

SPECIAL PROGRAMME FOR MAJOR FOOD CROPS PRODUCTION
RELATED TO SUPRA INSUS PROGRAMME
(F.G. 1987/88 / EX. ADB. AREAS)

MINISTRY OF AGRICULTURE
DIRECTORATE GENERAL OF FOOD CROPS AGRICULTURE
JAKARTA
1987

PROJECT DIGEST

1. Project Title : Special Programme For Major Food Crops Production Related to Supra Insus Programme.
2. Location : Four provinces ; West Java, Central Java, D.I. Yogyakarta, East Java, North Sumatera, West Nusa Tenggara and Jakarta.
3. Executing Agency : Directorate General of Food Crop Agriculture, Ministry of Agriculture.
4. Objectives :
 - a. Immediate
 - Rice seed and other production inputs sufficiently timely correct at farm level.
 - To find out the better Water Management for Rural Irrigation System through Water User Association (HIPPA)
 - To strengthen of farm machineries for land preparation, pest control, transplanting, harvesting and Post-Harvest activities at farmer group level.
 - To strengthen and improve the facilities for management and extension workers.
 - B. Long range
 - To assist the government to increase major food crops production through Supra Insus Programme.
 - Sustain and increase of rice production and rice farm income as well.
 - To contribute the success of self-sufficiency in food crop production.
5. Project Description : Supply of equipment machineries and existing facilities for :
 - a. Establishment of Garden Seed Farm and Seed Grower groups which will produce the high quality seed.
 - b. Establishment of Farmer group which will related to Supra Insus Programme.

- c. Strengthening of Water User Association (HIPPA) which will improved the better Water Management for Rural Irrigation System.
- d. Supply of extension and communication equipment to the Extension Workers which is need in transfer of their knowledge and message to the farmer groups.
- e. Supply of office equipments for management of Major Food Crops Production Programme.

6. Implementation Time : 1987/88

7. Project Cost	:	Total Cost	¥	700,000,000
		Grant Aid Cost	¥	600,000,000
		Local Cost	¥	100,000,000

8. Amount proposed for oomitment: ¥ 600,000,000

9. Related to project aid : ADB's Project, Major Food Crops Production Japanese Cooperation Programme.

10. State of Project Preparation : This project is supporting the proposal for Major Food Crops Production especially related to Supra Insus Programme in Indonesia that has been discussed with the government of Japan.

TERM OF REFERENCE

I. BACKGROUND AND SUPPORTING INFORMATION

1. Justification of the Project

The Government of Indonesia gives high priority to increasing food crops production generating rural employment and improving the standard of living of the rural population and than achieving food self-sufficiency. These objectives will be achieved through main activities intensification, extensification, diversification and rehabilitation programme.

To achieve self-sufficiency is specifically rice had been acted many activities is such General Intensification (INMUM) and Specific Intensification (INSUS). And than, in the production increasing effort which aims to maintain food self-sufficiency, it is need to increase the quality of intensification, especially on "INSUS" which is called as "Supra Insus Programme".

Supra Insus Programme is an urgent attempt to break through the possible technical bottle neck in sustaining and increasing more rice production under given economic feasibility assumption. One of integrated inputs of the production functions in intensified energy or farm power. Supra Insus in this regard is Characterized by simultaneous planting of rice seeding under limited short time, to efficiently manage irrigation water and Control possible rice pest/disease outbreak.

Consequently of Supra Insus Programme :

- (a). The need of large member of labors or meechanical power means in this immediate peak season. Meanwhile shortage of human labour and animal power have been recognized seriously.

(b). Harvesting season have also been carried out simultaneously.
Therefore harvesting operation should be performed quickly
and appropriately to minimize losses.

Responding to this consequences, farm machineries for land preparation,
pest control, transplanting, harvesting and post-harvest are important
input facilities in Supra Insus to be more intensified, so that
the end goals of Supra Insus Programme can be satisfied.

The first Supra Insus had planned by the Government of Indonesia
will be conducted in 1987, which are covered an area of about 60,000 ha
(10,000 ha in West Java, 10,000 ha in Central Java, 5,000 ha in
D.I. Jogjakarta and 35,000 ha in East Java).

Regarding to this plan, The Government of Indonesia will provide,
production inputs, Credit of capital and extension services through
farmer groups. While equipments and machineries will be provided
through the Japan Second Kennedy Round Grant 1987/88 to support this
plan.

2. Name and Location of The Project.

- 2.1. Name of Project : Special Programme For Major Food Crops Production Related
to Supra Insus Programme.
- 2.2. Project Location: First Area of Supra Insus Programme, West Java, Central
Java, D.I. Jogjakarta. East Java, North Sumatera,
West Nusatenggara and Jakarta.

3. Institutional Frame Work.

3.1. Executing Agency and Implementing.

--Executing Agency : Directorate General of Food Crops Agricultural, Ministry of Agricultural.

--Implementing Agency : Directorate General of Food Crops Agricultural and Ministry of Finance.

3.2. Supporting Agency : Provincial/District Food Crops Agricultural and Bank Rakyat Indonesia (BRI) as Channelling Credit System.

4. Government Follow-up.

a. Equipment Supply for Garden Seed Farm and Seed Grower Groups;

The Provinces/district are expected to be able produce healthy good seed in the frame work of seed production and distribution system, the seed will be used for extension purposes of the local.

b. Equipment Supply for Farmer Groups which will related to Supra Insus Programme;

The Equipment and Machineries will be allocated to the farmer groups of Supra Insus Programme. The government will lend to the Farmer Groups through credit system.

c. Equipment Supply for Water User Association (HIPPA) ;

The equipment and machineries will be allocated at the HIPPA. The government will lend to the HIPPA through credit system.

d. Equipment Supply for the Extension Worker;

The equipment and machineries will be placed at the provincial/District Foods Crops Agriculture Service offices. The government will provide guidance due to make for effective an it.

e. Office Equipments for Management of Major Food Crops Production;

Directorate General of Food Crops Agriculture^e has all responsibility for promotion of food crops production in coordinated with other

concerned department, so it is necessary to be equipped with enough office equipments for management of major food crops production programme.

II. OBJECTIVES OF THE PROJECT

1. Immediate Objectives.

- a. Rice seed and other production inputs sufficiently, good quality, timely correct at farm level.
- b. To find out the better water management for rural irrigation system through Water User Association (HUPA).
- c. To strengthen of farm machineries for land preparation, pest control, transplanting, harvesting, and post-harvest activities at farmer group level.
- d. To strengthen and improve the facilities for management and extension workers.

2. Long Range Objectives.

- a. To assist the government to increase major food crops production through Supra Insus Programme.
- b. Sustain and increase of rice production and rice farm income as well.
- c. To contribute the success of self-sufficiency in food crop production.

III. PLAN OF OPERATION

Operational plan of "Special Programme for Major Food Crops Production Related to Supra Insus Programme

No	ACTIVITIES	1987												1988											
		6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12					
1.	Project Preparation	XXXXXXXXXX																							
2.	Exchange of Notes	XXXXXXXXXX																							
3.	Preparation of Tender	XXXXXXXXXX																							
4.	Tender etc.													XXXXXXXXXX											
5.	Shipment of Equipment													XXXXXX											
6.	Equipment arrive													XXX											
7.	Instalment of Equipment													XXX											
8.	Trial run													XXXXXX											
9.	Rutin Operational activities													XXXXXX											

IV. EXTERNAL AND GOVERNMENT INPUT

1. External Input

The equipment and Machineries for the project are amounted
₱ 600,000,000,- (see annex).

2. Government Input

- a. Providing handling cost, taxes, salaries of local staff, duty travel cost of local administrative and communication cost borne by the project.
- b. Operational and Maintenance.

