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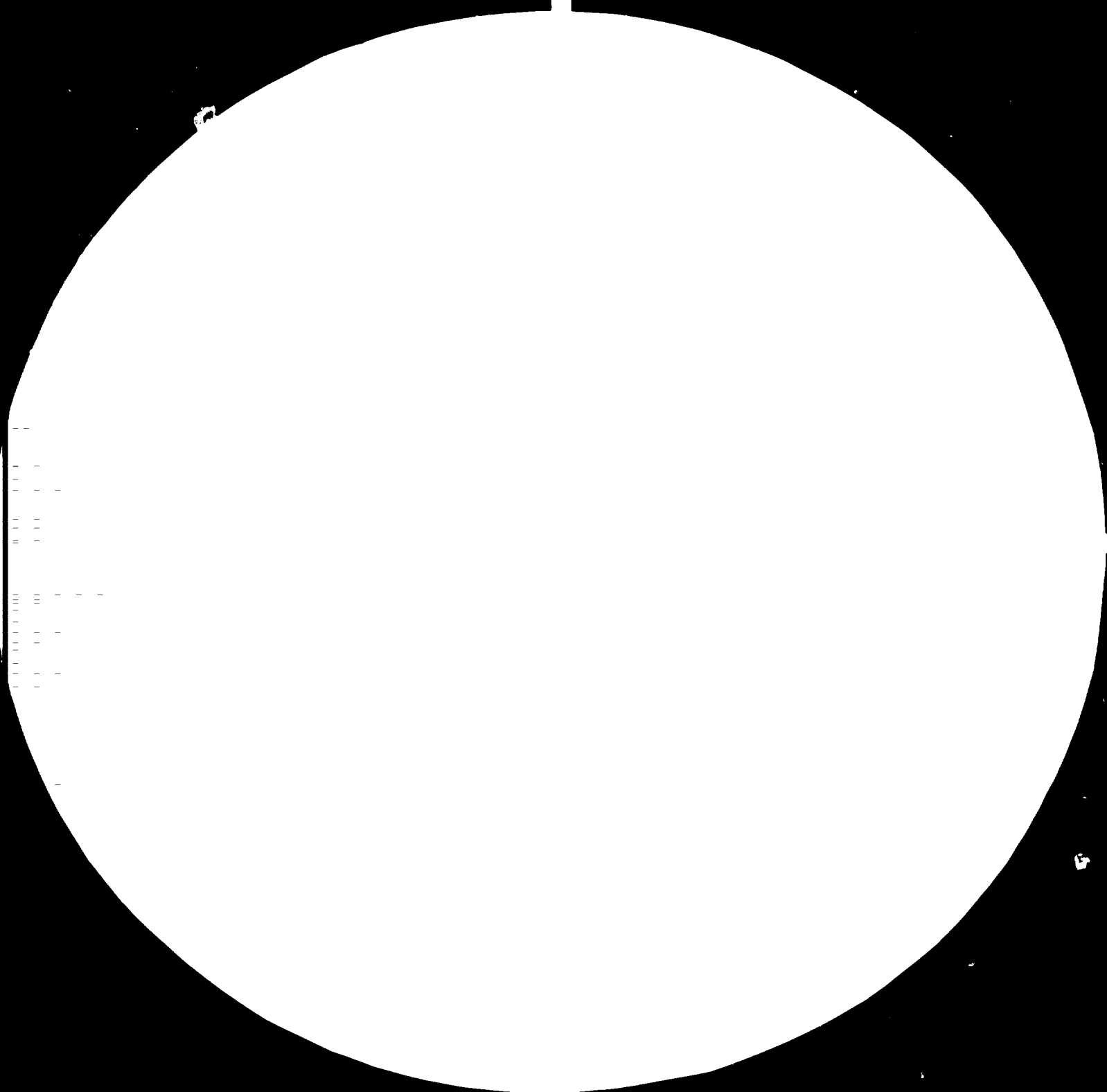
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Consultation Meeting

on the Agricultural Machinery Industry

Regional assessment of issues on agricultural machinery industry in
some countries of North Africa (Libya, Algeria, Morocco, Tunisia,
Egypt and Sudan)

March-April 1979

Report prepared for the Division of Policy Co-ordination,
Negotiations Section

by

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This report has not been cleared with the United Nations Industrial Develop-
ment Organization which does not therefore necessarily share the views presented.

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27 April, 1979

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

As a direct result of the Lima declaration, the developing countries must raise their share in industrial production and reduce their dependence on imports.

Agricultural machinery industry is seen as part of the general process of industrialization referred to above. Bearing in mind the results of the Consultations so far made by UNIDO in readiness for a Consultation Meeting on the Agricultural Machinery Industry, to assess the reactions of the principal countries in a region regarding the issues summarized in the Discussion Document dated 6 November 1978, UNIDO has carried out this mission to visit selected countries and assess their reaction and given precision to additional elements coming from within the region for inclusion in the Discussion Document.

I visited the North African region (Libya, Algiers, Morocco, Tunisia, Egypt) and Sudan. The report contains detailed statements of the Government officials and other individuals concerned with agricultural machinery use and manufacture interviewed in all the countries visited.

The report discusses the present status of agricultural machinery manufacture and the future plans and government strategies. Recommendations for assistance and help are outlined for all the countries due to the similarity of conditions and problems.

Appendix I contains tables showing estimates of agricultural machinery in year 2000 which was taken from a report by IDCAS and the Arab Fund for Economic and Social Development entitled "Preliminary Study on the Agricultural Machinery and Equipment Industry in the Arab Region" August 1978.

Appendix II contains a list of all individuals interviewed.

AGRICULTURAL MACHINERY INDUSTRY

SUMMARY

Countries visited were, Libya, Algiers, Morocco, Tunisia, Egypt and Sudan. Visits started on 9 March 1979 and concluded on 22 April 1979.

I. Policy Aspects

This part concerns national policies related to the Agricultural Machinery Industry.

All countries visited have realized the importance of mechanization in Agricultural production and have formulated policies leading to the establishment of local manufacture of their needs rather than depend on imports.

Algiers has several plants for tractors, combines, engines and implements manufacture with a reasonable degree of integration.

Morocco and Tunisia are manufacturing cat. I and cat. II and assembling tractors. Libya and Egypt have contracted with Massey Ferguson for manufacture and assembly of tractors. Sudan has contracted also with MF for manufacture and assembly of tractors, combines and implements.

II. Technical aspects

Each country has its own special type of agriculture, soils, crops and mechanization practices. So, the degree of importance of each group of machinery (I to IV) for each country differs from the others.

Generally speaking, in Algiers, Morocco and Tunisia, cat I, cat II and cat III are important to their agriculture. In Libya they concentrate on cat II and III.

In Egypt cat I will be phased out by 1985 and by 1990 hard labour in agriculture will be replaced by mechanical power. So, cat. II and III are important.

In Sudan cat II, III and IV are important due to the bigger size of holdings.

III. Institutional aspects

A. Policy and technical coordination

None of the countries visited has a proper institution for technical co-ordination. This is the case for all countries, the others, including

Sudan it is completely absent, and assistance should start by these two countries.

B. Research and Development

All countries visited have realized the importance of Research and Development institutions and have taken steps towards initiating some activity in this direction.

In Libya and Sudan the activity is very limited and assistance is required to establish and equip such facility. Sudan, Morocco and Tunisia have cooperation programmes with CNEEMA and CEEMAT of France. In Algiers and Egypt there is a need to reinforce the existing centres.

