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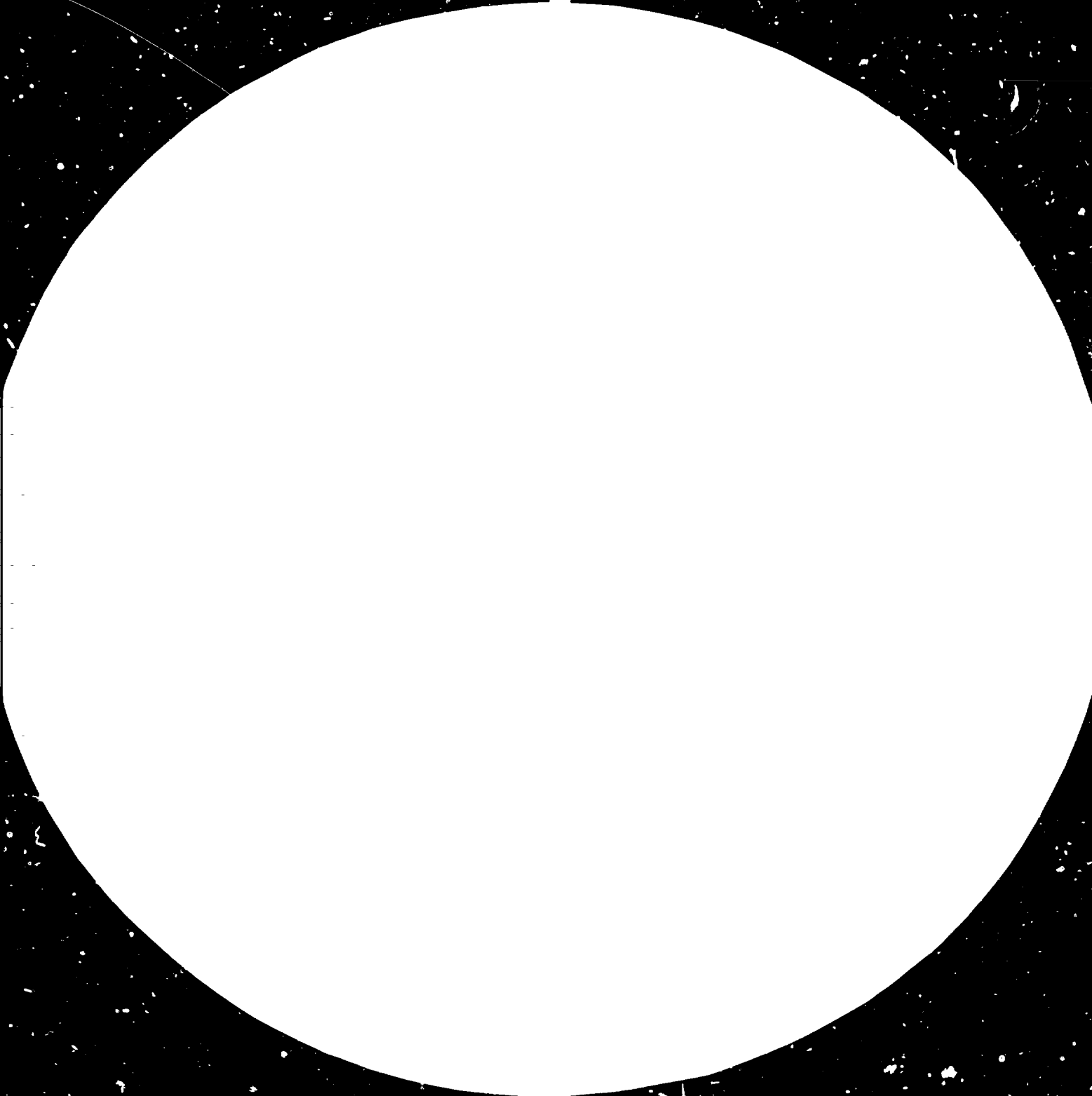

