーターを据付け、昭和56年5月に電気、水道等の工事が完了した。

パイロットプラントの建物の配置図を図1に示した。

i) 農産加工ラインはR/Dに従って設置されている。ただし、澱粉ラインは本年度末には完成の予定で一部プラントが到着し、据付け、プラント技術者の派遣待ちであった。

豆腐ライン、製麺ライン、澱粉加工ライン(酵素糖化装置)、製茶ライン、砂糖製造ライン、穀類加工ライン(脱穀、糲摺機、乾燥の穀類調整加工装置)、製油・食用油ラインが完成し、インドネシア側のカウンターパートや技術者が十分にプラントの運転乾燥を習得し、各加工ラインの製造に技術的な成果を上げている。

特に豆腐ライン、製茶ラインおよび製麺ラインでは、これらの機械を用いて、応用分野にも手を広げ、インドネシアで市販されている豆腐や紅茶の製造や、小麦粉の代替としてタピオカ澱粉を用いた麺の製造が行なわれていた。この結果、製造方法が検討され、工夫され試作品の製造が行なわれていた。

ii) 発酵食品実験室、品質管理実験室、貯蔵実験室には、それぞれの実験器具が整備され、十分に活用されていた。

工作室には機械が設置され、英文の使用管理、安全マニュアルが作られ、取扱いに十分な配慮がされていた。

iii) パイロットプラント以外の備品および実験器具の維持管理、使用状況をチェックし、それぞれの実験室の器具、器械について確認を行った。保管状態、使用状況はおおむね良好であり、DARMAGAのキャンパスでの実験器具は実験、実習に十分活用されていた。

昭和54年度以前の供与機材の器具は一部がポゴールの旧キャンパスの食品加工工学科(FATEMETA)の学生実験実習室にあり、実験、研修が行なわれていた。この中で一部供与した器具がインドネシアの入力電圧と異なるため故障したもの、附属部品が破損し、使用されていない。(PHメーター、液送ポンプ、温度測定計)。附属部品がないために顕微鏡で、使用されていないもの、ガスもれのため、製氷機フリザーが修理されないまま

のものがあった。

Ⅳ) ボイラー、ジェネレーターはインドネシア側の技術者に運転免許をとらせ、保守管理についてIHI(ボイラー購入の石川島播磨重工㈱)から指導を受けている。

インドネシア側の送電圧関係が悪く、電圧の変動が激しく、パイロットプラントの稼動中に停電があり、このためジェネレーターをよく使用し、燃料費はインドネシア側のボゴール大学が負担しているため、かなりの額になっていた。

(2) ライン別、評価

パイロットプラントの設置運営に関する調査を行ない、各ラインの工程、機材供与の年月、設置の運営の進捗状況、インドネシア側に対する運転技術、管理、パイロットプラントの活用方法の評価を行ない、インドネシア側の実験室や施設、人員配置、予算措置を個別に表に示した。

設置、運営の進捗状況、技術移動の評価基準をA、B、Cのランクで示した。

- A. 80%以上実績が目標を上回って予想以上の効果があった。
 - B. 50～80%実績が目標とほぼ同じで予想通りの効果があった。
 - C. 50%以下実績が目標より多少下回って、予想以下の効果があった。
 - D. 0%実績が目標を大きく下回って、予想以下に少ない効果があった。
- D-6 設置されているが殆んど危険防止の上から、規模の点から今後改良しないと使用できないもの。

プラント名	豆腐ライン (Tahu Line)	
工 程		
機材供与	機材総額	4,962,000円
	予算年度	1978
	船積年月	April 1979
	引取年月	1979
	据付年月	May 1980
	利用状況	A
	管理状況	A
進捗状況	設置	A
	マニュアル作成	済 (英文)
	運営指導	A
技術移転	運転技術	A
	管理技術	A
	利用方法	豆腐・テンペ協同組合工場の機械化事業指向的役割を果たす。
インドネシア側の対応	実験室・施設	B
	人員配置	Dr. Marang, M, Drh. S. Ma'oen, Ir. Liesbetini, H
	予算措置	
総合判定	① 実績が目標を大きく上回った。(予想以上の大きな効果があった) ◎ ② 実績が目標を多少上回った。(予想以上の効果があった) ③ 実績が目標とはほぼ同じであった。(予想どおりの効果があった) ④ 実績が目標より多少下回った。(予想以下の効果があった) ⑤ 実績が目標を大きく下回った。(予想以下に少ない効果があった)	
コメント	Although the Line is the busiest for demonstration operations on various occasions, the product tahu of AP4 is softer than its commercial counterparts in the market, which means a little lower acceptability for Indonesian palate. The technical problems underlying have been thoroughly studied.	