C. Repair and maintenance

All countries visited realize the importance of availability of good repair and maintenance facilities in areas where machinery is used. All countries have good programmes and have established good facilities. The contribution of distributors and dealers is very limited in this field and laws and regulations governing their activity are badly needed. There is need to initiate regional programmes for training of the good personnel in organization of maintenance activity and good technicians in aspect of repair and maintenance.

D. Popularization and Extension

All countries visited have well established agricultural extension services which caters in part for extension in agricultural machinery activity.

There is need for establishing and equipping specialized sections for machinery extension.

E. Training

Training at all levels is the back bone of good machinery manufacture, research and development, operation and repair and maintenance. All countries visited realize this fact and have established different level centres.

Egypt is more advanced than other and has extra training capacity that could be utilized by other African and Arab countries. They are cooperating now but in a limited way and would expand the programme if international agencies or Governments would supply the costs. All countries suggested

two top priority training programmes where assistance is greatly needed. These mostly concentrated on supply of equipment for centres and instructor training.

F. Finance

Egypt and Sudan are in bad need of international and regional assistance in securing finance for machinery imports and for the proposed plants.

G. Standardization

Of all countries visited, only Egypt has a standardization institute and is the only one making use of the Arab Organization for standardization and Metrology (ASMO) with headquarters in Cairo. It is an Arab League organization and all these countries are members in it.

I suggest that international help to those countries be channelled through ASMO. The organization itself needs some assistance (equipment and training).

H. Small Scale Industries (SSI)

All countries visited have programmes of varying degrees for encouragement of SSI. Special banks provide loans and technical institutes provide economic and technical studies.

I. Financing of Machinery Purchase by Farmers

In all countries visited, there is the policy to encourage the farmer to obtain and use machinery. All countries have a system of easy credit facility or subsidy so the farmer can be encouraged to buy machinery.

In Libya and Tunisia, the Government subsidises sale of machinery to small farmers and co-operative by up to 20-30% of the price in case of tractors and up to 50% in case of sprayers and other machinery.

Morocco and Algiers have easier credit facilities with nominal interest rate. In Egypt and Sudan the farmer pays 25 to 50% of the price at the time of purchase and the balance is paid over 5 years at an interest rate of 5-6% per year.

In all cases such help should be rendered to the farmers specially the small ones encourage them to obtain and use machinery.

A.1 LIBYA

A.1 I. Policy Aspects

All trade in Libya has been nationalized and is channeled through Government organizations and that includes tractors and machinery. In the present 5 year plan (1976-1980), Agriculture has top priority. The present policy of the Secretariat of Agricultural Reclamation and Land Development (S.A.R. and L.D.) is to increase production through modern technology of which mechanization has top priority. The Government subsidizes tractor purchases by farmers up to 60% of price. The Libyan Agriculture is coming close to being completely mechanized.

No Industry exists in the country, but a joint venture company (The Libyan Tractor Company) has been formed to assemble and later part manufacture three Massey Ferguson Tractor's models. The Libyan Government holds 2/3 and MF 1/3 with total project cost of \$30 Millions. The agreement includes manufacture of implements in the near future. Factory is under construction now and is expected to start production in 1980/81. At present all tractors and implements are imported through the General Establishment for Machinery and Agricultural Requirements which also acts as agent for all foreign suppliers.

A.1 II. Technical Aspects

The Libyan technicians agree to the classification of machinery and implements into 4 categories although it does not apply in their case. There is very little use for hand tools and animal drawn equipment. The future is for more mechanization and use of tractors, balers and combine harvesters.

Category I

All imported and no plans for local manufacture.

Category II

The greater part is imported. There is a small factory making disc ploughs and trailers and has no testing or technical facility. In the future (about 1985) manufacture of these implements will be included in the production programme of the Libyan Tractor Company under license from MF.

Category III

At present all is imported. They are trying to standardize on two H.P. range tractors 45-48 H.P. and 70-81 H.P. The Libyan Tractor Company will produce 30% MF 240 (47H.P.), 50% MF 275 (70H.P.) and 20% MF 290 (79 H.P.). It will produce 3 to 5,000 tractors per year with one shift and could satisfy all needs by working two shifts per day in the near future. Combine harvesters and balers will continue to be imported and have no plans for manufacture.

- a) Import of tractors and implements will continue until the Libyan Tractor Company production satisfies the needs. There are no restrictions on imports and no customs on tractors and implements.
- b) Assembling is on its way and will start in 1980/81.
- c) Partial manufacture of up to 30% will start in 1984/85.
- d) Total local manufacture is not foreseen.

In connection with the establishment of the Libyan Tractor Company, the project study and analysis and negotiations were carried by a Joint Committee of representatives from the University of Tripoli, Ministry of Agriculture and the General State Organization for Industrialization. However, they would have appreciated assistance from UNIDO or any international organization at that stage. They welcome very much the idea of an international model for negotiations and contracting.

They anticipate difficulties in getting the necessary engineers and technicians for the tractor factory. MF is helping through a good training programme. They feel any help along this line is welcomed. Feeding industries were established by the Government and more are being built or planned. They include a big Foundry and Forge (1981), battery factory, type factory, electric wires and cables factory, an integrated steel plant (not completed).

Category IV

No imports of this equipment and not expected in the near future and so is local manufacture.

A.1 III. Institutional Aspects

A. Government Policy in Technology Transfer

This falls within the scope of the Secretariat of Agriculture and the General State Organization for Industrialization. The Industrial Research Centre (with UNIDO help) is concerned primarily with techno-economic studies and with soils and mineral research. International assistance is needed in setting up an efficient mechanism.

B. Research and Development

At present no institution in Libya is engaged in research, design, development or adaptation or testing in the field of agricultural machinery. However, some institutes exist which could be developed to carry these functions.

These include:

1. The Agricultural Research Centre. It does not include an agricultural engineering centre, but limited tillage trials are going on.
2. Agricultural Engineering Sections in the University of Tripoli and the University of Benghazi. Both need equipment, workshops and staff to be able to carry any work in Research and Development.
3. Garabli Training Centre for operators. Some trial testing of machinery is done upon request from the Secretariat of Agricultural Reclamation and Land Development.

The country needs a complete and well equipped centre for Research and Development. Small tractors and power tillers could be popular with small farmers and in use in orchards.

C. Repair and Maintenance

All tractors, combines and implements and spare parts are imported by the General Establishment for Machinery and Agricultural Requirements. The establishment is also responsible for distribution and repair and maintenance. There are about 30 workshops, 28 machinery sheds and 59 mobile workshops covering the whole agricultural sector.

There are no Government restrictions on imports of equipment and spares. There is a custom duty of 30% on spare parts. No cooperation exists with neighbouring countries and is not likely to happen in the near future although they see its benefits.

D. Popularization and Extension

An extension section exists within the Secretariat of Agricultural Reclamation and Land Reform, but does not include farm machinery extension as a separate division.

They think the activity in the agricultural machinery field should cover popularization and use of machinery through field days, demonstration farms, literature, news papers, radio and television etc. Training is no part of their extension section.

They think cooperation between developing countries in this field could be best served through exchange of visits by farmers.

They need extension material in the field of farm machinery such as posters and cut-away engines etc.

E. Training

They agree to the classification of 3 levels and this is what is applied in their case. Institutions include:

1. Agricultural Engineering Section, University of Tripoli (about 60 students).
2. Farm Machinery Section, Faculty of Agriculture, University of Benghazi.
3. Garabali Training Centre.
4. El Marj Training Centre.

The training centres (3 and 4 above) holds two Sessions per year with turnover of 200 per year each for machine and tractor operators and mechanics. They hold special sessions for farmers and their sons on driving, repair and maintenance. More training centres are planned. They are interested in assistance from international agencies and industrialized countries in training of technicians. No cooperation with other developing countries exists.