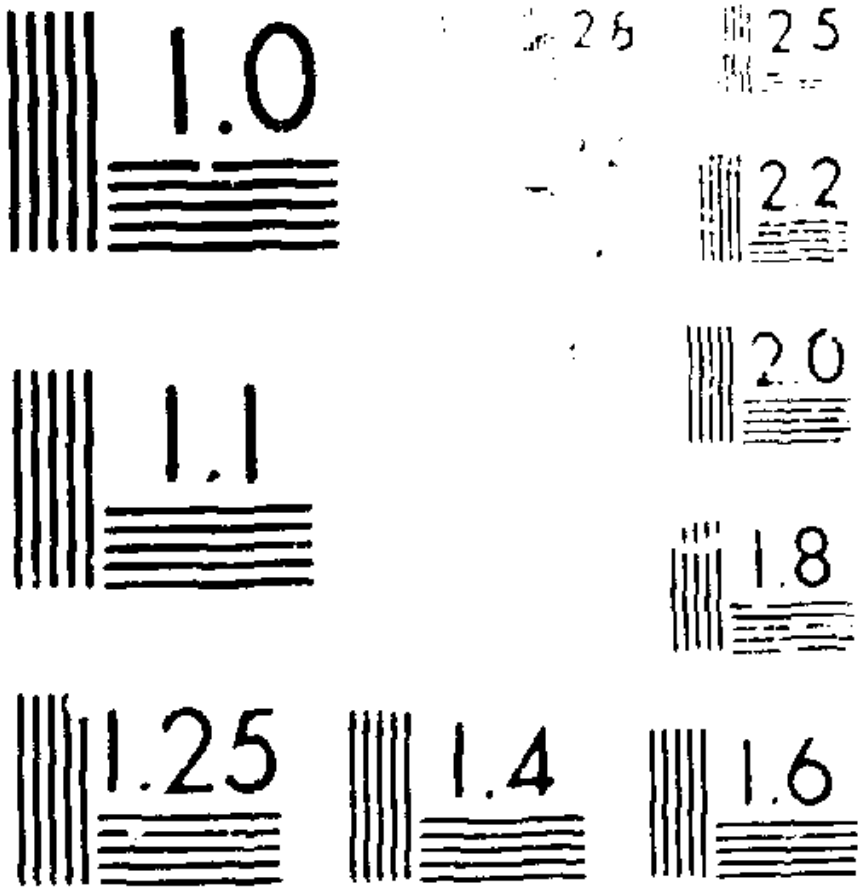
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Meeting on Exchange of Experiences and
Co-operation among Developing Countries in the
Development of Agricultural Machinery Industry

Beijing, China, 20 - 27 October 1980

COUNTRY SUMMARY - THAILAND *

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1. More Yield per Hectare

In order to increase farm productivity concept of technology know-how is most important to be considered, not only the use of high-yield variety, adequate moisture, soil fertility but also improve farming practices in terms of well-spacing and timing operation are major factors contributing to good crop yield. In Thailand, however, reports show the evidence of lack of farming power and labor, 0.20 - 0.45 kilowatt per hectare, which result in the waste (non-cultivated) land, late cultivation, and, improper soil preparation, planting and harvesting.

Thailand covers an area of 514,000 square kilometers of which approximately 43 percent is under agriculture. It has a typical monsoon climate with distinct wet and dry seasons, the annual rainfall varying from 1,000 - 1,500 millimeters in the drier areas of the Northeast

to in excess of 2,000 millimeters in the South. Six major crops namely rice, maize, cassava kenaf, rubber and sugar-cane account for 88 percent of the combined crop land. However, of these crops, rice is by far the most dominant being approximately 60 percent of total crop land.

2. Farm Mechanization

Three major interesting features of farm mechanization are as follows :

1. The majority of farm machinery used in the field are locally manufactured.

2. Limited types of machines are used, of which are those mainly for soil preparation.

3. Existing machine are limited in better crops areas.

3. Estimated Need for the Next Five Years

The following list reveals the equipment which are currently used either in actual farm areas or on experimental basis.