LIST OF EQUIPMENT AND MACHINARIES
OF
SPECIAL PROGRAMME FOR MAJOR FOOD CROPS PRODUCTION RELATED TO SUPRA INSUS PROGRAMME
(FOOD GRANT 1987/88)

No.	TYPE OF EQUIPMENT AND MACHINARIES	LOCATION (UNIT)			AMOUNT (UNIT)	UNIT PRICE (Rp)	ESTIMATED COST (Rp)
		WEST JAVA	CENTRAL JAVA	EAST JAVA			
1.	<u>EQUIPMENT SUPPLY FOR GARDEN</u>	1	1	1			
	<u>SEED FARM.</u>	1	1	1			
1.1.	Four Wheel Tractor	3	3	2	11	750,000	
1.2.	Power Tiller	3	3	2	11	300,000	
1.3.	Mist Blower	6	6	4	22	100,000	
1.4.	Paddy Reaper	6	6	4	22	335,000	
1.5.	Rice and Soybean Thresher	6	6	4	22	70,000	
1.6.	Transplanter	6	6	4	22	300,000	
1.7.	Drayer	6	6	4	22	150,000	
1.8.	Motor Seed Cleaner	6	6	4	22	100,000	
1.9.	Moisture Tester	6	6	4	22	40,000	
1.10.	Bag Sawing Clozer (manual)	6	6	4	22	30,000	
1.11.	Scale Bar	6	6	4	22	30,000	
1.12.	Peck up	6	6	4	22	1,000,000	
	TOTAL 1.					58,960,000	
2.	<u>EQUIPMENT FOR WATER USER ASSOCIATION (HIPPA)</u>	1	1	1			
2.1.	Water Pump (5 HP)	40	25	10	100	150,000	
2.2.	Water Pump (8 - 12 HP)	20	10	5	50	250,000	
	TOTAL 2.					27,500,000	

	1	2	3	4	5	6	7	8	9	10
3. <u>EQUIPMENT SUPPLY FOR FARMER</u>										
<u>GROUPS LEVEL.</u>										
3.1. Four Wheel Tractor	1	20	1	20	1	10	1	30	1	750,000
3.2. Power Tiller	1	250	1	200	1	50	1	200	1	300,000
3.3. Hand Sprayer	1	60	1	60	1	20	1	60	1	25,000
3.4. Trans Planter	1	60	1	60	1	20	1	60	1	300,000
3.5. Reaper	1	60	1	60	1	20	1	60	1	335,000
3.6. Thresher	1	60	1	60	1	20	1	60	1	70,000
										416,000,000
4. <u>EQUIPMENT FOR EXTENSION</u>										
4.1. Audio Visual Aid Unit	1	3	1	2	1	1	1	1	1	8,159,000
4.2. Wireless Radio	1	6	1	6	1	3	1	6	1	150,000
4.3. Motor Cycle	1	12	1	12	1	6	1	12	1	150,000
										91,340,000
5. <u>EQUIPMENT FOR MANAGEMENT OF MAJOR FOOD CROPS PRODUCTION PROGRAMME.</u>										
1. Micro Computer	1	-	1	-	1	-	1	-	1	1,000,000
2. Set of office Equipment	1	-	1	-	1	-	1	-	1	5,000,000
3. Jeep	1	-	1	-	1	-	1	-	1	200,000
										6,200,000
TOTAL GRANT (1 + 2 + 3 + 4 + 5)										600,000,000

UNITED NATIONS DEVELOPMENT PROGRAMME
Project of the Government of
INDONESIA

PROJECT DOCUMENT

Title : Development and Utilization of Post-Harvest Tools and Equipment

Number: INS/85/004/B/01/12

Duration: 29 months

Primary Function : Experimentation

Secondary Function: Direct Support

Sector : (Govt) Agriculture and Irrigation (UNDP) 04 Agriculture, Forestry and Fisheries

Sub-Sector: (Govt) Agriculture (UNDP) 0410 Agricultural Development Support Services

Government Implementing Agency: Directorate of Food Crops Production Development, Directorate General of Food Crops, Ministry of Agriculture

Executing Agency: Food and Agriculture Organization of the United Nations (FAO)

Estimated Starting Date: 1 August 1985

Government Inputs: Rp. 63 765 000
(in kind, local currency)

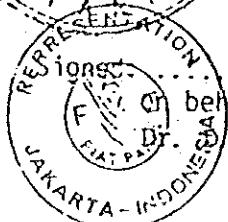
UNDP Inputs: US\$ 500 010
(US dollars)



Yanfu

Date: 22 Oct. 1985

on behalf of the Government
Dr. Sjarifudin Baharsjah
Secretary General Minagri



Bap Reddy

Date: 23 Oct. 1985

on behalf of the Executing Agency
Bap Reddy, FAO Representative

Gamil M. Hamdy

Signed: Gamil M. Hamdy, Resident Representative Date: 24 October 1985
on behalf of the United Nations Development Programme

PROJECT SUMMARY

APPROVAL OF UNDP ASSISTANCE TO A PROJECT OF THE GOVERNMENT OF INDONESIA

Development and Utilization of Post-Harvest Tools and Equipment (INS/85/004)

Date of present approval	: October 1985
Starting date of project activities	: 1 August 1985
Planned completion date	: 31 December 1987
To be executed by	: Food and Agriculture Organization of the United Nations (FAO)
Government implementing agency	: Directorate General of Food Crops (Ministry of Agriculture)
Estimated cost of assistance	: UNDP financed US\$ 500 010
Source of UNDP financing	: Indicative Planning Figure (IPF)

1. Background and Justification

In recent years Indonesia has made good progress in increasing rice production and developing appropriate post-harvest technology systems for this crop. High priority is now being given to palawija (secondary) crops, principally soybean, groundnuts, maize cassava and mung bean, with view to increasing production and reducing imports. This policy also benefits a very large number of small and marginal farmers in upland, rainfed areas who are largely dependent upon secondary crops for their livelihood. The development and utilization of appropriate post-harvest tools and equipment for secondary food crops is an essential component of development programmes aimed at strengthening the secondary crop sub-sector in the agricultural economy of Indonesia.

Appropriate post-harvest and product-handling equipment used by farmers can reduce quantitative post-harvest losses, which are estimated to be between 15-25 percent for maize, 10-23 percent for soybeans and 11 percent for groundnuts, as well as maintain nutritional quality. The reduction of post-harvest food losses complements efforts for increasing food production - the cost of preventing food losses is generally less than producing a similar additional amount of food of the same quality.

This project will focus mainly on secondary food crops post-harvest engineering technology at the farm level and will be conducted through the provincial agricultural mechanization workshops. The software programme will be planned and formulated at the national level by the Directorate General of Food Crops, Ministry of Agriculture, based on identified local priorities for appropriate post-harvest tools and equipment and considering standards established by the Directorate General of Small Scale Industry, Ministry of Industry, to facilitate future local fabrication and extension work.

II. Objectives and Expected Outputs

The principal objective of the Project is to strengthen programmes for the development and utilization of appropriate post-harvest technology thereby reducing quantitative and qualitative (nutritional) losses.

Outputs: 1 - A set of appropriate post-harvest technology systems, 2 - Prototypes of post-harvest tools and equipment that have been field tested and proven and are ready for commercial manufacture, 3 - Local artisans have a demonstrated capacity to produce prototypes, 4 - Appropriate multi-farm arrangements amongst small farmers for the successful utilization of post-harvest tools and equipment, 5 - Agricultural services and provincial workshops have a capacity to continue to develop, test and adapt post-harvest tools and equipment to meet local requirements and to promote their utilization amongst small farmers.

It is expected that the post-harvest systems developed through this Project will be relevant in other regions of the country as well.

III. Inputs

The UNDP Inputs to the project are :

1. Chief Technical Advisor - Agricultural Mechanization	29 m/m
2. Consultants in post-harvest technology	2 m/m
3. Bilingual secretary	29 m/m
4. National consultants in post-harvest technology	5 m/m
5. Sub-contracts for construction of experimental prototypes	
6. Fellowship, group and in-service training	
7. Equipment	
8. Production of reports	

IV. Financial data

<u>Item</u>	<u>US\$</u>
Personnel	302 010
Sub-contracts	12 000
Training	66 400
Equipment	95 600
Miscellaneous	22 000
<u>Total</u>	<u>500 010</u>

The estimated total value, expressed in US dollars, of the inputs provided directly by the Government to the project is \$132,000 in kind.

PART I

LEGAL CONTEXT

This Project Document shall be the instrument (therein referred to as a Plan of Operation) envisaged in Article I, paragraph 2, of the Agreement between the Government of Indonesia and the United Nations Development Programme concerning assistance under the Special Fund sector of the United Nations Development Programme, signed by the Parties on 7 October 1960 and endorsed in a letter from the Minister of Foreign Affairs dated 25 January 1967.

PART II

THE PROJECT

A. Development Objectives

The development of the palawija (secondary) crops sub-sector has high priority during PELITA-IV. An integral component of this programme is the development and utilization of appropriate post-harvest technology which, in turn, is expected to contribute towards:

- increased food availability through
 - a) a reduction of post-harvest losses (quantitative) and,
 - b) maintenance of nutritional value of products (qualitative)
- increased on-farm labour productivity and incomes especially in rainfed, upland areas (including transmigration areas) where secondary crops dominate agricultural production systems, and
- additional off-farm employment opportunities and incomes of artesans engaged in the manufacture and servicing of post-harvest tools and equipment.