Two priority programmes requiring assistance:

1. An Institute for agricultural machinery training, testing and Research and Development is in the execution stage and help is needed in training technicians instructors and in setting up programmes.
2. Ten training centres are planned during the present 5 year plan covering all agricultural fields. Assistance is needed in planning, preparation of courses, selection of equipment, execution and follow up.

F. Finance

General establishment is the sole importer for tractors and machinery and every year they submit a budget to the Government for approval. Import is done through open tenders and import license. Tractors and machinery are exempt from any customs but 30% is paid on spare parts.

The proposed project will cost \$30 million and the Libyan part will be financed by credit from the Government through local banks. Loan to the company is also provided by the local banks. They have no financing difficulties. They think the best way to secure financing is to establish joint venture projects with big supplying companies and the of international agencies to promote such projects.

G. Standardization

No national standard organization exists. There is limited activity in setting up specifications and standars for other industries but not for farm machinery. However, there is a national agricultural machinery committee headed by the head of the Agricultural Engineering Section, University of Tripoli. Their main job is to select suitable machinery and provide specifications.

International assistance is badly needed in setting up a national standard section. Although Libya is a member of the Arab Organization for standardization and Metrology (ASMO) but they have no cooperation with it and have not made good use of its facilities.

H. Small Scale Industries Promotion

The Secretariat for Industry and the Industrial Research Centre help in promoting and assisting small scale industries. Loans for private sector can be obtained from the Industrial Bank. .

No programme is planned for Categorie I and Categorie II. Major problems facing all industries in Libya is the shortage of technicians and skilled labour.

A.2 ALGIERS

A.2. I. Policy Aspects

The agricultural revolution which started ten years ago does not allow the farmer to higher any farm labour, so mechanization became a must. The Government gave priority to manufacture of tractors, combines and machinery. Most of the needs are locally manufactured and no tractors or combines or trailers are imported. Local industries suffer from lack of technicians and skilled labour because of emigration to Europe and lack of housing near these factories. The housing problems will be solved in the next 4 years.

The Société Nationale des Constructions Mecaniques: (SONACOME) a Government company is the major manufacturer of tractors, combines and machinery and is the major importer also. It caters for all the needs of the country as submitted by the Ministry of Agriculture from locally manufactured products and import of items not manufactured locally. Its activities cover distribution, spare parts and repair and maintenance through branches and workshops all over the country.

A.2. II. Technical Aspects

The classification of agricultural machinery in 4 categories agrees with what is practiced in Algiers.

Categorie I

Animal drawn implements are used in small holdings and some of it is locally manufactured. Import is limited - hand tools are locally produced but a lot is imported. In the future all requirements will be locally produced. No R and D institutes available and cooperation with other countries does not exist and is not expected in the near future.

Categorie II

Most of the needs are manufactured locally by SONACOME and other medium and small manufacturers. These include diseplooughs, hand sprayers, chised ploughs, cultivators and trailers. SONACOME is trying to improve and expand its production to cover all the needs in the near future. R and D agricultural machinery is very limited (trial testing). There is a central R and D institute, but it needs strengthening and assistance.

They agree that Categorie I and Categorie II implements should be manufactured locally and they hope to satisfy all needs very soon.

Categorie III

Most requirements are locally manufactured. The tractor plant has a capacity of 5,000 tractors (Deutz) per year of 45,62 and 82 H.P. which satisfied most of the needs. Claas balers and combine harvesters are locally made and so are implements (disc ploughs, seed drills, chisel ploughs plus some 30 other implements.

Local manufacture will be increased to reach self sufficiency. All plants are designed to cater for this. The SCNACOME tractor factory is designed to produce up to 35,000 tractors in one shift with up to 65% local contents. This is not achieved yet (after 5 years of production) because of technical and personnel problems. Personnel problems are training, emigration and lack of housing near the factory site in Constantine. All are on their way to solution. The technical problems are more serious and have to do with wrong equipment in the foundry, bad machining of lids, pivot-pins and gear shift forks. The plants have their own foundries, forges, heat treatment and machining shops. The tractor production by 1990 should reach 1,000 units per year. Production of combines balers and other implements should reach its maximum designed capacity.

Categorie IV

There is little need for this kind of equipment now and its manufacture is not planned.

A.2 III. Institutional Aspects

A. Government Policy in the field of Technology Transfer

There are several design institutes covering a lot of industries but not agricultural machinery. Most of the technology is purchased. It is very advanced and is presenting a lot of technical problems due to lack of skilled and well trained engineers and technicians. There are plans of establishing facilities to develop locally suited technology - this field.

B. Research and Development

There is no institute to deal with research, design, development or adaptation, but one is planned for 1980, to assist the local manufacturing programmes. International assistance is needed in review of plan and help in implementation and training of personnel. Small tractors and power tillers are gaining popularity specially with small farmers.

C. Repair and Maintenance

SONACOME has a net work of distribution centres which also deal with sale of spare parts and repair and maintenance. The National Bureau of Agricultural Equipment (ONAMA) distributes machinery to agricultural cooperatives and state farms and takes care of repair and maintenance shops. Import of machinery and spares is done by SONACOME in consultation with (ONAMA) and Ministry of Agriculture. Import is done through open tenders and are free from custom duties. No cooperation exists between them and other developing countries in spares and components.

D. Popularization and Extension

The extension service is part of the Ministry of Agriculture and has no programme for agricultural machinery. Training is not part of extension. Extension in agricultural machinery field should cover operation, adjustments and repair and maintenance. Activities include field days, shows, demonstration, farms, radio and television, newspapers etc.

Cooperation with other advanced countries can be in the form of exchange of farmers visits. Assistance from industrialized nations and international agencies could be in the form of supply of posters and cut away engines etc.

E. Training

They agree to the three levels of professionals in the field of agricultural machinery. They have institutes for training operatives and mechanics and at university level, however they do not have specialized machinery training for technicians.

Training for manufacturing and Research and Development for manufacturing is carried at the factories by SONACOME.

Two priority programmes requiring assistance are:

1. They plan to establish a national Institute for research and training in agricultural machinery within the Ministry of Agriculture. Help is needed in planning and creating the centre.
2. Training of instructors to improve the training programmes. Algiers has helped neighbouring countries by offering training and scholarships.

F. Finance

SONACOME has a yearly budget for the manufacture and import of all the needs of the country as presented by cooperatives, ONAMA and Ministry of Agriculture. Imports are free from customs.

G. Standardization

They have a national standard organization but does not include agricultural machinery programme. Assistance is needed to establish such a programme.

H. Small Scale Industries

Establishment of small scale industries are encouraged especially for rural areas and receive loans from the industrial bank. Category I and Category II manufacture exists in the programme of SONACOME and in private Sector. There is no national agricultural machinery committee.

A.3 MOROCCO

A.2 I. Policy Aspects

The Moroccan agriculture suffers from small area holdings which does not encourage mechanization. The market need is not big enough to warrant establishing manufacturing facilities. The present policy is 50% assembly and 50% import for tractors and most of the big implements and combines etc.

The Government is trying to group small farmers in cooperatives to be able to provide more mechanization. The Government encourages use of machinery for land preparation and gives subsidies to the farmers and cooperatives to purchase equipment and it can go up to 50% of the price.

Some animal drawn implements and hand tools are made locally. Disc ploughs are manufactured under license and in enough quantities and its import is restricted. Other implements such as chisel ploughs, ridger and disc harrows are also manufactured.

A.2 II. Technical Aspects

They agree with our classification but they do not use it because they do not use Category IV equipment and actually use light tractors and implements. So they have 3 classes:

1. Hand tools
2. Light equipment and machinery which include animal and tractor drawn implements.
3. Heavy equipment with engines such as tractors and combine harvesters.