パイロットプラントの設置運営に関する調査表

プラント名	製麺ライン (Noodle Line)	
工 程	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">生地 混合機</div> — <div style="border: 1px solid black; padding: 2px;">延べ 延機</div> — <div style="border: 1px solid black; padding: 2px;">線切 切出機</div> — <div style="border: 1px solid black; padding: 2px;">計 量 計量機</div> — <div style="border: 1px solid black; padding: 2px;">包 装 包装</div> </div>	
機材供与	機材総額	1,750円
	予算年度	1978
	船積年月	April 1979
	引取年月	1979
	据付年月	May, 1980
	利用状況	A
	管理状況	A
進捗状況	設 置	A
	マニュアル作成	仮マニュアル(英文)
	運営指導	A
技術利転	運 転 技 術	B
	管 理 技 術	A
	活 用 方 法	A
インドネシア側の対応	実験室・施設	B
	人員配置	Ir. Adil, Basuki. A
	予算措置	
総合判定	① 実績が目標を大きく上回った。(予想以上の大きな効果があった) ② 実績が目標を多少上回った。(予想以上の効果があった) ③ 実績が目標とほぼ同じであった。(予想どおりの効果があった) ◎ ④ 実績が目標より多少下回った。(予想以下の効果があった) ⑤ 実績が目標を大きく下回った。(予想以下に少ない効果があった)	
コメント	The Line essentially comprises a Japanese noodle UDON manufacturing equipment. In research and development of grainmilling and flour processing, some essentially important equipments and machines should be considered in the future. Comparison of wheat flour and the flour mixed with others Appropriate cooking of product noodles is to be assessed.	

パイロットプラントの設置運営に関する調査表

プラント名	澱粉加工ライン(A) 酵素糖化装置	
工 程	<p style="text-align: center;"> 焙地調整 → 殺菌 → 植菌 → 培養 → 集菌・分別 → 糖化 <small>ジャーフエメンター</small> → <small>速心分離機</small> </p> <p style="text-align: center;"> ↓ 濃縮機 ← 中和槽 ← 中和槽 <small>以下砂糖ライン</small> </p> <p style="text-align: center;"> ↓ 脱色槽 ← イオン交換装置 ← 脱色槽 <small>イオン交換装置</small> </p>	
機材供与	機材総額 予算年度 給積年月 引取年月 据付年月 利用状況 管理状況	19,500,000円 1981 1982 March 1982 May 1982 A A
進捗状況	設 置 マニュアル作成 運営指導	A 済(英文) A
技術移転	運転技術 管理技術 活用方法	B B B
インドネシア側の対応	実験室・施設 人員配置 予算措置	A Dr. Eriyatno, Ir. Sri Laksmi, Dra. Soeliantari
総合判定	<p>① 実績が目標を大きく上回った。(予想以上の大きな効果があった)</p> <p>② 実績が目標を多少上回った。(予想以上の効果があった)</p> <p>③ 実績が目標とほぼ同じであった。(予想どおりの効果があった) ㉟</p> <p>④ 実績が目標より多少下回った。(予想以下の効果があった)</p> <p>⑤ 実績が目標を大きく下回った。(予想以下に少ない効果があった)</p>	
コメント	<p>The Fermentor is the basic facility for and controlled, submerged fermentation and enzymatic conversion. The equipments including a series of three 30L Jar Fermentor, that are first introduced to Indonesia, are already at Tanjung Priok. The Jar Fermentors are directed to the production of 1) Starch Sugars from Cassava starch, 2) High Fructose Liquid Sugar.</p>	