Category I: Implements

Hand tools: spades
hoes
sickles

Animal drawn equipment:

ploughs
harrows
weeders
carts

Hand operate simple machinery:

rice transplanter
seeder

Category II: Intermediate machinery

ploughs
harrows
weeders
sprayers

Category III: Power machinery

pumps
power tillers

Category IV: Specialized equipment

tractors
rice threshers
soy bean threshers
diesel engines
rice transplanters
rice harvesters

Number of Agricultural Machinery in Use : 1980

	YEAR				
	1975/76	1976/77	1977/78	1978/79	1979/80
Equipment					
Power tillers	90,001	113,286	151,504	192,004	230,591
Small 4-wheel tractors	14,575	16,427	23,942	26,984	31,158
65-80 Hp tractors	13,338	17,569	22,826	28,987	33,285
Puddling machines	9,882	9,000	8,700	8,200	8,000
Sprayers	1,310,464	1,379,436	1,452,038	1,528,461	1,604,884
Engines	56,891	68,219	81,923	89,775	107,730
Pumps	251,288	277,084	317,328	359,308	473,975
Winnowers	42,342	47,423	53,114	59,488	66,806
Corn shellers	5,721	6,407	7,175	8,036	9,000
Rice threshers	3,955	4,430	4,962	5,557	6,224
Animal feed mill	374	419	469	525	588
Windmill	1,937	2,169	2,429	2,721	3,047
Cane harvester	-	-	-	-	-
Small rice mill	24,658	24,914*	25,170*	25,426*	25,682

Note: The types and numbers of machinery being used are limited since there are difference in climatic and geographical conditions, varieties of crops and ways of farming.

4. Manufacture and Imports

As for the current manufacturing status of the above detailed four categories are as follows :

Category I: Certain type of implements need to be improved in design and quality. Presently, research work are being done on redesigning of animal plough to reduce the draft force, several hand and animal drawn weeder for wet soft and dry soils, and, field trial on manual rice transplanters.

Local production of spades, hoes, and sickles can meet the future demand with no constrain as far as raw materials are concerned.

Category II: The basic implements for medium size tractors such as disc plough and disc harrow are fabricated locally using imported high quality steel discs. Local production of knapsack sprayers has been increased sharply with small number for importing.

Category III and IV: In 1979, the importation of 281,668 pumps accounts for more than 50 percent of the total number being used throughout the country. Up to 1976, there were at least 60 companies manufacturing power tillers and other related products. These firms were either small with working area of 80 square meters and 10-20 workers or large one with 1,500-2,000 square meters and upto 120 workers. Approximately six of the latter were reported to have manufactured a total of 10,000 power tillers. Most of the firms are located in the vicinity of Bangkok and in the farming areas. These firms posses operating equipment namely lathes, electric drills, power saws, metal guillotines, electric welders and air compressors. In addition, the

larger manufacturers also have hydraulic press, steel rollers and sprocket wheel cutter. Basic facilities as foundry, forging, heat treatment render services to farm machinery manufacturers. As for the staff, all firms provide in-house apprenticeship, new employees being trained by the elders who have experience and skill.

Beside power tillers, number of firms put out small 4-wheel tractors, capacity of 13-18 Hp range, as well as rice thresher which had been successfully introduced to manufacturers as local producers and farmers as users.

There are two major problems facing local manufacturers : 1) assistance in terms of technology-machine design and engineering process, 2) enhancing the out-of-growing-season marketing, which sale index tends to fall, by ways of either export of machines normal produced or suggestion of additional products.

5. Design and Development, Adaptation, Testing and Evaluation

In order to recommend the machines suitable for operation in specific local conditions and to suit the local manufacturing techniques, R & D is being carried out to support the recommendation technically and economically.

Research projects are directed to establish first hand information regarding development of farm mechanization in Thailand and carry out experimental work on machinery use both in the fields and in the workshop.