Category I

Most of the hand tools are made in local black smith shops and some are imported. Animal drawn implements are locally manufactured but not in great numbers and most needs have to be imported. There are projects under study to manufacture all needs locally by 1987.

Category II

There are four factories for manufacturing machinery and implements of different sizes. They also manufacture animal drawn equipment, trailers and hand tools. Implements manufactured include disc ploughs (their import is not allowed) chisel ploughs, ridgers, cultivators, disc harrows and seed drills. They also produce trailers and fuel and water tankers.

The need is increasing every year, and they would need to expand existing factories or put new ones by 1987. The whole industry is in the hands of the private sector. No Research and Development institutions exist. Some trials on choice of equipment is carried in the agronomy sections of research in connection with different crops.

They agree that it is necessary to manufacture all Category I and Category II machinery in the country.

Category III

There are two plants assembling tractors under license at present. One assembles two MF models of 45 HP and 77 HP and has a capacity of 1,500 tractors per year. The second one is a Joint Venture between the private sector (51%) and I.H. of France (49%) and assembles crawler tractors at the rate of 2-3 units per day and according to the demand volume.

In 1982 they estimate their needs for wheel tractors to be 3,500 per year and by 1987 to be 4,900 per year and crawlers 120 by 1982 and 150 by 1987. The need today is for 2,500 tractors and so they import about 1,500 per year. Combines and balers are imported.

The requirements are not great and so they think they will continue with the present 50% local assembly and 50% import, but would encourage the private sector to establish industry.

Import of tractors is open but quantities are controlled by the Ministry of Agriculture and Ministry of Trade. Custom duties have been reduced to 10% on implements and lifted in the case of tractors. The Industrial Development Centre, is the institution that prepares all the technical and economic studies for Government and private sector projects. Their activity extends to the negotiation stages and supervision of implementation.

Category IV

Demand for this category is nil if we exclude combine harvesters (150 per year).

A.2 III. Institutional Aspects

A. Policy

No technical research Institute exists. The Industrial Development Centre takes care of all technical and economic studies for Industrial projects. It is a big and well established centre and had contacts with some similar centres in Europe and cooperates with some of the big firms in the World.

They need to establish an industrial research institute.

B. Research and Development

The Centre Nationale de Mechanisme Agricole in connection with the Agricultural Engineering Section of l'Institut National Agronomique Hassan II is engaged in documentation, trials and field tests of machinery and implements. It should be expanded and augmented to include development, research, adaptation and proper testing.

They would welcome help from industrialized countries and international organization in the form of equipment and personnel training. Smaller tractors and power tillers could be encouraged. They are limited in use and individual farmers cannot afford them.

Repair and maintenance

The Government encourages cooperatives to buy tractors and implements and to establish work shops. The subsidy goes up to 20% of the tractor price and up to 50% for implements. The Agricultural Bank finances these purchases for 5 years and at very low interest rate. But spare parts are not subsidized and carry 30% custom duty.

The repair and maintenance is carried mostly in the Government Agricultural Centres at subsidized cost and Extension Centres which also repair Government owned equipment hired to small farmers. These centres cover most of the irrigated and rainlands. Distributors and dealers provide service in the cities and big centres. They have agents in the rural areas selling spare parts.

D. Popularization and extension

Extension should cover use, repair and maintenance of machinery activities should concentrate on demonstration farms and field days as the most effective means. Radio and television and newspapers are used. Cooperation through exchange of farmers visit could be useful. Assistance is needed in training of extension workers and supply of extension aids.

Training of operators is part of the extension service.

E. Training

They agree with the 3 levels suggested.

They have no special institutions for training in planning and besides the universities.

Training for repair and maintenance is done in service in the factory. They have training centres for operators and mechanics and long and short term sessions for farmers and their sons (part of extension service). In the 3 year plan 1973/76 they will create more training and repair and maintenance centres.

Two training projects with top priorities are:

1. Training of Agricultural engineers abroad.
2. Training of instructors for the existing and future centres.

F. Finance

A yearly budget is drawn for the import of CKD components and CPU tractors and implements after the Ministry of Agriculture has estimated the needs. There is no other restriction on importation. Import license is obtained from the Ministry of trade. No customs on tractors and 10% is paid on CIF value of implements.

G. Standardization

They have no national standard organization. They would like to have one incorporated in the Industrial Development Centre who help in putting specifications now. They think that cooperation with international organizations and developed countries is important. They do not see too much hope for regional cooperation.

H. Small scale industries (SSI)

The National Bank for Economic Development (BNDE) in cooperation with the World Bank and other local banks are helping existing SSI and giving loans to establish new ones.

I. They do not have a national agricultural machinery committee or research and development centres.

They would welcome the idea of having a model contract for establishing machinery industry.

I. Policy Aspects

The majority of the holdings in Tunisian Farming land is in the small range of 3-5 Ha. The Tunisian government encourages the use of machinery and extend loans to farmers and co-operatives. The government through one of its corporations carries all mechanized operations for small farmers at subsidized price.

However, manufacture of tractors and machinery is not a priority item due to the small requirement (about 3000 tractors per year). They are encouraging manufacture of hand tools and animal drawn implements and light tractor pulled implements. One factory is doing this. At present most requirements are imported, but a manufacturing complex for tractors (2200) and implements is under study.

A. 4 II. Technical Aspects

The classification of agricultural machinery most suited to their agricultural conditions is :-

1. Small implements, animal drawn and hand tools
2. Medium implements that need 15-25 H.P. prime mover or tractor
3. Tractors and larger implements that need 45-100 H.P. tractor

Hand tools and animal drawn implements are made locally. Some are imported. One factory manufactures implements and one assembles tractors.

For future, they are planning a manufacturing complex for tractors, engines, machinery and tools by 1980.

The agricultural machinery section of the Centre De Recherche Du Genie Rural is engaged in testing of tractors and machinery and certification before it is allowed for use in the country. They also do modification and design work and provide specifications and advise on use of different equipment.

Cat.I - The Agricultural engineering section has developed a universal tool carrier with different implements to be animal drawn. The prototype is being presented to manufacturers.

Cat.II - Mostly imported at present. They agree that Category I and Category II equipment should be made locally and are planning to do so. They do not consider Category II as a necessary step to Category III.

Cat.III - Priority is given to tractor assembly.

The Industrial Studies Centre together with representatives of the Agricultural Engineering Section and Ministry of Industry form a committee to study the project, analyse the proposals and negotiate the arrangements.

They would welcome co-operation between neighbouring countries as a possible market.

Supporting industries are essential but for machinery industry it is not well developed.

Cat.IV - There is no demand for equipment in this category besides combine harvesters (150 per year) which are imported and there are no plans for its manufacture.

III. Institutional Aspects

A. Policy in Technology Transfer

They do not have an institution specialized in technology transfer. The Centre De Recherche Du Genie Rural and the National Centre for industrial studies together with the Ministry of Agriculture and the Director of the Mechanical and Metalurgical studies, they set up the policy.

They need help in physical facilities and training of personnel.

B. Research and Development

The Agricultural Engineering Section of the Centre De Recherche Du Genie Rural and the National Centre for industrial studies are the two organizations doing research and development. The Agricultural

Engineering Section has close co-operation with the Centre De Tut De Mechinism Agricole Tropicale in France and the Centre National de Tut Machinism Agricole and FAO. The section is in need of equipment for testing and development and training for engineers and technicians to be able to do Research and Development. They are interested in small tractors and power tillers.