パイロットプラントの設置運営に関する調査表

プラント名	澱粉加工ライン (Tuber processing Line) (B) Starch	
工 程	<p>水洗浄 — 粉碎機 — 沈降分離 — 分別 — 脱水 —</p> <p>粗粗澱粉乳糖 回転ふるい 脱水遠心機</p> <p>乾燥 — 製品</p> <p>自然乾燥・火力乾燥</p>	
機材供与	機材総額 予算年度 船積年月 引取年月 据付年月 利用状況 管理状況	6542000 + 19500 円 1981~1982 August 1981 March 1982 未据付 未利用 未管理
進捗状況	設置 マニュアル作成 運営指導	未完成 未完成 未完成
技術移転	運転技術 管理技術 活用方法	未完成
インドネシア側 の対応	実験室・施設 人員配置 予算措置	未 Ir. Machnd, Ir. Adil Basuki
総合判定	<p>① 実績が目標を大きく上回った。(予想以上の大きな効果があった)</p> <p>② 実績が目標を多少上回った。(予想以上の効果があった)</p> <p>③ 実績が目標とほぼ同じであった。(予想どおりの効果があった)</p> <p>④ 実績が目標より多少下回った。(予想以下の効果があった)</p> <p>⑤ 実績が目標を大きく下回った。(予想以下に少ない効果があった)</p>	
コメント	<p>The provision of machinery by Budget AP4 Fiscal 1981/82 is limited as for crude starch slurry manufacture. The equipments for starch refining and drying will be procured by Budget 1982/83. The Line, therefore, may not be completed virtually by the end of 1983.</p>	

パイロットプラントの設置運営に関する調査表

プラント名	製茶ライン (Tea Line)	
工 程	Steaming 蒸機 — 粗揉 粗揉機 — 揉捻 揉捻機 — 中揉 中揉機 — 精揉 精揉機 — 乾燥 乾燥機 — 荒茶	
機材供与	機材総額	7,300,000円
	予算年度	1979
	船積年月	March 1980
	引取年月	1980
	据付年月	March 1981
	利用状況	A
	管理状況	A
進捗状況	設 置	A
	マニュアル作成	済 (英文)
	運営指導	A
技術移転	運転技術	B
	管理技術	A
	活用方法	A
インドネシア側の対応	実験室・施設	B
	人員配置	Moedjijarto, P., Ir. Zein Nasution
	予算措置	
総合判定	① 実績が目標を大きく上回った。(予想以上の大きな効果があった) ◎ ② 実績が目標を多少上回った。(予想以上の効果があった) ③ 実績が目標とはほぼ同じであった。(予想どおりの効果があった) ④ 実績が目標より多少下回った。(予想以下の効果があった) ⑤ 実績が目標を大きく下回った。(予想以下に少ない効果があった)	
コメント	IPB counterparts request the modification of the Line so as to enable it to manufacture Indonesian Teh Hijau (green tea), which is semi-fermented oolong-type tea. For this purpose, a Parching Machine should be designed and added to the Line. Some facilities for overnight withering of tea leaves may also be needed.	

パイロットプラントの設置運営に関する調査表

プラント名	砂糖製造ライン (Sugar Line)	
工 程	粉砕機 — 搾汁機 — 分離槽 — ろ過機 — 炭酸飽和炭酸飽充槽 — 中和・ろ過機 — 濃縮機 — 真空結晶缶 — クリスタライザー — 分離機 — 乾燥 — ふるい分け振とう篩別機	
機材供与	機材総額 予算年度 船積年月 引取年月 据付年月 利用状況 管理状況	6.970.000円 1979 March 1980 1980 September 1981 B A
進捗状況	設 置 マニュアル作成 運営指導	済 (英文) 据付時、技術移転、試運転
技術移転	運転技術 管理技術 活用方法	B B B
インドネシア側の対応	実験室・施設 人員配置 予算措置	C Ir. Djumali, Ir. Syamsul Ma'arif, Ir. Z. Nasoetion
総合判定	① 実績が目標を大きく上回った。(予想以上の大きな効果があった) ② 実績が目標を多少上回った。(予想以上の効果があった) ③ 実績が目標とほぼ同じであった。(予想どおりの効果があった) ④ 実績が目標より多少下回った。(予想以下の効果があった) ㊟ ⑤ 実績が目標を大きく下回った。(予想以下に少ない効果があった)	
コメント	From a sugar technologist's point of view, the assembly of individual equipments of Sugar Line has some problems in regard with material balance and unit operations. Some modifications will be needed including some additional equipments for refining beyond crude sugar to refined sugar manufacture. Such modifications will be assessed through surveys on presently available facilities in Pasuruan or in Yogyakarta.	