B. Immediate Objectives

1. The purpose of post-harvest technology, in the context of this Project, is to reduce quantitative crop losses and to maintain the nutritional value of produce derived from these crops at the farm level.

2. The principal objective of the Project is to strengthen programmes for the development and utilization of appropriate post-harvest technology, with special reference to:

- the farm level,
- the more important secondary crops, namely, soybean, groundnuts, maize and cassava, and
- the Provinces of North Sumatera, South Sumatera and Lampung.

3. The immediate objectives of the Project are:

- a) To define a set of post-harvest technology systems that meet the criteria under points 1. and 2. above.
- b) To develop field-tested and proven prototypes of post-harvest tools and equipment that are ready for commercial manufacture.
- c) To develop a capacity amongst local artisans to produce prototypes.
- d) To promote appropriate multi-farm arrangements* amongst small farmers for the successful utilization of post-harvest tools and equipment.
- e) To strengthen the capacity of the agricultural services and provincial workshops to continue (i) to develop, test and adapt post-harvest tools and equipment that meet local requirements and (ii) to promote their utilization amongst small farmers.

4. It is expected that the post-harvest systems developed through this Project will be relevant in other regions of the country as well.

* e.g. farmer groups (kelompok tani), cooperatives, leasing arrangements, custom work, etc.

C. Special Considerations

The beneficiaries of the programme, to which this Project will contribute, are mainly small farmers and rural artesans and reflects the growing concern to improve the economic and social welfare to the poorer and more vulnerable sections of the population.

Rural women who are traditionally involved in the post-harvest processing and storage activities will directly benefit from this Project.

D. Background and Justification

Post-harvest food losses, in terms of both quantity and quality, occur between harvest and consumption and are caused by the intervention of nature, pest and diseases and man himself. The nature of these losses vary greatly and can be the result of adverse climatic factors (temperature, moisture content, etc), physical losses through spoilage and shattering, mechanical damage during the various stages of harvesting, drying, storage, processing, packaging and distribution. Losses are also caused by microorganisms (moulds), insects, birds, rodents and other vertebrates or frequently by a combination of two or several of these factors.

Food losses are a major concern, especially in developing countries, not only in terms of quantity but also of nutritional value and economic return. Biological deterioration is of special importance in tropical climates where the higher temperatures and moisture accelerate the development of microorganisms and also increases the rate of biological breakdown.

Investment in appropriate post-harvest technologies for the prevention of food losses not only increase availability of food and improves nutrition, but also offer incentives to farmers to increase their production and to market their food crops.

The need to give greater emphasis to the prevention of post-harvest losses was brought out at the World Food Conference, held in Rome in November 1974, and at the Seventh Special Session of the United Nations General Assembly in 1975. The UN General Assembly called for further reduction of post-harvest food losses in developing countries to be undertaken as a matter of priority with a view to reaching at least 50 percent reduction by 1985. FAO was requested to play a leading role in this effort. It is believed that a 50 percent reduction of post-harvest food losses in developing countries would greatly reduce or even eliminate the need of some countries to import large quantities of food. FAO's experiences to date in this field provides substantial evidence that such loss reductions are possible by applying resources in this direction.

Past efforts in the direct transfer between countries of post-harvest technologies, for harvesting, threshing, drying, storing, processing and protecting food crops, which are dissimilar in climate, economics, and

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technical and human resources, have often led to poor results, wasted efforts and frustration. There is, therefore, the need in Indonesia to evolve its own appropriate technologies through applied and adaptive research in its own environment. Indonesia has already started to do this but is handicapped by a shortage of trained and experienced personnel, equipment and applied research, development, training, extension and information collection and dissemination.

In recent years Indonesia has made good progress in increasing rice production and developing appropriate post-harvest technology systems for this crop. In PELITA-IV high priority is now being given to palawija (secondary) crops, principally soybean, groundnuts, maize, cassava and mung bean, with view to increasing production and reducing imports. This policy also benefits a very large number of small and marginal farmers in upland, rainfed areas who are largely dependent upon secondary crops for their livelihood. The development and utilization of appropriate post-harvest tools and equipment for secondary food crops is an important component of development programmes aimed at strengthening the secondary crop sub-sector in the agricultural economy of Indonesia.

The FAO Fertilizer Programme has been active in Indonesia since the late-1960's supporting increased production, initially, of rice and, more recently, of secondary crops. The present project, GCP/INS/057: Secondary Crop Intensification Programme (Phase II), is currently working in seven Provinces. While post-harvest technology is beyond the scope of the project, the need for improving such technology to deal with the resultant increased production has become apparent. More recently, FAO provided technical assistance to develop and introduce appropriate post-harvest technology for rice through project, TCP/INS/2201: Assistance to Prevent Quality Deterioration of Harvested Rice in Aceh Province. This project addressed a problem in post-harvest rice specific to Aceh Province. GCP/INS/057 and TCP/INS/2201 are implemented by the same Directorate as this Project, INS/85/004. A cooperative working relationship, as well as exchange of technical knowledge and experience, will be possible.

The various agricultural regions of the country have different prerequisites which define the need for post-harvest equipment for different crops. Such equipment will increase labour productivity, extend agricultural activities and improve the plight of rural women who are usually involved with post-harvest activities.

Appropriate post-harvest and product-handling equipment used by farmers can prevent quantitative post-harvest losses, which are estimated to be between 15-25 percent for maize, 10-23 percent for soybeans and 11 percent for groundnuts. The reduction of post-harvest food losses is a complementary means for increasing food production. This draws its importance not only from a moral obligation to avoid waste, but also because the cost of preventing food losses in general is less than producing a similar additional amount of food of the same quality.

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Further field studies, covering all aspects influencing the promotion of appropriate post-harvest equipment for soybeans, groundnuts, maize and cassava are required. Technical assistance will be needed in terms of expert and consultant services, training, fellowships and equipment.

This project will focus mainly on secondary food crops post-harvest engineering technology. At the provincial level it will be implemented through provincial workshops from the Directorate of Food Crops Development which are already established at Medan, North Sumatra, Palembang, South Sumatera, and Tegineneng, Lampung. The Sub-Directorate of Agricultural Mechanization will support the engineering designs at the national and provincial levels through the Agricultural Services (Dinas Pertanian) and courses conducted by the Sub-Directorate of Agricultural Mechanization. The software programme will be planned and formulated at the national level by the Directorate General of Food Crops, Ministry of Agriculture, based on identified, local priorities for appropriate post-harvest tools and equipment for the project area, considering standards established by the Directorate General of Small Scale Industry, Ministry of Industry, to facilitate future local fabrication and extension work.

Other Related Activities

a) The International Rice Research Institute project, with the Directorate of Food Crops Production Development, Ministry of Agriculture, is specifically concerned with technology associated with rice production. Some available, tested designs of tools and equipment could be considered for secondary crops through this Project, INS/85/004.

b) The Project will maintain close contact with RAS/81/046: Regional Post-Harvest Technology and Quality Control for Food Grains, which in Indonesia is being executed in association with BULOG. Activities are mainly concerned with regional net-working to promote an exchange of information and technology regarding rice between institutions. This Project, INS/85/004, will draw upon the results and experiences of the regional project for development and application of technology, as appropriate, at the field level.

c) RAS/84/024: Regional Network for Agricultural Machinery (RNAM), is also concerned with the testing, evaluation, design and development of agricultural tools and equipment. However, in Indonesia, project activities are confined to the central government level. RAS/84/024 will complement INS/85/004 to the extent that technology developed through the regional project will be tested, adapted and extended at the provincial, district and farm levels directly to the end users, namely, farmers and artesans. INS/85/004 project counterparts are members of RNAM/Indonesian National Committee for Mechanization which will ensure a direct link between the national and regional projects.