The project guidelines are as follows :

1. Survey on agricultural aspects
2. Research on small tools and animal drawn implement
3. Research on farm machinery and equipment for production
4. Research on crop processing and storage equipment
5. Tests for the economic and technical suitability of certain farm machinery and equipment for various regions of Thailand.

To cope up with the demand and workload, more engineers are urgently need in this national institute, The Agricultural Engineering Division (AED) of the Department of Agriculture.

8. Engineering and Manufacturing Technology

The Ministry of Industry through the Department of Industrial Promotion (DIP) established the Industrial Service Institute. ISI has headquartered in Bangkok and Chieng Mai.

The main objectives are :

- To provide entrepreneurs with various types of assistance for the establishment, maintenance and progress of industries
- To render technical training in small scale industries
- To increase industrial productivity by rendering extension, training and advisory services to owners, managers and factory workers
- To promote the establishment of industries in rural areas

Assistance is needed to strengthening ISI to give services specially to agricultural machinery manufacturers.

7. Repair, Maintenance, and Spare Parts Supply

There are hundreds of repair shops through out the country whose capability cover the repairing of not only basic farm machines but also sophisticate parts of engine.

Spare parts are either imported or locally made, here again technical assistance is a must to improve the quality of locally-made parts. At present, there is one small joint-venture diesel engine factory which currently operates in the country and marks a significant progressive steps towards the development of local production of farm machinery.

8. Policy, Planning, Strategy and Co-ordination

National Committee on Agricultural Machinery. This is the high level policy making body comprised of senior representatives from the Ministries/Departments of Agriculture, Industry, Bank of Agriculture and Agricultural Co-Operatives, besides the representatives of the Asian Institute of Technology, manufacturers and the Universities. The Committee chaired by the Under-Secretary of Agriculture and Cooperatives. A sub-committee of seven persons was also established and acted as a working group. The objectives of establishing the Committee are to advise the Government of important policy matters such as, promotion of appropriate farm mechanization, development and manufacture of agricultural machines, credits etc. It will also co-ordinate the activities within the country and decide on inter-country co-operation in the field of agricultural machines and farm mechanization.

9. International Cooperation

TCDC concepts can be well applied in case of manufacturing and utilization of agricultural machinery by way of import and export of appropriate

equipment includes power tillers, 4-wheel tractors, water pumps, rice threshers, corn shellers and grain winnowers. Beside the equipment, information and experience should be exchanged between countries.

10. Roles of UNIDO and Recommendations

Important role for UNIDO are .

10.1 assist ISI in providing technical assistance to manufacturers under two specific areas: 1) improve quality of products, and, 2) economic aspect of manufacturing process

10.2 Arrange conferences and workshops to exchange information and review the progress of industry

10.3 Persuate the industrialized countries to set-up joint-venture of manufacturing agricultural machinery in Thailand.

1. Agricultural machinery and implements needs and demand.

	1981	1982	1983	1984	1985	Basic Estimate 1980
Category I						
hand tool	13.5 million	13.5 million	13.5 million	13.5 million	3.5 million	4.5 million families of farmer x 3 = 13.5
Animal drawn equipment - wagon	95,000	92,500	85,700	81,400	77,300	100,000 (5% declining)
Category II						
Plough	3.8 million	3.5 million	3.3 million	3.1 million	2.9 million	6-8% decreasing due to the increase of tractors and power tiller
Harrows	3.8 million	3.5 million	3.3 million	3.1 million	2.9 million	
Sprayers	74,800	82,280	70,500	99,500	100,950	68,000 x 10% increase with 50% using machine and 50% of manual application
Category III						
Power Tiller	235,000	273,000	314,000	358,000	404,000	200,000 (35,000-40,000 units increase of power tiller per annum)
Simple and low cast tractors	21,000	26,500	32,500	39,000	46,000	
Pumps	410,000	450,000	490,000	540,000	590,000	370,000 (40,000 units increase p.a including gasoline (30,000) and diesel (10,000))
Category IV						
Medium and large tractors	37,500	40,000	42,500	45,000	47,500	35,000 (H.P. more than 20)
Combine harvestors	30	55	100	155	20	