C. Repair and Maintenance

The Societe Nationale De Motoculture (SONAM) a government Corporation is set up to buy tractors and machinery and does all the agricultural operations for the small farmers at subsidized cost. They have 8 province centres with big workshops and 13 smaller centres with workshops and these 21 centres cover most of the farming areas. They also are agents for tractors (Fendt) and machinery which they use and sell some of it. The workshops centres for repairs for private sector at cost. They stock their own spare parts.

The Government projects have their own workshops and spare parts departments run by the Agricultural Engineering Section of the Ministry of Agriculture.

The machinery and tractor dealers have central workshops.

SONAM covers 20% of the needs of the agricultural sector, by 1985 they would cover over 60%.

Import of spares is open and customs duty of about 30-40% is imposed on it.

The major difficulty facing Repairs and Maintenance of equipment in Tunisia is the big number of makes of tractors and models. In 1977 they imported 26 tractor makes with 72 different models. The Ministry of Agriculture is now controlling quantities to be imported and reducing no. of makes and models according to performance and Repairs and Maintenance situation. No co-operation exists with other countries.

Implementation and Extension

They think extension should cover use, adjustment, repair and maintenance of machinery. Activities include field days, demonstration farms, radio, television and newspapers. Training of tractor drivers is carried in extension centres.

Exchange of visits between farmers of different countries could be useful.

E. Training

They agree to our classification, however, they do not have specialized institutes for training in planning and Research and Development. Training for manufacturing is done in the factories.

Extension Section is part of the Ministry of Agriculture and covers all the agricultural areas through extension centres which include training activity for operators training.

The Ecole Supérieure des Ingénieurs de L'Équipement Rural at Magaz El Bab offers courses and B.S. degree for agricultural engineering, 4 years after secondary. They also offer 2 years course for technicians and mechanics. They have enough training centres on machinery at secondary level and lower. All centres offer special short term training sessions for farmers and their sons (28 of them).

Two projects in training they would need help with are :-

1. Equipment, training aids, workshop and tools, testing and laboratory equipment is badly needed for the institute at Magaz El Bab. The project is ready for presentation and need to identify the co-operating body.
2. Post graduate training for engineers to be able to do Research and Development and adaptation and testing.

F. Finance

The budget is drawn by the Ministry of Agriculture after determining the requirements. No custom duties on tractors and machinery. Import license and approval of Ministry of Agriculture are required.

New project for manufacture is still in the planning stage.

G. Standardization

At present they do not have a standard institute and the work is done by the industrial studies centre with the help of the Director for Mechanical and Metallurgical industries, and the Agricultural Engineering Section of the Research Centre.

An institute for standards and quality control is being planned within the Dept. of Mechanical and Metallurgical Industries.

H. Small Scale Industries (SSI)

The government encourages SSI through loans from the banks and special concessions. The world bank has a co-operation programme to promote and develop SSI in Tunisia. UNDP will co-ordinate the project.

I. There is no national agricultural machinery committee and its job is done by the Ministry of Agriculture, the Farmers Unions and the Agricultural Engineering Department.

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E G Y P T

I. Policy Aspects

Agricultural Mechanization enjoys top priority in the country's drive for food production. Manufacture of machinery has also a priority as an industrial input to agriculture.

The national policy in the first stage (up to 1985) is to replace the animal and animal-drawn equipment by tractors and implements. In the second stage (1990), human labour will be completely taken away from farm work except for tractor and machinery operators.

So, Cat. I and Cat. II are not important after 1985. At present they are manufacturing hand tools, animal drawn implements and Cat. III implements and assembling tractors. Some tractors are imported BCW and so are combined harvesters and sugar cane harvesters.

The Nasr Car Manufacturing Co. is negotiating with MF for manufacture of their MF 265 (5,000 per year) and 10,000 Perkins engines and machinery to be introduced at a later stage.

Other companies, private and government-owned, manufacture implements, pumps, engines, tools, etc.

II. Technical Aspects

They agree to our classification although at present they do not have use for Cat. IV and by 1990 will not use equipment in Cat. I.

Cat. I Most of the needs are manufactured locally in plants and B/smith shops including some of their own designs.
Future plans call for complete elimination of Cat. I equipment from agricultural production.

Cat. II Imports are about 30% of needs and the balance is manufactured locally at present. In future, the needs would increase considerably and a programme for its manufacture is included in the planned project with MF.

Expansion of existing factories will be undertaken.

R and D is done at the Agricultural Machinery Testing Station. Some of their prototypes are manufactured at the workshops of the Ministry of Agriculture and the other public sector plants.

They agree that Cat. II is a step to Cat. III, but in the industry Cat. III comes first and then Cat. II.

Cat. III At present the Nasr Co. is assembling MF, IMR and Universal tractors (all 60-65 HP). They are negotiating a plant with MF to manufacture 5000 tractors 265. 10,000 engines and 8,300 pieces of implements. Nasr Co. will hold 40%, MF 20%, the Arab Investment Co. 25% and Nasir Social Bank 15%. This should satisfy all their needs and more for export. At present, they are assembling 30% and 70% is imported.

The General Organization for Industrialization in the Ministry of Industry is responsible for planning industrial projects, preparing technical and economic studies with the help of the manufacturing organization and co-ordinates the industrial activity in the country. They are the authority that gives approvals for establishment of industries and grants the required concessions etc. International assistance is needed in Finance.

Supporting industries are well established and encouraged by the Government. They have bilateral co-operation with Sudan, with IDCAS and ASMO. Also with UNIDO and the World Bank.

Cat. IV Demand for this category is small but will increase by 1990 and not to the extent to warrant local production.

Few combine harvesters, rice combines and sugar cane harvesters were imported.

1.5 III. Institutional Aspects

A. Policy in Technology Transfer

This is formulated by the General Organization for Industrialization and the Agricultural Engineering Under-Secretary. It is very effective.

B. R and D

They have one center for R and D in machinery. It is well established but needs prototype workshop and some testing equipment.

Walking tractors and tillers are gaining popularity and are encouraged by the Government to replace Cat. I.

C. Repair and Maintenance

They have a central unit for repair and maintenance in every province and several smaller ones in every district. These stock spare parts and carry out repairs for co-operatives, Government projects and farmers. The programme is run by the Agricultural Engineering Section of the Ministry of Agriculture.

D. Popularization and Extension

Extension should cover use, repair and maintenance. Its activities should cover field days, demonstration farms, radio and television etc.

Exchange of visits between farmers in other countries was useful. They had several such programmes with Sudan, the USSR and other Arab and European countries.

E. Training

They agree to our classification and have many universities (over 6) and institutes and training centers (13) to cover their needs and more. They are doing a lot of training for neighbouring and African countries and could contribute more if international agencies (UNIDO, ILO, FAO) would pay for the costs.

The Universities offer post graduate degrees up to PHD in all fields. Extension is covered by the Agricultural Engineering Administration through the Agricultural Extension Centers which cover the whole country.

Two training programmes with priorities are:

1. Training of engineers in R and D and testing.
2. Training of instructors.

F. Finance

There is a yearly budget prepared by the Ministry of Agriculture. Import license is required and 13.4% of CIF tax is imposed on CPU tractors of which 7% is custom duty and CKD 19.5% of CIF value as tax of which 5% is custom duty.

The new manufacturing plant will cost about \$51 million, of which \$19 million as a loan from ECSP, \$17 million loan from the Arab African Bank and \$14 million local currency to be provided by the local banks.

The project is closely connected with the Sudanese project in bilateral co-operation.

G. Standardization

The National Standards Institute and the General Organization for Standardization are active in most fields but not agricultural machinery. They do not think it will be included in the near future because locally-made equipment conforms to international standards anyway and are made under license.