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- E. Outputs
1. Post-Harvest Systems Analysis
 - 1.1 A report, based on existing work and studies, reviewing and analysing post-harvest systems in respect of the four principal secondary crops in the selected project areas.
 - 1.2 A set of recommendations for the development of appropriate tools and equipment for reducing losses and maintaining quality.
 - 1.3 Training and extension manuals on post-harvest technology.
 2. Development of Prototypes
 - 2.1 Blue prints of tools and equipment, together with working prototypes.
 - 2.2 Tests and trials of prototypes in workshop and field, including the socio-economic aspects.
 - 2.3 Twelve Provincial and three Central staff trained in the design, modification and testing of prototypes.
 3. Production of Prototypes by Artesans
 - 3.1 40-60 artesans, per province, familiar with the production of prototypes.
 - 3.2 Prototypes produced locally by artesans.
 4. Utilization of Prototypes by Farmers
 - 4.1 Up to 100 groups of small farmers per province acquainted with the utilization of prototypes through field demonstrations.
 - 4.2 Suitable multi-farm arrangements amongst small farmers organized for the adoption and utilization of prototypes.
 - 4.3 A set of recommendations for multi-farm arrangements for expansion of the programme.
 - 4.4 20-30 field staff per province trained in demonstration techniques.
 5. Institution Strengthening
 - 5.1 Fifteen technicians of provincial workshops trained in the analysis of post-harvest loss systems and the management of programmes for the development and extension of appropriate post-harvest technology.

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d) The Project will maintain close contact with the Food Technology Development Centre and the Agricultural Engineering Department of the Bogor Agricultural Institute.

e) For engineering purposes, this Project shall maintain close contact with the Metal Industries Development Centre, Ministry of Industry, Bandung. The Ministry of Industry is responsible for the manufacture and development of equipment after prototypes have been designed, tested and demonstrated by the Ministry of Agriculture.

f) The proposed project, for the development of a National Centre for Agricultural Engineering (Japanese bilateral assistance), envisages the construction of a centre in Jakarta for the design, testing and modification of agricultural tools and equipment not only for food crops but, ultimately, also for fisheries, livestock, estate crops, etc. The project will involve the construction of a centre only and not a field programme to extend the technology to the farm level.

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- 5.2 Ten technicians exposed to programmes for the development and utilization of appropriate post-harvest systems, including tools and equipment, for soybean, groundnuts, maize and cassava.
- 5.3 The three designated provincial workshops equipped to continue the programme of development and utilization of post-harvest tools and equipment.
- 5.4 Recommendations for follow-up investment and expansion of programme activities.

F. Activities

No.	Starting Date and Duration	Description of Activity
1.1	Aug - Dec 85	Survey of present post-harvest practices for soybean, groundnut, maize and cassava.
1.2	Dec 85 - Feb 86	Identification of the weakest points and viable solutions.
1.3	Mar 86 - cont	Preparation of recommendations and field manuals
2.1	Aug 85 -cont	Select appropriate designs of post-harvest tools and equipment for soybeans, groundnuts, maize and cassava.
2.2	Aug 85 - Jan 86	Equip workshops with specialized equipment.
2.3	Aug 85 - cont	Manufacture and/or purchase appropriate post-harvest tools and equipment
2.4	Oct 85 -cont	Field test tools and equipment. Modify if necessary to suit local conditions, and re-test.
2.5	Mar 86 -cont	Monitor and evaluate the performance of prototypes with farmers in the project area, taking into consideration also the socio-economic aspects, and identify equipment suitable for production.
2.6	Aug 86 - cont	Production of blue-prints.
3.1	Feb 86 - cont	Supply initial prototypes to artesans

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- 3.2 Feb 86 - cont Identify tools and equipment required by artesans for the construction of prototypes and provide these where necessary.
 - 3.3 Sep 86 - Sep 87 Provide technical assistance and conduct two training courses of 20-30 artesans in each of the three provinces, in the construction of prototypes.
 - 3.4 Feb 86 -cont Promote local production of field tested, suitable prototypes for further evaluation by farmers and artesans.
 - 4.1 May 86 - cont Conduct field demonstrations of the most promising forms amongst farmers in the project area in close collaboration with extension services.
 - 4.2 Jan 86 -cont Organize and promote suitable forms of multi-farm use for post-harvest tools and equipment for small farmers.
 - 5.1 Aug 86 - Aug 87 Conduct two training courses for 15 technicians each at the national level, in the adaptation and development of post-harvest tools and equipment
 - 5.2 Jun 86 - Jun 87 Conduct two regional study tours for 3-4 technicians each.
 - 5.3 Aug 85 - cont Provision of equipment to designated workshops
 - 5.4 Jan 86 - end Feasibility study on follow-up investment and programme expansion
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6. Inputs

6.1 Government Inputs

1. Personnel

1.1 Project Director

The Director, Directorate of Food Crops Production Development, will be the Project Director. He will be responsible for the overall implementation of the Project and for liaising with other Government agencies and institutions, the Provincial Governments and related services and other aid agencies whose activities may relate to this Project.

At the Provincial level, the Chiefs of the Provincial Agricultural Services will function as Project Directors.

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1.2 Project Coordinator

The Chief, Sub-Directorate of Agricultural Engineering, will be the Project Coordinator. He will be the senior counterpart to the Chief Technical Advisor and responsible for the planning, management and implementation of all activities and inputs related to the Project from the Government side, namely, agricultural engineering systems analysis, the need for agricultural mechanization as it relates to on-farm land and labour productivity, and the analysis, design, prototyping and testing of agricultural tools and equipment.

1.3 Technical Counterpart Staff

The Head, Post-Harvest Section, Sub-Directorate of Agricultural Engineering, will be the functional day-to-day counterpart to the Chief Technical Advisor. Three technical staff of this Section will be directly associated with the Project as counterparts.

The Provincial Heads of the Agricultural Mechanization Sections and their staff will be directly associated with the Project as field-level counterparts.

1.4 Technicians and Support Personnel

Centre: Draftsmen (3)
 Workshop technicians, mechanics and assistants.

Provinces: Workshop managers, mechanics and assistants.

Typist (1), and drivers (4) for Project vehicles.

2. Travel

Travel and subsistence expenses of counterpart staff, and domestic travel costs of UNDP-financed Project personnel.

3. Sub-Contracts

Production of prototypes by artisans (buying-back).

4. Training

Travel and allowances for in-service training, seminars, workshops, etc of central and provincial agricultural engineering staff.

5. Equipment

Budget for operation and maintenance of the three workshops (which already have basic premises and equipment) and for designing, testing and multiplication of prototypes at the central and provincial workshops.

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6. Miscellaneous

Office space and facilities for the use of the Chief Technical Advisor and other Project staff, use of existing buildings, training facilities, workshops, design equipment, etc for carrying out the project activities in Jakarta and the field; petrol, oil and maintenance expenses and provision for repair and up-keep of project equipment, including vehicles; miscellaneous items including office supplies, facilities for photocopying, drawing, telephone, etc.

G.2 UNDP Inputs

10. Personnel

11. Expert Services

11.01 Chief Technical Advisor (29 m/m)

Agricultural Mechanization (Post-Harvest)
Duty station: Jakarta
Terms of Reference attached as Annex.

11.02 Consultants (2 m/m)

In specific fields of post-harvest technology as determined jointly by the Chief Technical Advisor and the Project Director; important subjects provisionally identified include post-harvest drying, and storage of food crops.

13. Support Personnel (29 m/m)

Bilingual secretary.

15. Official Travel

Daily subsistence allowances of UNDP-financed Project personnel.

17. National Consultants (5 m/m)

In specific fields of post-harvest technology as determined jointly by the Chief Technical Advisor and the Project Director; this provision is intended to enable the Project to obtain the services of national experts who are not directly associated with the Ministry of Agriculture, e.g., universities, research institutions, etc.

29. Subcontracts

Construction of experimental prototypes and/or parts for further field evaluation.

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30. Training

31. Fellowships

One fellowship in design of appropriate post-harvest technology (12 m/m) at a suitable institution in Thailand, Philippines, India or elsewhere (to be determined).

32. Group Training

Training of central and provincial-level managers and technicians in appropriate post-harvest technology systems, their design, testing, modification, production and on-farm utilization.

Two study tours, one each in 1986 and 1987, for 3-4 technicians each and for a duration of 3-4 weeks each, in Thailand, Philippines and India.

33. In-Service Training

Two in-service training courses, one each in 1986 and 1987, each for five managers/technicians from three provinces for five days each: Jakarta. Provision is made for the cost of training aids, materials, honoraria of non-Project resource persons.

Supplementary inputs for in-service training courses for artesans in each province including cost of travel and subsistence costs of participating artesans, and training aids and materials.

49. Equipment

One vehicle for Project Headquarters in Jakarta, and three pick-up vehicles, one for each workshop for transportation of prototypes tools and equipment.