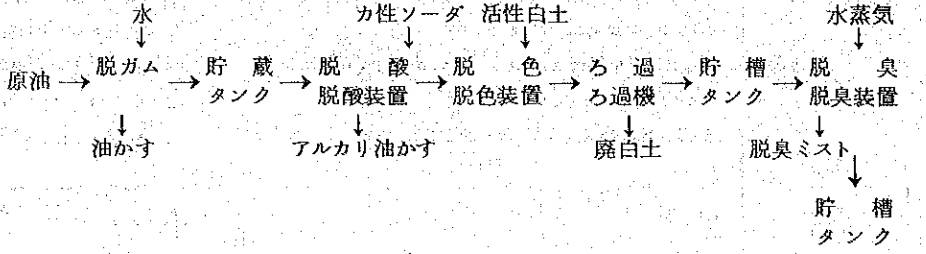
パイロットプラントの設置運営に関する調査表

プラント名	穀類調製加工ライン (Rice Processing Line)	
工 程	Yammar Husker --- Yammar Polisher (13-15 HP) (12-14 HP) Combination Kokoyo Husker - Polisher (13-15 HP) Kokuyo Thresher Satake Test huller 2×Yamamoto Rice Dryer (Flstbed type 3.3m ²)	Scale { 100 Kg 20 Kg Rice cooker Infrared Moisture Meter Whiteness meter Sample divider 2×Retmoisturemeter Kehmuistaremeter 2×Annemometer 4×Cra
機材供与	機材総額 予算年度 船積年月 引取年月 据付年月 利用状況 管理状況	April 1980 Occasional, depends on curriculum Good
進捗状況	設 置 マニュアル作成 運営指導	Finished None Good
技術移転	運転技術 管理技術 活用方法	B B B
インドネシア側の対応	実験室・施設 人員配置 予算措置	B A. Mudiastuti.P, Wakhuyuddin.C, 〇
	① 実績が目標を大きく上回った。(予想以上の大きな効果があった) ② 実績が目標を多少上回った。(予想以上の効果があった) ③ 実績が目標とほぼ同じであった。(予想どおりの効果があった) 〇 ④ 実績が目標より多少下回った。(予想以下の効果があった) ⑤ 実績が目標より大きく下回った。(予想以下に少ない効果があった)	
コメント	Sieves for polished rice and husked rice needed. Variuble speed motor should replace Diesel engines. One variable speed motor (15-20HP) okould make a powerstand to which polishers & huskers are placed.	

パイロットランプの設置運営に関する調査表

プラント名	食用油ライン (Oil Line)	
工 程	<p>A、圧搾工程、抽出工程 (Oil Press and Extraction Line)</p> <p>粉砕 → 粗砕 → 一段ローラー → 熟処理 (蒸熱缶 タッカー) → 圧搾 (圧搾機) → スクリュープレス → 残油 (16~18%) → 粉砕 (粉砕機) → 粉砕 (圧隔ローラー) → 抽出機</p> <p>精製工程へ ← 貯蔵タンク ← 乾燥 (真空乾燥機) ← 沈降分離 (遠心分離機) ← 過 (フィルタプレス) → 混合 → ミキサ → 蒸留 (減圧蒸留塔) → 蒸発 (蒸発塔) ← 過 (ミセラフィルタ) → 蒸発 (蒸発塔) → 脱溶剤機 → 熱交換 (熱交換かす冷却器) → 粉砕 (粉砕機) → 分級 (ふるい) → 油かす → 熱交換 (熱交換コンデンサ) → 水吸着 (アブソーバ) → 水分離機 (ヘキサノン水分離機) → 脱 (ヘキサノン貯槽)</p> <p>(溶剤ガス) (溶剤ガス) (抽利)</p>	
機材供与	機材総額 予算年度 給積年月 引取年月 据付年月 利用状況 管理状況	44,583円 1979 March 1980 1980 June 1981 精製工程A、圧搾工程B 精製工程A、圧搾工程B
進捗状況	設置 マニュアル作成 運営指導	完了 未 精製工程A、抽出工程D-6
技術移転	運転技術 管理技術 活用方法	精製工程A、抽出工程D-6、圧搾工程B # A # D-6 # B # A # D-6 # B
インドネシア側の対応	実験室・施設 人員配置 予算措置	B、抽出工程C Ir. S. Ketaren, Ir. J. Hariyantono
総合判定	① 実績が目標を大きく上回った。(予想以上の大きな効果があった) ② 実績が目標を多少上回った。(予想以上の効果があった) ③ 実績が目標とほぼ同じであった。(予想どおりの効果があった) ◎ ④ 実績が目標より多少下回った。(予想以下の効果があった) ⑤ 実績が目標を大きく下回った。(予想以下に少ない効果があった)	
コメント	Presently, two equipments of oil press line ; Oil Press and Expeller (mini-type), are out of order and repairment is pending. The performance of the expeller is very poor, and it is obvious that minimizing the size sacrificed the mechanical intensity. Improved design and re-procurement may be advisable.	