H. Small-Scale Industries (SSI)

These are encouraged by the Government and specially if established in the rural areas. Agricultural machinery is manufactured in small plants and workshops with help from the banks.

- I. There is no national agricultural machinery committee and its job is done by the Under-Secretary for Engineering Affairs and his Agricultural Engineering Section.

A.6 SUDAN

I. Policy Aspects

Agricultural machinery industry has priority in the present 6-year plan as an important input to agricultural production. Tractors and machinery are all imported now and will continue until the planned manufacturing complex is realized by 1981-1982. The plan and the project have passed the planning stage and UNIDO assistance was valuable during study and negotiation. Cat I is all locally made with little import of shovels, axes and hoes. Complete mechanization is the general policy. The proposed complex will produce 5000 MF 290 tractors, 400 combines and 5500 pieces of implements per year working one shift per day. This will be sufficient for their needs. Cat IV will continue to be imported.

A.6 II. Technical Aspects

They agree with our classification of 4 categories.

Cat I - produced by local blacksmith shops from scrap and animal drawn by local farmers or carpenter shops.

There are about 4 small plants manufacturing some hand tools.

The field is open for more plants within the private sector and the government gives concessions and the Industrial Bank helps with loans.

No R and D or co-operation with other countries.

Cat II - all imported and no R and D.

Cat III - manufacturing is planned which would include cat II also. At present all is imported in CBU's.

When the factory reaches its maximum planned capacity by 1987, imports will be very little.

The Projects Dept. of the Ministry of Industry is the agency that analyses proposals together with the help of the Industrial Research and Consultancy Institute (a UNIDO project 1973). UNIDO has helped with analyses and negotiations of this project. Co-operation with international agencies is very important.

Supporting industries are very essential for the success of any industry. The Government is encouraging these industries, but up to now they are very limited (small foundry, 2 battery factories, 2 paint factories and a planned tyre factory).

Cat IV - demand for items such as big tractors (100 HP and above), sugar cane harvesters and cotton pickers is increasing but they do not think that it would warrant local manufacture.

1.6 III. Institutional aspects

A. Government policy in technology transfer

There is no institutional mechanism as such but the industrial research and consultancy institute does some work. It needs assistance.

B. R and D

No R and D institutions exist now, but one is planned in co-operation with the French Government and CNEEMA. Priority would be in Cat II and Cat III. Power tillers and small tractors are not in use now but could be useful for small farms.

C. Repair and maintenance

All Government agricultural projects have their own workshops and trained personnel for repair. Machinery dealers have central workshops in cities and sell spare parts through agents in the country. Privately owned general purpose workshops help fill the gap in repair of tractors but do not stock spare parts.

Spare parts are not always available on site and present problems to users. Import is restricted by a preset foreign currency allocation every year. Spare parts carry 40% custom duty.

D. Popularization and extension

Extension should cover use of machinery, adjustments, repair and maintenance.

Activities include field days, demonstration farms, radio, television, leaflets, newspapers and short courses.

Training is not part of extension. Co-operation through exchange of visits between farmers in developed and neighbouring countries proved to be very useful.

International assistance is needed for supply of extension aids, cut away models, posters and arranging exchange of visits.

E. Training

They agree to our classification. For engineers they started a faculty for agricultural engineering.

They have one training centre at Tosi for operators and mechanics and three more are planned. Mechanics and technicians are trained in mechanical engineering centres. Co-operation with Egypt exists and has been going on for some time. They need more

specialized centres for machinery and need equipment for existing ones.

Two training projects requiring assistance are:

1. Training of instructors;
2. Help establish more centres to cover the needs in different parts of the country.

F. Finance

There is no budget for import of tractors and machinery. Before an import license is issued, credit facility for 3 or 5 years must be presented covering the purchase. All machinery is exempt from custom duty.

The proposed complex will need about \$100 million of which the Government's share has to be financed through loans. The two partners MF and SCD undertook to look for this finance. Finance is the major problem in expansion and international help is needed.

G. Standardization

There is no national standard organization and the agricultural engineering administration does this job. They carry tests and prepare specifications.

Help is needed to set up such an organization.

H. Small-scale industries (SSI)

The Industrial Bank helps in promoting SSI, especially those located in rural areas. The bank extend easy term credit to these industries.

There are 4 small factories making Cat I and Cat II equipment.

I. There is no national agricultural machinery committee and its work is done by the Agricultural Engineering Administration.

B. RECOMMENDATIONS

Due to the similarity of general policies of all countries visited and their stress on mechanization and manufacture of agricultural machinery and similarity of problems, the recommendations given below apply to all of them.

- B. 1. Governments of these countries should find a permanent solution to provide Research and Development Centres with adequate budgets. So they can function properly.
- P. A 2. International and bilateral assistance is needed in training, Research and Development, Finance and repair and maintenance institutions, either by establishing new ones or developing the existing ones. UNIDO, FAO, ILO and other organisations should organise or contribute to assistance programmes.
- B. 3. Attempts should be made to include the Arabic Language as a UNIDO Working language. Arab organisations such as IDCAS and ASMO can help.
- P. 4. Whenever possible, UNIDO should involve IDCAS in all studies and programmes and assistance undertaken in these countries.
- B. 5. UNIDO or other international organizations should take advantage of the Egyptian International Centre for Agriculture to help in easing training problems. The Centre is engaged in a big co-operation programme and has trained and still is training individuals from Arab, African and Asian Countries.
P. Their major problem is lack of finances to support Foreign training costs at the Centre.
- B. 6. UNIDO should foster a regional institute for Research and Development and repair and maintenance and training at regional level, similar to RNAM.

7. It was suggested in the IDCAS study on machinery industry in Arab countries to divide the Arab countries in 3 regions to cater for better co-operation in this field. These are suggested to be grouped as follows :-

- (a) Morocco, Algiers, Tunisia, Libya and Mauritania
- (b) Egypt, Sudan, Somalia and the the two Yemens
- (c) Syria, Lebanon, Jordan, Iraq, the Emirates, the Arabic Gulf and Saudi Arabia

I recommend that UNIDO adopts this regional division.

- B. 8. UNIDO should attempt with the help of IDCAS to carry out individual country surveys and obtain more details and information in the Agricultural Machinery Field with the view of providing good assistance and help.

- B. 9. Countries in the process of establishing machinery industry (Libya, Tunisia, Egypt and Sudan) need technical and financing assistance. Egypt and Sudan are in bad need of Financing and require international assistance. UNIDO should try to help.

- B. 10. Model contractual contracts and tender bid models inviting manufacturers to offer, are needed. UNIDO can help in this.

- B. 11. Institutions for transfer of technology should be established in all countries and priority given to Libya and Sudan for their great need and lack of any agencies in this field.

- B. 12. The recommendation of the Working Party on Agricultural Machinery Industry in the International Forum on Appropriate Industrial Technology should be taken into consideration here.

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C. C O N C L U S I O N S

- C. 1. Regional and International Cooperation with industrialized countries and with manufacturers of machinery is very essential for solution of some problems and overcoming constraints. It is both effective and economic.
- C. 2. Among the major problems in the region is lack of financing for import of machinery, spare parts, equipment for Research and Development and Training. Planned projects are delayed or cut down due to lack of finance. Both short-and long-term credit by suppliers of machinery or financial institutes will help solve the problem.
- C. 3. Cooperation between UNIDO and IDCAS and other Arab Organisations can help a great deal in providing UNIDO with fairly accurate information on which effective solutions for problems and constraints could be found.
- C. 4. Organisation like UNIDO, FAO, ILO, UNESCO and others are helping a great deal in several activities in this field and should be encouraged to do more, specially in poorer countries like Sudan and Egypt to whom these organisations can offer much at no cost or very little cost.
- C. 5. Although all countries in the region are members of the Arab Organization for Standardization and Metrology (ASMO) yet none of them with the exception of Egypt have made use of it nor established standards, in the field of agricultural machinery. Better popularization programme is needed on the part of ASMO and the countries concerned.
- C. 6. All countries required assistance in training programmes for Research and Development and in instructor training. This indicates the lack of trained personnel in two important areas for machinery manufacture and operation, repair and maintenance - and will present great difficulties in the future. Priority must therefore be given to training and UNIDO and other international organisations should act very fast to find solutions for this important problem.