2. Estimated Demand and Present Usage

Thailand is a developing country whose principle source of income is agriculture. As far as labor saving machinery in agriculture is concerned, there should have been a much wider use than that mentioned in Section I. The following factors may account for its limited use :-

1) The government has limited financial means for the development of agriculture.
2) 90 % of the farmers lack basic technical knowledge.
3) The farmers' low purchasing power.
4) The country's farming is still largely dependent on nature. The country has several big dams but farmers have not benefited from them because of inadequate irrigation canals.
5) Frequent political changes.

It may be concluded that there is a considerable room for improvement in the country's agricultural production, especially since cattle and buffaloes are still the major source for farm production.

All these factors have been the causes of slow development in agricultur However, there has been good co-operation between the government and the private sector in an attempt to develop both the farmers and the use of labour saving machinery in agriculture. Farmers have been taught how to use mechanical power instead of animal power, soil conservation, the use of the right kinds of seeds, etc.

Power tiller, pumps, and tractors have been in use widely in the central region of Thailand and there are good prospects for them to be used also in the northern, north-eastern and southern regions in the near future.

The rapid increase in the use of labour saving farm machinery is therefore proof of the success in the initial stage for Thailand.

As for combine harvestors, they are still in an experimental stage. However, it may be expected that, with increases in farm products, it will not be long before we see more combine harvestors on the farms.

3. Manufacture and Imports

3.1 In Category I & II

Most of these are fairly simple farm machinery produced in Thailand by a great number of small and medium scale factories. These factories have received advice and technical assistance to achieve certain standards from government officials, engineers and also international assistants. There has not been much problem in getting the farmers to use these simple machines.

3.2 In Category III

There are many factories in Thailand producing power tillers assisted by qualified mechanical engineers who have helped to develop and improve the efficiency of these machines. As for prime movers, there are at present two manufacturers, The Siam Kubota Diesel Company Limited and Yanmar Thailand, producing these using, in the initial stage, locally produced components up to 20 % , the remaining 80 % of the components have to be imported from abroad. The proportion of the locally produced components will increase by 20 % each year until all the components are completely produced in the country. However, considering the limiting factors as previously mentioned, it may be regarded that power tillers with diesel engines have reached maximum use at the present time. But if further development is seriously undertaken there will certainly a wider scope for the use of such machines.

There are also factories in the country producing small tractors. With exception of hydrolic pumps and steering wheels which have to be imported, all the components are made locally including diesel engines as previously mentioned, the development of which has been the result of the Thai government support and co-operation of foreign investors especially Japanese companies who have formed joint venture with the Thais to produce the engines in the country.

Water pumps for agriculture are now made locally, mostly of sizes 2" - 6" in diameter.

3.3 In Category IV

As for medium and large tractors and combine harvestors, these still have to be imported from abroad since we are not ready to manufacture them locally but in the future they will certainly have to be developed locally.

3.4 Basic facilities and ancillary industries.

a) Foundry, forging, heat treatment gearshops etc.
There are quite a few number of small, medium and large factories as such in Thailand. However, they are still in the developing stage and are capable of handling only minor and simple tasks.

b) Financing problem is still envisaged by the manufacturers as the major obstacles in expanding their activities and developing their plants' facilities. At present, the government is playing its role in supporting these plants to increase their capitals.

c) The reasons which inhibit the development of the factories are as follows.

c.1 Lack of support from the government.

c.2 Lack of financing support from the financial institutions.

c.3 Lack of technical know-hows.

c.4 Developed nations are still lacking in sincerity when giving aids....giving priorities to their self-interest instead of considering the benefit of the country concerned.

d) The government has to pay more attention to eliminate the above problems which prevent the progress of the factories.