Specialized testing and design equipment and tools and equipment for the central and provincial workshops (see list attached).

59. Miscellaneous

Operation of equipment, reporting costs, translations and other incidental expenses.

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H. Project Workplan

A detailed workplan for the implementation of the Project will be prepared jointly by the Chief Technical Advisor in consultation with the Project Coordinator and approved by the Project Director. This will be done at the beginning of the Project and updated periodically. The workplan agreed upon will be attached to the Project Document as Annex I, and will be considered as part of the Document.

I. Framework for Effective Participation of National and International Staff

The activities required to produce the anticipated outputs and to achieve the immediate objectives will be carried out jointly by the national and international staff assigned to the Project. The respective roles of the national and international staff will be determined by their leaders, by mutual discussion and consultation, at the beginning of the Project and set out in the Framework of Effective Participation of National and International Project Staff. The Framework, which will be attached to the Project Document as Annex II, will be reviewed periodically. The respective roles of the national and international staff shall be in accordance with the established concept and purpose of technical cooperation.

J. Development Support Communication

An important aspect of this project is promoting the utilization of appropriate post-harvest tools and equipment for on-farm use. The Project will collaborate with the Directorate of Extension and the Agency for Agricultural Education, Training and Extension in the demonstration of tested technology and the development and dissemination of extension materials (including prototypes). Material produced will be used by field workers and technicians of Agricultural Information Centres and Rural Extension Centres for the benefit of small farmers.

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K. Institutional Framework

The Directorate of Food Crops Production Development, Directorate General of Food Crops, Ministry of Agriculture, will be the Government Implementing Agency for this project.

The Sub-Directorate of Agricultural Engineering, within the Directorate of Food Crops Production Development, is responsible for:

- identifying the need for the agricultural mechanization that will raise on-farm land and labour productivity,
- formulating and implementing programmes for the development of improved agricultural engineering systems, and
- analysing, designing, prototyping and field testing agricultural tools and equipment.

The Sub-Directorate comprises three technical Sections for Energy and Soil and Water Engineering, Pre-Harvest Technology, and Post-Harvest Technology, and a fourth for Evaluation and Standardization of Agricultural Machinery.

The Project will be implemented directly by the Section for Post-Harvest Technology with the support of the Section for Evaluation and Standardization.

The Sub-Directorate of Agricultural Engineering operates a Central Agricultural Engineering Workshop, at Jakarta, which is used for the basic design, testing and construction of prototypes which, in turn, are sent to provincial workshops for field-level testing, modification, further production and dissemination.

Other central-level agencies and institutions will be associated with aspects of the Project. These agencies and their associations include:

- Directorate of Food Crops Economics and Processing: assessing the socio-economic impact of post-harvest losses and technology,
- Directorate of Food Crops Planning and Programming: monitoring and evaluating food crops development programmes including post-harvest technology,
- Directorate of Food Crops Extension: organization and management of the extension services, including the agricultural engineering aspects; demonstration of prototype tools and equipment at the farm level through the Rural Extension Centres; multi-farm use of tools and equipment,

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- Agricultural Engineering Departments of agricultural universities, particularly University of Sagar, Mada and Bogor Agricultural Institute,
- Directorate General of Small-Scale Industry, Ministry of Industry: technical support and advise on the engineering aspects of agricultural technology,
- Agency for Agricultural Education, Training and Extension: dissemination of agricultural information through the Agricultural Information Centres and Rural Extension Centres, and
- private sector: a key element of the Project is the production and servicing of farm tools and equipment by artesans.

At the provincial level, the Project will be implemented through the Agricultural Mechanization Section of the Provincial Agricultural Services. This section corresponds to the central level, Sub-Directorate of Agricultural Mechanization and is responsible for the provincial workshops and field programmes.

L. Prior Obligations and Prerequisites

Personnel, facilities and organizational arrangements are in position for the implementation of this Project.

M. Future UNDP Assistance

The need for future assistance will be determined on the basis of tripartite reviews of the Project.

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PART III

SCHEDULES OF MONITORING, EVALUATION AND REPORTS

A. Tripartite Monitoring and Technical Reviews

The Project will be subject to periodic review in accordance with the policies and procedures established by UNDP for monitoring project and programme implementation.

B. Evaluation

The Project will be subject to evaluation, in accordance with policies and procedures established by UNDP for the purpose. The organization, terms of reference and timing of the evaluation will be decided by consultation between the Government, UNDP and the Executing Agency.

C. Progress and Terminal Reports

The Chief Technical Advisor will prepare six-monthly progress reports in accordance with the established UNDP/FAO reporting procedures.

Towards the end of the Project, the Chief Technical Advisor will draft the Project Terminal Report, and the draft will be sent to FAO Headquarters three months before the end of the Project for review, finalization and submission to the Government at the conclusion of the Project. This report will assess in a concise manner the extent to which the Project's scheduled activities have been carried out, its outputs produced, its immediate objectives achieved and its results utilized towards the realization of the related development objectives; and it will present recommendations for any future work arising from the Project.

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PROJECT BUDGET COVERING GOVERNMENT CONTRIBUTION IN KIND
(in Thousand Rupiahs)

Country : Indonesia
 Project Number : INS/85/004/B/01/12
 Project Title : Development and Utilization of Post Harvest Tools and Equipment

No.	Budget Item	TOTAL		1985/86		1986/87		1987/88	
		m/m	Rp	m/m	Rp	m/m	Rp	m/m	Rp
10	<u>PROJECT PERSONNEL</u>								
	Counterpart Staff								
	11.01 Project Director	29	-	5	-	12	-	12	-
	11.02 Project Coordinator	29	-	5	-	12	-	12	-
	11.03 Technicians - Centre (4)	116	4 060	20	700	48	1 680	48	1 680
	11.04 Technicians - Provincial (3)	87	1 305	15	225	36	540	36	540
	Sub-Total	<u>261</u>	<u>5 365</u>	<u>45</u>	<u>925</u>	<u>108</u>	<u>2 220</u>	<u>108</u>	<u>2 220</u>
13	Support Personnel		5 800		1 000		2 400		2 400
15	Official Travel		11 600		3 600		4 000		4 000
19	Component Total		<u>22 765</u>		<u>5 525</u>		<u>8 620</u>		<u>8 620</u>
29	<u>SUB-CONTRACTS</u>		<u>6 000</u>		<u>1 000</u>		<u>2 500</u>		<u>2 500</u>
30	<u>TRAINING</u>								
33	In-service Training		5 000		-		2 500		2 500
49	<u>EQUIPMENT</u>		-		-		-		-
59	<u>MISCELLANEOUS</u>		30 000		5 000		12 500		12 500
99	<u>TOTAL GOVERNMENT CONTRIBUTION</u>		<u>63 765</u>		<u>11 525</u>		<u>26 120</u>		<u>26 120</u>

PROJECT BUDGET COVERING UNDP CONTRIBUTION
(in US Dollars)

Country : Indonesia
 Project Number : INS/85/004/B/01/12
 Project Title : Development and Utilization of Post-Harvest Tools and Equipment

No.	Budget Item	TOTAL		1985		1986		1987	
		m/m	US\$	m/m	US\$	m/m	US\$	m/m	US\$
10	<u>PROJECT PERSONNEL</u>								
11	Experts								
11.01	Chief Technical Advisor	29	238 460	5	39 100	12	98 160	12	101 200
11.02	Consultants	2	21 000	-	-	1	10 000	1	11 000
	Sub-Total	31	259 460	5	39 100	13	108 160	13	112 200
13	Support Personnel	29	13 850	5	2 390	12	5 730	12	5 730
15	Official Travel		21 500		1 500		11 000		19 000
17	National Consultants	5	7 200	-	-	3	4 200	2	3 000
19	Component Total		302 010		42 990		129 090		129 930
29	<u>SUB-CONTRACTS</u>		12 000		-		7 000		5 000
30	<u>TRAINING</u>								
31	Individual Fellowships		13 000		-		6 000		7 000
32	Group Training		30 400		-		15 200		15 200
32	In-service Training		25 000		-		14 500		10 500
39	Component Total		68 400		-		35 700		32 700
49	<u>EQUIPMENT</u>		95 600		30 000		45 000		20 600
59	<u>MISCELLANEOUS</u>		22 000		2 000		8 000		12 000
99	<u>TOTAL UNDP CONTRIBUTION</u>		500 010		74 990		224 790		200 230

TERMS OF REFERENCE

Agricultural Mechanization (Post-Harvest) (Chief Technical Advisor)

Duties and Responsibilities

In collaboration with staff of the Sub-Directorate of Agricultural Engineering, Directorate of Food Crops Production Development, Directorate General of Food Crops, Ministry of Agriculture, the Chief Technical Advisor will carry out the following duties:

1. Plan, coordinate and direct the activities of the Project as outlined in the Project Document.
2. Advise Government on policy matters relating to the promotion of appropriate post-harvest technology and the reduction of losses at the farm level with special reference to soybean, groundnuts, maize and cassava.
3. Advise and assist national counterparts and provincial counterparts and their workshop and field-level staff in technical matters, particularly with regard to definition of technology requirements, selection, development, testing and evaluation of prototypes, and production by artisans.
4. Advise and assist on appropriate multi-farm arrangements amongst small farmers for the effective implementation and utilization of post-harvest tools and equipment at the farm level.
5. Advise and assist national and provincial counterparts in planning and arranging training courses, including preparation of training materials, extension materials and manuals.
6. Liaise and exchange information with national institutions and international agencies to promote Project activities.
7. Prepare six-monthly Progress Reports and a Terminal Report in accordance with UNDP/FAO reporting procedures.