パイロットプラントの設置運営に関する調査表

プラント名	食用油ライン(続)	
工 程	<p>B. 油脂精製法 (Oil Refining Line)</p> 	
機材供与	機材総額 予算年度 船積年月 引取年月 据付年月 利用状況 管理状況	続(別刷)
進捗状況	設 置 マニュアル作成 運営指導	未
技術移転	運転技術 管理技術 活用方法	続(別刷)
インドネシア側の対応	実験室・施設 人員配置 予算措置	B Ir. S. Ketaren, Ir. J. Hariyantono
総合判定	① 実績が目標を大きく上回った。(予想以上の大きな効果があった) ② 実績が目標を多少上回った。(予想以上の効果があった) ◎ ③ 実績が目標とはほぼ同じであった。(予想どおりの効果があった) ④ 実績が目標より多少下回った。(予想以下の効果があった) ⑤ 実績が目標を大きく下回った。(予想以下に少ない効果があった)	
コメント	Oil extraction operations with n-hexane as solvent requires utmost precautions in order to avoid fire and explosion caused from mishandling. At the time of the Line installation, it was concluded AP4 technical man power did not meet the necessary level of expertise, and test operation was postponed until some convenient timing of JICA experts availability. The test run is therefore pending.	

パイロットプラントの設置運営に関する調査表

プラント名	貯蔵実験室 (Storage Facilities)	
工 程	Storage Room I & II (3.2m ²) Storage Room III (6.6m ²) 2×12 pts Temperature recorder (C-A) 2×Thermocontroller 3×Hand Assmann Hggrometer	1×Hair Hygrometer Thermostat bath 2×1 week temp recorder 2×0 yiuction for C-A X-Y Recorder
機材供与	機材供与 予算年度 船積年月 引取年月 据付年月 利用状況 管理状況	July 1981 A A
進捗状況	設 置 マニュアル作成 運営指導	A NONE (not needed) A
技術移転	運 転 技 術 管 理 技 術 活 用 方 法	no - problem
インドネシア側の対応	実験室・施設 人 員 配 置 予 算 措 置	A Dr. Kamaruddin. A, G. Kamendong
総合判定	① 実績が目標を大きく上回った。(予想以上の大きな効果があった) ② 実績が目標を多少上回った。(予想以上の効果があった) ◎ ③ 実績が目標とほぼ同じであった。(予想どおりの効果があった) ④ 実績が目標より多少下回った。(予想以下の効果があった) ⑤ 実績が目標を大きく下回った。(予想以下に少ない効果があった)	
コメ ン ト	Well utilized by DR Kamaruddin and his studeats. Mr. John kumendong seems to be of great help. New projects are proposed. S1, S2 courees are given directly making use of this lab.	

パイロットプラントの設置運営に関する調査表

プラント名	工 作 室 (Work Shop)		
	Lathe	Drill	Welder 3×Hand drills 1 hand grinder Hand saw
	Milling Machine	Grinder	2×Elect planer
	Pipe Threader	Pipe cutter	1-1/2 tcn chain block vices other tools
機材供与	機材供与 予算年度 船積年月 引取年月 据付年月 利用状況 管理状況	Just uistalled not begin yet good at presout	April 1982
進捗状況	設 置 マニュアル作成 運営指導	A Safety manuals (2 sheets) A	
技術移転	運 転 技 術 管 理 技 術 活 用 方 法	future problem	
インドネシア側 の 対 応	実 験 室 ・ 施 設 人 員 配 置 予 算 措 置	A Kusen should be the coordinator	
総 合 判 定	① 実績が目標を大きく上回った。(予想以上の大きな効果があった) ② 実績が目標を多少上回った。(予想以上の効果があった) ③ 実績が目標とほぼ同じであった。(予想どおりの効果があった) ◎ ④ 実績が目標より多少下回った。(予想以下の効果があった) ⑤ 実績が目標を大きく下回った。(予想以下に少ない効果があった)		
コ メ ン ト	For the modification of machines no that they better suit Indonesian materials & conditions. sheet metal machines are the first to be secured, such as a shear, bender, spot welder. A Drill bit sharpener (grinder) is also needed.		