7. All countries visited have either set up tractor and machinery industry or contracted and building a facility to be operational between 1980 and 1984, except Morocco. All products are either of different makes or same makes but different models. So, regional cooperation in the form of parts exchange or bigger volume etc. is very unlikely and not much effort should be spent on it. But since Egypt and Sudan have an economic and technical integration agreement and they are manufacturing the same make equipment (MF), than the possibility of encouraging and helping cooperation exists and may be can include Libya since it is will be manufacturing MF equipment of the same models as both Egypt and Sudan. Possibilities of cooperation could be explored between other Arab countries.

TABLE No. 10 - ESTIMATED TRACTOR FLEET AND TRACTOR DEMAND IN THE YEAR 2000

| | MOROCCO | ALGERIA | TUNISIA | LIBYA | EGYPT | SUDAN | SYRIA | EGYPT | JORDAN | IRAQ | MAURITANIA | SAUDI ARABIA | SOMALIA | HANOI YEMEN | DEMOC. YEMEN | OTHER COUNTRIES | TOTAL | |
|---------------------|------------------------------|---------|---------|--------|--------|--------|---------|--------|--------|-------|------------|--------------|---------|-------------|--------------|-----------------|--------|---------|
| LOWER MIDDLE INCOME | <u>TRACTOR FLEET IN 2000</u> | | | | | | | | | | | | | | | | | |
| | Indicated farming | 10 000 | 6 000 | 2 000 | 10 000 | 40 000 | 27 500 | 10 000 | 1 500 | 1 000 | 20 000 | 1 400 | 12 000 | 2 500 | 3 000 | 100 | 1 500 | 148 500 |
| | Estimated farming | 35 000 | 47 000 | 31 000 | 10 000 | - | 40 000 | 25 000 | 3 000 | 3 400 | 16 500 | 1 000 | 6 000 | 6 250 | 11 000 | 1 600 | 500 | 217 250 |
| | TOTAL | 45 000 | 53 000 | 33 000 | 20 000 | 40 000 | 67 500 | 35 000 | 4 500 | 4 400 | 36 500 | 2 400 | 18 000 | 8 750 | 14 000 | 1 700 | 2 000 | 365 750 |
| | Replacements | 4 500 | 5 300 | 3 300 | 2 000 | 4 000 | 6 000 | 3 500 | 450 | 410 | 3 650 | 240 | 2 300 | 875 | 1 400 | 170 | 200 | 39 125 |
| Fleet growth | 1 100 | 800 | 600 | 200 | 1 500 | 2 200 | 800 | 20 | 20 | 760 | 100 | 700 | 300 | 600 | 20 | 80 | 9 300 | |
| Annual Demand | 5 500 | 6 000 | 4 000 | 2 200 | 5 000 | 9 000 | 4 500 | 500 | 500 | 4 500 | 350 | 3 000 | 1 200 | 2 000 | 200 | 300 | 48 000 | |
| UPPER MIDDLE INCOME | <u>TRACTOR FLEET IN 2000</u> | | | | | | | | | | | | | | | | | |
| | Indicated farming | 17 000 | 10 000 | 3 300 | 13 500 | 67 000 | 60 000 | 17 000 | 2 500 | 1 700 | 33 000 | 2 300 | 12 000 | 2 500 | 3 000 | 100 | 3 000 | 247 900 |
| | Estimated farming | 70 000 | 70 000 | 46 000 | 20 000 | - | 90 000 | 50 000 | 3 500 | 5 000 | 33 000 | 2 000 | 6 000 | 6 250 | 11 000 | 1 600 | 500 | 414 050 |
| | TOTAL | 87 000 | 80 000 | 49 300 | 33 500 | 67 000 | 150 000 | 67 000 | 6 000 | 6 700 | 66 000 | 4 300 | 18 000 | 8 750 | 14 000 | 1 700 | 3 500 | 662 750 |
| | Replacements | 8 700 | 8 000 | 4 200 | 3 300 | 6 700 | 15 000 | 6 700 | 600 | 670 | 6 600 | 430 | 2 300 | 875 | 1 400 | 170 | 350 | 66 745 |
| Fleet growth | 2 000 | 1 000 | 1 200 | 800 | 2 000 | 5 500 | 2 100 | 80 | 120 | 1 900 | 120 | 700 | 300 | 500 | 20 | 400 | 20 420 | |
| Annual Demand | 11 500 | 10 000 | 6 000 | 4 200 | 9 000 | 20 500 | 7 000 | 700 | 800 | 8 500 | 600 | 3 000 | 1 200 | 2 000 | 200 | 800 | 87 000 | |

TABLE No. 11

EVOLUTION OF THE DEMAND FOR TRACTORS IN THE ARAB WORLD
 ACCORDING TO THE HYPOTHESIS HELD
 (growth-rate: 6.4%)

| | 1977 | 1980 | 1983 | 1990 | 1995 | 2000 |
|--------------|-------|-------|-------|-------|-------|-------|
| Morocco | 2500 | 3000 | 4250 | 5900 | 8250 | 11500 |
| Algeria | 2700 | 3200 | 4250 | 5650 | 7500 | 10000 |
| Tunisia | 2150 | 2450 | 3050 | 3800 | 4800 | 6000 |
| Libya | 4500 | 4000 | 4000 | 4700 | 4100 | 4200 |
| Mauritania | 50 | 50 | 150 | 250 | 350 | 600 |
| Sub-Region 1 | 11900 | 12700 | 15700 | 19600 | 25000 | 32300 |
| Egypt | 3500 | 3950 | 4850 | 5950 | 7300 | 9000 |
| Sudan | 1700 | 2350 | 4050 | 6950 | 11900 | 20500 |
| Somalia | 300 | 350 | 500 | 650 | 900 | 1200 |
| Yemen A.R. | 200 | 250 | 450 | 700 | 1200 | 2000 |
| Yemen D.R. | 200 | 250 | 250 | 250 | 300 | 300 |
| Sub-Region 2 | 5900 | 7150 | 10100 | 14500 | 21600 | 33000 |
| Syria | 3800 | 4250 | 5100 | 6200 | 7450 | 9000 |
| Lebanon | 300 | 350 | 400 | 500 | 600 | 700 |
| Jordan | 200 | 250 | 300 | 400 | 600 | 800 |
| Iraq | 3000 | 3450 | 4300 | 5400 | 6800 | 8500 |
| Saudi Arabia | 300 | 400 | 650 | 1100 | 1800 | 3000 |
| Emirates | 150 | 200 | 300 | 400 | 600 | 900 |
| Sub-Region 3 | 7750 | 8900 | 11050 | 14000 | 17850 | 22900 |
| Total | 29950 | 33750 | 36850 | 48100 | 64450 | 88200 |