The Chief Technical Advisor should have a degree in Agricultural Engineering or Agriculture, a minimum of 10 years experience with extensive experience in developing countries in post-harvest tools and equipment.

Duration : 29 month

Duty Station: Jakarta, with frequent travel to North Sumatra, South Sumatra and Lampung Provinces

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LIST OF EQUIPMENT

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Development and Utilization of Post-Harvest Tools and Equipment

- 4 Vehicles (1 sedan & 3 pick-ups)
- 1 Electric type-writer
- 1 Office photocopier
- 1 Blue-print copier
- 1 MC-plotter, usable with Apple & IBM micro-computers
- 4 Drawing equipment sets
- 3 Digital moisture meters
- 3 Electronic grain counters
- 3 Grain-probe and digital thermometers
- 3 Thermohydrographs
- 3 Grain samplers & quality control kits
- 3 Grain airflow meters
- 3 Grain test sieve sets
- 3 Field and laboratory balances
- 3 Anemometers, wind speed & direction transmitters
- 1 Sunshine & radiation meter
- 1 Liquid prismatic compass
- 3 Digital tacometers
- 3 Micrometers & calipers
- 3 Vibration meters
- 3 Noise meters
- 3 Mechanic tool sets
- 3 Blacksmith tool sets
- 3 Carpenter tool sets

Various prototype post-harvest tools & equipment such as: thresher, cleaner, sheller, stripper, chipper, dryer;

Miscellaneous.

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(1) INSTITUTIONAL FRAMEWORK

The RNAM Project was approved according to the ESCAP Resolution No. 156 of 6 March 1975. It was based on the network concept involving interlinkages to facilitate sharing of technology and experiences among the eight participating countries. The basic elements of the network system consist of the Regional Office which coordinates regional sub-programme activities; the NIs which coordinate/implement national sub-programme activities through the National Network Systems; and the participating countries; international institutions and other ESCAP member countries which provide financial inputs through cash or kind contributions and technical assistance through experts.

During the fourth phase (1987-1991), the institutional framework of RNAM will continue to be network of participating countries in the region with a nucleus office already located at Los Baños, Philippines. The participating countries are already actively engaged in sharing production information. The fourth phase will capitalize on the gains of the first three phases and focus sharper on activities which will produce a greater but measurable impact on the countries' development including formulation of mechanization strategies, design and development, local manufacture and extension and popularization of selected machinery for food and feed crop seeding and planing, harvesting, threshing, drying and milling.

Governing Body. The Governing Body will continue to function on the existing basis during the fourth phase of activities of the project as was provided for in the project documents for the last three phases. It will meet once a year and conduct its business according to the rules of procedure already adopted. The Governing Body will provide policy decisions and will consider and decide on matters related to financial contributions,

external assistance, inter-country co-operation and complementary and reciprocal arrangements to be arrived at in the implementation of specific activities. The Governing Body will not engage itself in technical matters such as the preparation of the workprogramme and related matters, which will be dealt with by the Technical Advisory Committee (TAC). However, it will oversee the activities of the TAC, and the project as a whole.

Technical Advisory Committee. The Technical Advisory Committee will continue to be a committee of experts, such as professional engineers holding senior positions in the national institutes of the network, or experts directly connected with technical aspects of these institutes, and will be nominated by the Governments concerned. UNDP, ESCAP, FAO, UNIDO and IRRI will nominate their own technical representatives. The aforementioned representatives will participate in the TAC sessions at project expense. Other ESCAP member countries concerned may send representatives at their own expense. The Committee will meet once a year and will elect its own officers for each session. The duration of the TAC meeting shall not exceed seven days and its report shall be submitted to the Governing Body for consideration. The Committee will have the following functions:

(a) Review the annual workprogramme of the RO as prepared by the RO, modify the draft as necessary, and approve a final version for the actions to be taken by the RO in the ensuing year;

(b) Review the country workprogrammes prepared by the national directors;

(c) Review all the reports prepared by the RO. However, they should be circulated prior to the TAC meeting and the Project Manager should make reference only to such documents as are relevant to the agenda items;

(d) Make specific recommendations of critical actions which should be undertaken by the RO and/or the participating countries for the ensuing year in addition to the workprogramme, if necessary.

National Institutions. The national institutions already designated by the participating Governments will continue to be recognized as the National Institutes in the network. However, as explained under institutional framework above, the concept has been widened to establish national networks and the RNAM will have linkages at the policy and decision-making level in the Governments. The focal national institutes are listed in Annex I. The national institutions will also develop project activities on national concept involving selected manufacturers and farmers, the details of operation of the scheme may be determined to best suit the local conditions.

National Farm Mechanization Committees (NFMCs). Review of the structures and functions of the NFMCs in each participating country and evaluate their actions and performances. Based on this evaluation, a report for wide spread circulation in the region will be prepared clearly stating in detail the strengths and weaknesses of the NFMCs and recommendations for government action to effect improvement.

The NFMC in each participating country will continue to be an advisory body on strategy formulation and will give direction to the national network

for successfully executing the mechanization programme. The network will continue to consist of government agencies concerned, manufacturers, farmers, and institutions of research, education, training, extension and credit.

International Institutions. FAO and UNIDO will play a more active role in the project and collaborate in activities related to their fields of competence. Similarly, other UN specialized and international agencies such as UNIDO, IRRI, ICRISAT, IITA, etc., will play a more active role of participation, collaborating with the Network for the achievement of certain specific objectives and outputs. For example, the experiences of FAO in the field of national strategy formulation will be drawn upon to assist participating countries in their own efforts for the formulation of national mechanization strategies. UNIDO might assist in the feasibility studies and specific areas of manufacturing technology. IRRI could provide greater assistance in training, extension and provision of prototypes.

Provision for Government Follow-up. During the first three phases of activities of RNAM, there have been commitments by the participating Governments to provide greater resources in terms of manpower, land, building, machinery and operational funds for promotion of agricultural mechanization and manufacture of machinery. The RNAM Project has stimulated integrated activities at the national level and Governments appear to be interested in continuing or expanding their existing country programmes to be more comprehensive and in providing funds to support them and the regional network.

(2) RNAM (Regional Network for Agricultural machinery) activity

In the phase III (1985-1986) RNAM activity is composed of six sub program as follow :

1. Strengthening national network for agricultural machinery
2. Strengthening design capability
3. Testing and modification of prototype
4. Promotion of local manufacturer
5. Popularization of improved machinery
6. Information Dissemination

Progress of each subprogram will be explained as follow :

4.1. Strengthening national network

1. National Farm Mechanization Committee (NFMC)

NFMC was established in 1981 under the Ministry of Agriculture decree. This committee is comprised of the interdepartmental institutes such as the representative of ministry of Agriculture, Ministry of Finance, Ministry of Industry, Bank, KADIN (Industrial chamber), National Institute of Science, University, Farmer Assosiation and others institute or person involved in agricultural mechanization development.

The functions of the committee are :

- . to develop policy strategy on research, development and utilization of agricultural machinery.
- . to develop policy formulation on testing of agricultural machinery
- . to develop policy formulation on at farm level farm machinery management
- . to develop policy formulation on supply of agricultural machinery.

As agreed by the members, the committee will conduct a periodical meeting at least one in a year. The Committee has adopted a policy planning, and strategy for agricultural mechanization which is known by "Selective mechanization" as described in section II. This "selective mechanization" has been tested operationally at South Sulawesi, Bali and West Java.