4. Design and development, adaptation, testing and valuation.

As mentioned above that Thailand is a developing country and most of the people's income derive from the agricultural products. Consequently, there is a rather small industrial growth rate which have only been developed for the last ten years. As a matter of fact, the factories have generally been developed to improve their production facilities to supply local needs and they are not in the position to launch highly technical products which will not be accepted by the uneducated mass. Despite the fact that there are several advanced technical and engineering institutions in Thailand, such as the National Research Institution, the Asian Institute of Technology, Factory Department of the Ministry of Industry and several sciences and technological departments of the Universities produced top grade engineers, It is still necessary to equip these people with technical know-hows and try to support the progress of the industrialized factories by every possible means and improve conditions which was mentioned in No. 3C. These will gear our factories and products towards a brighter goal than the present.

5. Engineering and manufacturing technology.

a) Technical Institutions in Thailand mentioned earlier are ready to develop but still lack sufficient support from the government. In addition, those with technical know-hows are not provided with ample opportunities to express their abilities.

b) In the meantime, the various sorts of agricultural machinery which introduced by the engineers and the aforesaid institutions are still limited to the category 3

c) Ideally the investors and the government should try to support these institutions and the technician they produce as much as possible by providing them with the right jobs and by cooperating with the private sector in order to maximise existing resources.

6. Repair, maintenance and spare parts supply.

The production and maintenance of spare parts which are locally made can be developed by improving the technical men and up-grading the local-made spare parts to meet the acceptable criteria. This will lengthen the life span of the machine.

With respect to the categories which are imported, there are no serious problem of maintenance as the importers usually take good care and render satisfactory services in order to capture the largest market share. Unfortunately, the people are mostly fond of using the non-genuine spare parts instead of genuine parts due to ignorance and poverty because non-genuine spare parts are much cheaper. Thus it is the public relation job to ensure that farmers are well informed of the basic facts.

7. Policy, planning, strategy and Co-ordination.

The Agriculture Ministry, the Industry Ministry, the Education Ministry and the Prime Minister's Office have set policies and plans to provide knowledge to farmers by several means such as sending officers to train them in the line of machinery promotion, producing qualified engineers and technicians and promoting the manufacturers to produce the standard equipments. At the same time, many of big firms and factories i.e. Charoen-Phokaphand Group Co. and the Siam Kubota Diesel Co., Ltd. Despatch their own staffs to train and try to stimulate farmers to use the labour-saving agricultural machines. It's also very pleasing to see that several financial institutions are now beginning to take active parts in agricultural-development.

8. Inter-regional cooperation.

a) Our country is now able to assist the neighbouring countries including Malaysia, Laos and Cambodia etc. by exporting agricultural equipment such as four-wheelers, water pumps and tractors at cheaper prices than they are able to produce locally and by giving knowledge of mass production as these countries are less developed than Thailand in this particular aspect.

b) The countries that can assist our country are Japan, U.S.A. and Western European countries by promoting the technical know-how , local investment and financial aids.

9. Role of UNIDO

a) UNIDO should place particular emphasis on giving aids to agricultural development in the Northeast, the South and the North of Thailand by providing basic agricultural training and providing the much needed agricultural equipments to farmers in these regions

b) UNIDO should play a more active and important role in helping develop essential agriculture machinery and equipment to suit the Thai farmers. Also should give a hand to many other industries related to agriculture sector in a more realistic sense.

c) Technical information of UNIDO and Thailand should be improved and should reach the agricultural manufacturers and institutes directly and should not be practiced as in the past that are merely meeting for exchanging of opinions and just published briefly in the press which do not reach the concerned parties directly.

10. Specific proposals and recommendations

Parts of Thailand that still need to be developed are the North, the Northeast and the South since the soil is not fertile and most of farmers still lack agricultural knowledge and equipments. As the result productivities in these areas are very low. If UNIDO really intends to help the farmers, aids should be given immediately, by coordinating with the government and the private sector in providing technical know-how , financial aids and standard equipments rather than just being content with meetings and plannings.