Source: SEMA estimate

TABLE No. 12

ESTIMATED DEMAND FOR CULTIVATORS IN THE YEAR 2000

| COUNTRY | Irrigated surfaces farmed by cultivators | Fleet in the year 2000 | Annual market in 2000 |
|--------------|--|------------------------|-----------------------|
| MOROCCO | 100,000 | 20,000 | 2,500 |
| ALGERIA | 60,000 | 12,000 | 1,500 |
| TUNISIA | 20,000 | 4,000 | 500 |
| LIBYA | 50,000 | 10,000 | 1,300 |
| MAURITANIA | 14,000 | 2,800 | 350 |
| EGYPT | 400,000 | 80,000 | 10,000 |
| SUDAN | 275,000 | 55,000 | 7,000 |
| SOMALIA | 25,000 | 5,000 | 650 |
| YEMEN A.R. | 30,000 | 6,000 | 750 |
| YEMEN D.R. | 1,000 | 200 | 25 |
| SYRIA | 100,000 | 20,000 | 2,500 |
| LEBANON | 15,000 | 3,000 | 400 |
| JORDAN | 10,000 | 2,000 | 250 |
| IRAQ | 200,000 | 40,000 | 5,000 |
| SAUDI ARABIA | 60,000 | 12,000 | 1,500 |
| TOTAL | | 272,000 | 34,225 |

Source: SEMA estimate

TABLE no. 13

THE CEREAL AND COMBINE DEMAND IN THE YEAR 2000

| | Cultivated areas of cereals in 1975 (in hectares) | Cultivated areas of cereals in 2000 (in hectares) | Fleet of combines in 2000 | Market of combines in 2000 |
|--------------|---|---|---------------------------|----------------------------|
| Morocco | 4,700,000 | 5,500,000 | 11,000 | 1400 |
| Algeria | 3,200,000 | 4,000,000 | 8,000 | 1000 |
| Tunisia | 1,600,000 | 2,000,000 | 4,000 | 500 |
| Libya | 500,000 | 625,000 | 1,300 | 150 |
| Egypt | 1,800,000 | 1,800,000 | 3,600 | 450 |
| Sudan | 1,800,000 | 2,300,000 | 4,600 | 600 |
| Somalia | 600,000 | 700,000 | 700 | 100 |
| Yemen A.R. | 1,300,000 | 1,600,000 | 1,600 | 200 |
| Yemen D.R. | 70,000 | 80,000 | 100 | 10 |
| Syria | 2,900,000 | 3,500,000 | 7,000 | 900 |
| Lebanon | 60,000 | 80,000 | 150 | 20 |
| Jordan | 260,000 | 340,000 | 700 | 100 |
| Iraq | 3,350,000 | 4,300,000 | 8,600 | 1000 |
| Saudi Arabia | 400,000 | 500,000 | 1,000 | 150 |
| TOTAL | | | 50,750 | 6,380 |

Source: SEMA Enquiry (for the cultivated areas)

SEMA estimates (for the fleet in the year 2000)

TABLE No. 14

ANIMAL DRAUGHT OUTFITS: ESTIMATED DEMAND FOR 2000

| COUNTRY | Annual demand of animal-draught outfits in 2000 |
|--------------|---|
| Morocco | 70,000 |
| Algeria | 70,000 |
| Tunisia | 46,000 |
| Libya | 20,000 |
| Mauritania | 1,500 |
| Egypt | — |
| Sudan | 80,000 |
| Somalia | 12,500 |
| Yemen A.R. | 22,000 |
| Yemen D.R. | 2,500 |
| Syria | 50,000 |
| Lebanon | 3,500 |
| Jordan | 5,000 |
| Iraq | 23,000 |
| Saudi Arabia | 6,000 |
| TOTAL | 411,500 |

Source: SEMA estimate

Persons Met

1. LIBYA

UNDP

Mr. Ahmed Sabi - Resident Representative
Mr. A. Udo - Assistant Resident Representative
Mr. J. Lebacqz - J.P.O.

Secretariat of Agricultural Reclamation and Land Development

Dr. M. Soghmari - Chief, Technical Co-operation Section
Dr. A. Mador - Head, Agronomy Research Unit
Mr. A. El Baroni - Chairman and Managing Director, the General
Establishment for Implements and Agricultural
Requirements
Mr. M. A. Eltayeb - Financial Director, the General Establishment
for Implements and Agricultural Requirements
Mr. F. Elkireigshi - Director, Training Department
Mr. N. Hassan - Director, Agricultural Extension Department

Ministry of Industry

Mr. A. Moamar - Chairman and Managing Director, Libya Tractor Co.

2. ALGIERS

Ministry of Agriculture and Agrarian Reform

Mr. A. Bouakene - D. Director, Production Vegetable
Mr. A. Rezil - Engineer, Foreign Relations Department

Ministry of Industry

Mr. M. Sifawi - Director, Sales, SONACOME
Mr. J. E. Djerbou - Production Department SONACOME

3. MOROCCO

UNIDO

Dr. Y. Helbawi - UNIDO SIDFA

Ministry of Agriculture and Agrarian Reform

Mr. Moulina - Director, Agricultural Production
Mr. Benani - Agro Industries Department

Ministry of Industry

Mr. H. Ben Omar - Director, Mechanical and Electrical Department
Dr. B.A. Abd El Rahman - Director, Industrial Development Center
Mr. B.A. Abd El Rahim - Chief, Mechanical and Electrical Department,
Industrial Development Center
Mr. B. Jaidi - Chief, Department of Economics, Industrial
Development Center
Mr. M. Ben Gelali - Engineer, Industrial Development Center

4. TUNISIA

UNDP

Mr. G. M. Handy - Resident Representative
Mr. D. Duroy - J.P.O. UNIDO
Mr. F. Brucher - FAO Representative

Ministry of Agriculture

Mr. M. Ben Saleh - Director, Crop Production
Mr. M. E. Khalil - Director, International Co-operation
Mr. S. E. Amami - Director, Centre de recherche du genie rural
Mr. K. Ben Khalil - Chief, Agricultural Engineering Department,
Centre de recherche du genie rural
Mr. M. Gaddash - Chief, Agricultural Education Department
Mr. H. Elmaleh - Instructor, Farm Machinery
Mr. Z. Ben Mustafa - Director, Agricultural Extension, Education and
Research
Mr. A. Elshawashi - Chief, Engineering Section

Ministry of Industry

Mr. Boujday - Director, Department of Mechanical and Metallurgical
Industries

Private

Mr. M. H. Belhadi - Departement materiale agricole, Sociéte de
LE MOTEUR

5. EGYPT

UNDP

Dr. S. Szivos - SIDFA, UNIDO

Ministry of Agriculture

Dr. A. El Kassar - Under-Secretary for Engineering Affairs
Mr. F.M. Abdo - Chief, Agricultural Machinery Department

Ministry of Industry

Mr. S. El Nahas - Director, Central Administration for Foreign Projects, The General Organization for Industrialization

Mr. H. Shakir - Director, Engineering Projects, The General Organization for Industrialization

Mrs. S. A. El Aziz - Mechanical Engineer, The General Organization for Industrialization

Mr. M. H. Zaki Aamir - Director, Projects and Factories Engineering, The Nasr Co. for Cars (NASCO)

Arab League Organizations

Industrial Development Center for Arab States (IDCAS)

Mr. A. Hilmy - Senior Director

Mr. E. S. Mowafy - Engineer

Arab Organization for Standardization and Metrology (ASMO)

Mr. A. M. Fadlalla - Assistant Secretary General

Mr. K. Abul Yosy - Technical Director

6. SUDAN

Ministry of Agriculture

Dr. A. H. Abdoun - Director, Agricultural Engineering Administration

Ministry of Industry

Mr. A. Widatalla - Under-Secretary

Mr. A. Salleiman - Director, Industrial Control Department

Mr. F. El Tayeb - Acting Director, Industrial Research and Consultancy Institute

Private Sector

Mr. E. Y. El Kireil - The Combine Harvester and Engineering Co.