Since 1982, the national program on agricultural mechanization sifted gradually from extension base to a more engineering development base and it seems progressing satisfactorily.

Engineering base activities are meant as development related to design and development of prototypes, testing, engineering training and system analysis.

In this year the Committee plans to have a meeting in November 1985, and will discuss the policy on marketing and at farm level utilization of farm machinery.

2. Indonesian Society of Agricultural Machinery Business (ALSINTANI)

The Indonesian Society of Agricultural machinery was established in 1976, and the member of society is now about 60 local manufacturers. Most of them are located in Java Island. In 1984 this society participated in the workshop of agricultural manufacturing technology held in Thailand.

3. Agricultural Engineering Society

Indonesian Society of Agricultural Engineering was established in 1967 in Ciawi Bogor. The first name of this society was Permeta (PERHIMPUNAN AHLI DAN PEMINAT MEKANISASI PERTANIAN) and then in 1981 was change to be Perhimpunan Mekanisasi Pertanian Indonesia without changed in its abbreviation. After the third convention in February 1985, the new name is PERTETA or Perhimpunan Teknik Pertanian.

The last convention held in February 1985 was attended by 220 members, and inaugurated by the Ministry of Agriculture. As he addressed at the opening session mechanization is badly needed to support the food self sufficiency program in Indonesia. The Engineering aspects of mechanization such as design, testing and modification of prototypes should be improved.

The member of the Association is about 600 people comprised of government officials, private sectors, professors, research workers, farmers, manufacturers and others who are interested in the field of Agricultural Engineering.

4. Study of Social Economic Aspect of Agricultural Machinery

Study of socio-economic aspect of Agricultural Mechanization have been conducted in Aceh and West Sumatera for thresher adoption.

The preliminary result indicated that thresher is economically feasible, and socially accepted by the farmer in both of these provinces.

The advantages of this technology are :

- (a). reduced losses at field level
- (b). reduced cost of post harvest (threshing)

The study of thresher diffusion by PAE (1984) indicated, even at the diffusion stage thresher technology reduce employment opportunity on post harvest activity, the employment opportunity and income of farm labour is still in a good position since they still have employment alternative. In that case the net return generate from the thresher adoption and "lumbo" (winnowing) is greater than negatif impact due to thresher adoption.

Study of Mechanization impact will be conducted on November 1985. This study is deal with the overall impact of agricultural mechanization development for food crops agricultural production. Eight provinces will be covered and the respondents for this study are farmer, farmer groups, rural workshop and village cooperative. This study is designed to analyse the consequences of farm machineries application on production, cost of production, employment and possibility for developing rural industry.

4.2. Strengthening Design Capability.

Design capability is one of the important factor to develop prototype. To meet those requirement program related to increase the design capability are created, such as:

- . improvement facility for design (workshop, equipment, drawing equipment).
- . training for staff (under RNAM, IRRI, JICA and National Program).
- . increase budget for design and modification of prototype

1. Improvement facility

In Jakarta formerly there were two workshop run by IRRI project and NI project respectively. Due to administration and the need of working efficiency, since June 1984 both workshop were merged under the management at NI. This workshop is equiped with machines which sufficient to produce or develop prototype such as tractor (power tiller), reaper, husker, thresher and other non-motorized machineries or simple machinery.

This workshop is also organize to train artisan and rural workshop to develop machinery of prototypes. At provincial level, there are 14 (fourteen) unit of workshops which have been established and renovated since 1982. These wrkshops will play as the regional centre for prototype development, and had fully been operated since 1987 in the areas of modification, testing, prototype multiplication and also conduct regional training.

Table 6 : 14 Provincial agricultural machinery workshop in Indonesia.

No.	Provinsi	Status *).
1.	Aceh	II
2.	Nort Sumatera	II
3.	West Sumatera	IV
4.	South Sumatera	II
5.	Lampung	III
6.	West Java	III
7.	Central Java	IV
8.	Yogyakarta	II
9.	East Java	IV
10.	B a l i	II
11.	West Kalimantan	I
12.	South Kalimantan	II
13.	West Nusa Tenggara	I
14.	South Sulawesi	III

Note : I. well equipped with basic shop mechaneries/tools.
 II. status I + testing instrument.
 III. Status II + design instrument.
 IV. III + standard training aid + facilities.

At present East Java workshop has been able to modify reaper (CAAM, IRRI design) and tested in the field, tractor (power tiller) and other simple post harvest tools and equipments.

2. Training for technical staff.

Since 1982, training for design and modification had done annually, attended by 20 participants from provincial level. Directorate of Extension of the Directorate General of Food Crops and Agency for Agricultural Education, extension and Training currently conduct training for subject matter specialist (PPS) and senior field extension worker (PPM) and field extension worker (FPL). General Technical for Agricultural mechanization staff at Regency level is also covered by their program.

a). Short course on Design and Modification (National Level).

The participants are the section head of the agricultural mechanization in the provincial level, the subject of training course and number of participants is presented in Table 7.

Table 7 : Subject matter training and number of participants.

No.	Year	Subject matter	Number of participants
1.	1982	Testing Procedure of Farm Machineries	20
2.	1983	Design and Modification of Farm Machineries	20
3.	1984	Design and Construction of Farm Machineries	19
4.	1985	Design and Contruction of Farm Machineries	20

The objective of training is to improve knowledge and skill of each participant in order to transfer their knowledge to other people. Courses are focused on the method of testing (based on RNAM test code for Farm Machineries), simple manufacturing, engineering economic and planning the future activity (discussion). After they finished the course, they bring back the material (blue print, prototype and patern of the design), and organized the provincial course on Agricultural Mechanization.

The duration of course is 5-7 days and number of participants are around 20 people. The overall number of participants attended various mechanization course reach at least 600 people in 1984/1985.

In 1985/1986, the course will be specially for rural industrialist or artisan in the purpose of popularization of post harvest machineries (husker, thresher, winnower etc.).

b). Training for rural workshop

Under special effort, the NI also conducts a training for local manufacturer, for instance special training for mini rice husker, which is now sucessfully adopted by local manufacture. Six manufacturers from West Sumatera and West Java are now able to manufacture low cost husker (\$ 180 - \$ 295).

4.3. Testing of Farm Machinery.

Farm Machinery Testing Committee was established in 1976. This committee is comprised of interdepartemental institutes such as MOA, MOI, MOT, University and LIPI (National Institute of Science).

The function of Committee is :

- (a) to prepare test code
- (b) to conduct verification test of Agricultural Machinery
- (c) to supervise the regional testing team at provincial level
- (d) to publish the test report of agricultural machinery

To implement these function, Field Testing team is established attached to the committee and grouped into pre harvest and post harvest machinery sub teams.

This team conduct, field testing of agriculture machinery (verification) test and the result will be evaluated discussed at Testing Board meeting, to result wether or not a machinery meets to the standart requirement.

Table B : Number of farm machinery tested in 1984/1985

No.	Item	Number of machinery tested
Pre harvest machines :		
a.	Power tiller (6-9 hp)	5
b.	Mini tractor (12-15 hp)	-
c.	Wheel tractor (20 hp)	2
d.	Centrifugal pump	-
e.	Axial pump	1
f.	Sprayer	43
sub total		51
Post harvest :		
a.	Reaper	1
b.	Thresher	4
c.	Rice milling	3
d.	Husker	2
e.	Polisher	5
Sub total		15
Total		66 unit

Table 9 : Number of improved farm machinery tested in 1984/1985

No.	Machine improved	Number
1.	Power tiller (5 hp)	2
2.	Transplanter	1
3.	Weeder	1
4.	Axial pump	1
5.	Thresher	3
	- pedal	1
	- TH-6	1
	- pedal thresher equipped with blower	1
6.	Fertilizer applicator	1
7.	Lime Spreader	1
8.	Husker	1
9.	Winnower	1
10.	Dryer	1
Total		16

4.4. Promotion of Local Manufacture

As stated on the project document, there are two outputs targeted, common and specific output :

(a). Report of survey on demand, production and sale of agricultural machinery. By that time, the survey on demand is not specially conducted by NI, this survey will be completed at the end of April 1986, the first step of this survey is conducted through the "mechanization mapping". Draft of the first part already finished in September 1985, and it will be published in early of November 1985.

Production and sale of agricultural machinery have not been conducted, since there is no budget to do it. It is expected that this survey can be conducted at the early of 1986, by sending the questioner to the manufacturer.

(b). Material for regional catalogue of commercial machines.

This activity conducted by sending the request to the manufacturer. But only a few of them send the technical leaflet or specification of each machine produced.

Specific output.

(a). Batch level production of 6" axial flow pump.

There are 3-4 manufacturers produce axial pump at different size (4-10") and has been tested by the Testing Commission Price of each unit is about \$ 1.500.

(b). Bath level production of power tiller (8-10 hp).

There are 13 manufactures producing 6-9 hp power tiller. The price of power tiller in the market is between \$ 2000 - \$ 2.500 or equivalent to 4-6 buffalo (kerbau). The production capacity (licency) is 19.570 unit.

Exchange of Prototypes

As the request of Republic of Korea, NI's has sent a set of blue print (technical drawing), test report and spesification of the modified husker.

This modified husker is one of the recent example of post harvest machinery design, developed by the NI's in the early of 1985. The modification is stimulated by the fact where prior white rice recovery resulted by the operation of Engelberg Rice Machine. It was indicated that combination of husker has engelberg will increased milling recovery at about 5% (from 61 % to 66 %).

4.5. Popularization of improved implement and machinery

Some activities related to popularization of improved implement and machinery have been conducted by the National Institute. Those activities are : (a) demonstration (b) Field Day (c) TV program and others media for transfer of technology.

a). Field Demonstration :

As the extension tools, field demonstration is regularly conducted at the provincial level. This activity is organized by office of agricultural extension service at provincial level. This year (1985), machineries to be demonstrated are focused on post harvest machineries such as reaper (East Java), thresher, dryer, winnower and husker. This field demonstrations are widely conducted through out the country with respect to the post harvest campaign in order to reduced losses at farm level.

b). Field Day :

One field day had been organized in April 1985, in West Java, the field day was specially to promote the new design/improved machinery which was developed in Central Workshop (NI's workshop).

The field day was attended by at least 150 farmers, rural workshop operators and key farmers. One of the rural workshopman who attended the field day, has presently manufactured rice husker (5 units).

c). Slide presentation

Using the audio - visual equipment provided by RNAM, slide presentation have been prepare to present Agricultural Mechanization and RNAM programme in Indonesia. One example was : under post harvest campaign more than 16 agricultural journalist visited workshop and were entertained with sufficient information through slide presentation. NI's has not been able to prepare video presentation since no budget to purchase this facility.

d). Training for extension specialist

Thirty peoples of PPS (Agricultural Extension Specialis) were trained for agricultural mechanization at National level in 1985. Within the last two years there were already 56 PPS had been trained in the area of agricultural mechanization.

The objectives of this special training mainly :

- (a). to improve knowledge of agricultural mechanization
- (b). to improve the knowledge to identify the need of agricultural mechanization at farm level.
- (c). to improve the analytical capability for developing mechanization program.

Other level of extension workers such as PPM (senior rural extension) and PFL (rural extension worker) are also trained along with PPS training program. The training courses are organized by Agency of Agricultural Education, Training and Extension in collaboration with the NI (Sub Directorate of Agricultural Mechanization).

NI supplies the curricula and instructors for the training held by the agency. Two regional centres for agricultural mechanization training are already established in South Sulawesi (Batang Kaluku) and West Java (Cihea), managed by AAETE.

Table 10 : Type of course, number of participants and background of participants (conducted at National level at Cihea Centre by AAETE).

No.	Year	Course	Duration	Number of participants	Background of participants
1.	1983	Agricultural mechanization Course	1 month	26	Agricultural Extension specialist (PPS)
2.	1984	Agricultural Mechanization Course	1 month	29	- ditto -
3.	1983	Agricultural Mechanization	4 month	35	Ag. Extension Worker (PPM) Kabupaten level
4.	1984	Agricultural Mechanization	4 month	36	- ditto -
5.	1984	Construction of Agricultural Machinery	1 month	30	PPM, Kabupaten level Technical Staff

Other extension center related to mechanization program.

Extension program is one of the important tool for technology transfer from Research to the farmer. In order to transfer the result of research agency and new technology which are recommended by technical institution (Directorate of Food Crops, Directorate of Plant Protection etc), there are some institutions at rural level. These institute are :

Senior Field Extension Worker (PPM) is stationed at BPP or Rural Extension Centre. The extension area of BPP is called WKBPP or Area of Rural Extension Centre covered at least 10 WKPP or village extension area, in which 1 Field Extension Worker is stationed here. A village extension area (WKPP) is an area of 600 - 1000 Ha of rice field, which is normally equal to one to two villages in Java Island. Number of extension intitutes in rural area and the extension workers can be seen in Table 11.

Table 11 : Number of extension centres and extension workers in Indonesia (1984)

No	Item	Number
1.	Institution :	
	- WKBPP (unit)	1,492
	- WKPP (unit)	17,630
2.	Personal :	
	- Subject matter specialist (PFS)	550
	- Senior Field Extension Worker (PPM)	2,959
	- Field Extension Worker (PPL)	14,786

Activity under the BPP programmes are :

- Field Trial
- Demonstration Plot
- Training for PFL and Farmer

For the special purpose such as post harvest campaign, they conduct a training for village staff and farmer in order to have better understanding in posr harvest handling at farm level mainly for the utilization of post harvest equipment.

1984年(昭和59年)8月の第8回日・イ年次協議においてインドネシア側より「適正農業機械技術開発センタープロジェクト(技術協力と無償資金協力の組合せ)」の要請がなされた。この要請を受けわが国は、

1) 農業協力コンタクト調査団

- ① 日程 昭和59年10月22日～11月4日
- ② 団員 ⑦鍋木 功 ④渋市 徹 ②遠藤幸男 ⑤戸田政則 ⑧川路賢一郎

2) 適正農業機械技術開発センタープロジェクト長期調査団

- ① 日程 昭和60年5月15日～6月30日
- ② 団員 ⑦有吉 亮(元肥料機械課) ④伊沢敏彦(農業機械化研究所) ②富永勝広(IICA)

3) 適正農業機械技術開発センタープロジェクト事前調査団

- ① 日程 昭和60年6月17日～6月30日
- ② 団員

担当分野	氏 名	
団長・総括	品 田 正 道	農業機械化研究所理事
協力政策	沢 木 英 二	外務省経済協力局無償資金協力課事務官
協力企画	芦 沢 和 郎	農林水産省経済局国際協力課海外協力官
無償資金協力	丹 羽 憲 昭	国際協力事業団無償資金協力計画調査部基本設計調査第一課
業務調整	川 路 賢一郎	国際協力事業団農林水産計画調査部農林水産技術課

を派遣し、調査検討の結果、本件をプロジェクト方式技術協力として実施することはインドネシア側にとって非常に有意義であることが認められた。

4) 適正農業機械技術開発センター基本設計調査団

- ① 日程 昭和60年8月12日～9月1日
 - ② 団員
- | | | |
|-------|---------|-----------------------------|
| 団長/総括 | 石 川 秀 勇 | 農業機械化研究所企画調査部 |
| 計画管理 | 丹 羽 憲 昭 | 国際協力事業団無償資金協力計画調査部基本設計調査第一課 |
| 建築計画 | 八 矢 英 世 | 株式会社創造社 |
| 建築設計 | 柿 沢 英 司 | 株式会社創造社 |
| 設備設計 | 福 原 肇 | 株式会社創造社 |
| 資 機 材 | 保 田 博 | 株式会社創造社 |

① 日程 昭和60年11月20日～11月27日

② 団員

(ドラフト説明)

団長／総括 品田正道 農業機械化研究所理事

計画管理 生井年緒 国際協力事業団無償資金協力計画調査部基本設計調査
第一課

建築計画 八矢英世 株式会社創造社

資機材 保田博 株式会社創造社

5) 適正農業機械技術開発センター計画実施協議調査団

① 日程 昭和62年1月28日～2月11日

② 団員

担 当	氏 名	所 属
団 長	芦 沢 利 彰	生物系特定産業技術研究推進機構理事
設計・開発・改良	入 江 道 男	農林水産省農業研究センター作業技術部主 任研究官
農業機械化の技術分析	宇 井 勝 昭	農林水産省農産園芸局肥料機械課課長補佐
検査・評価	鈴 木 光 雄	生物系特定産業技術研究推進機構企画部主 任研究員
業務調整	鈴 木 晃	国際協力事業団農業開発協力部農業技術協 力課課長代理

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