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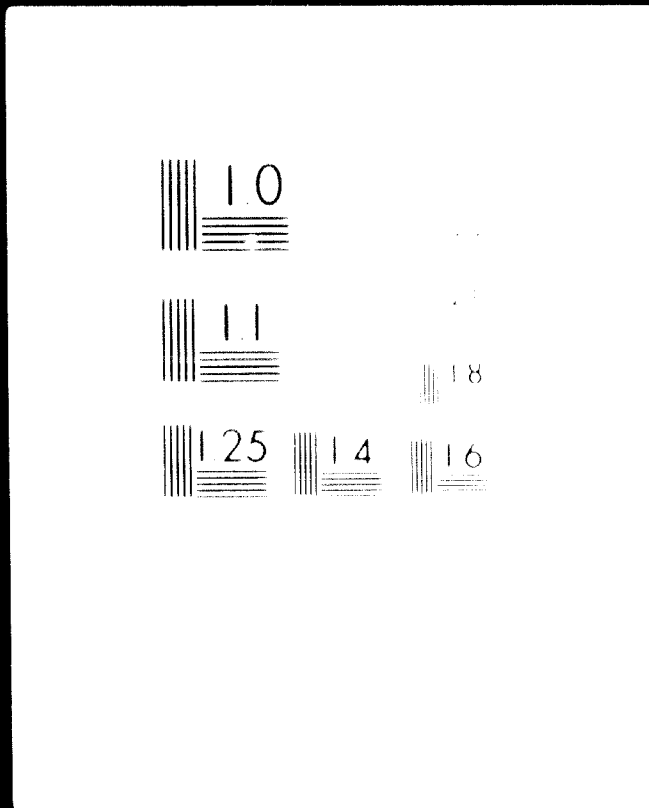
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Secretariat of State for Development

OFFICE OF THE COMMISSIONER FOR PLANNING

02161

REPORT ON THE POSITION OF THE AGRICULTURAL
MACHINERY INDUSTRY IN MADAGASCAR

November 1969

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Secretariat of State for Development

OFFICE OF THE COMMISSIONER FOR PLANNING

Section I THE GENERAL SITUATION OF AGRICULTURE IN MADAGASCAR^{1/}

(a) Geographical distribution of agricultural land

The agricultural survey of 1962, published in 1966, showed that out of a total area of 58,704,000 hectares some 917,000 hectares (15.5 per cent of the area) were cultivated.

Tananarive Province has the largest area (193,000 hectares) of cultivated land, this area representing 21 per cent of all the cultivated land in Madagascar, although the total area of the province (7,191,000 hectares) is only 12.3 per cent of the total area of the island.

The province with the smallest area of cultivated land (115,000 hectares or 12.5 per cent of the total) is Diégo-Suarez Province. Its total area (4,305,000 hectares) is only 7.3 per cent of the area of the island, however, so that actually it has the highest percentage area of cultivated land after Tananarive Province.

Between these two extremes come Fianarantsoa Province and Tananarive Province with respectively 181,000 hectares (19.7 per cent) and 160,000 hectares (17.5 per cent) of cultivated land out of total areas of 10,237,000 hectares (17.4 per cent) and 5,823,000 hectares (9.9 per cent), and Majunga Province and Toloar Province with 141,000 hectares (15.4 per cent) and 127,000 hectares (13.8 per cent) of cultivated land out of total areas of 15,002,000 hectares (25.6 per cent) and 16,141,000 hectares (27.5 per cent).

These figures give a good idea of the very large scope for the expansion of agriculture in Madagascar.

^{1/} Source: Office of the Commissioner for Planning, from a survey conducted by INSR (Statistics).

The problems of developing agriculture in Madagascar are connected with population increase, the size and structure of farms, cultivation techniques and their modernisation, the use of agricultural equipment, the relationship between agriculture and stock-raising, and the selection of crops not only in order to provide food, but also to provide materials for the internal market, for the processing industries and, perhaps most important of all, for export.

(b) Breakdown of land by types of crop and production figures

Crop	Area planted (thousands of hectares)	Production figures for 1968 (tonnes)	Remarks
Rice	526	1,550,000	
Maize	35	-	
Manioc	124	300,000	
Sweet potatoes	29	-	
Groundnuts	21	41,000	(in shells)
Coffee	116	58,000	
Cotton	6	11,500	(seed cotton)
Bananas	35	5,126	(for export)
Cloves	33	500	
Vanilla	27	1,000	
Tobacco	-	4,580	
Sugar Cane	8	1,250,000	

Madagascar is marked by great ecological diversity (differences in soil, climate, altitude, etc.), and each ecological zone naturally has different crops adapted to the prevailing conditions, different economic conditions, and, because of special ethnic characteristics, different cultivation habits and traditions.

Fertilizers were rather a long time coming into use, and only now can they be said to be used on any significant scale. At present, rice-growers are the leading users of fertilizers, as a result of the Government's efforts to improve rice-growing by promoting the use of fertilizers on rice plant nurseries and rice fields and the introduction of small agricultural equipment. The next largest users of fertilizers are growers of sugar cane and cotton. Cotton-growing is expanding, and production of seed cotton should reach about 30,000 tonnes per year by 1973.

Organic manure is on the whole little used, because there is usually no proper balance between agriculture and stock-raising. Where such a balance has been achieved, however (notably on the plateaux), such manure is quite popular, especially for hillside crops.

As far as irrigation is concerned, rice alone accounts for 85 - 90 per cent of the entire irrigated area, followed by sugar cane and cotton. About 95 per cent of the total irrigated area is irrigated by gravity, the remaining 15 per cent being irrigated by rainwater retention.

Agriculture in Madagascar has two main functions. The first of these functions is to produce food crops, of which rice (or, in certain parts of the island, manioc) is the most important, and crops for processing by local industry (oil nuts, cotton, etc.).

These crops are only traded in to a very limited extent and are mainly used to satisfy the needs of the growers themselves. The same is largely true of stock-raising.

The second function is the production of crops for export, mainly coffee (200,000 hectares), vanilla, cloves, sugar, lima beans, tobacco, sisal, etc.

This second type of agricultural activity provides the peasants with most of their monetary earnings, as well as supplying the major part of Madagascar's exports, which it should be possible to increase in the years to come.

(c) Agricultural activities and the population

Altogether, Madagascar has about 5 million rural inhabitants and some 330,000 peasant farms. The area of these varies according to location from 30 to 160 ares, and the average occupancy is 4 to 5.5 persons per farm, which represents a cultivated area of 15 - 35 ares per person.

For Madagascar as a whole, the average area of farms is 104 ares and average occupancy is 4.3 - 5 persons.

In order to gain a clear idea of the problems and development possibilities of agriculture in Madagascar it is desirable to examine briefly the breakdown of farms as a function of the age-group of the farmers.

Such an examination reveals that 30 per cent of the farms are operated by farmers under 35 years of age. These farms represent about 23 - 24 per cent of the total cultivated area, and their average size is around 90 ares.

Farmers in the 35-44 age group operate 25.3 per cent of the farms, representing 26 per cent of the total cultivated land area. The average area of these farms is 107 ares.

Farmers in the 45 - 54 age group operate 22.4 per cent of the farms, representing 26.5 per cent of the total cultivated land area. The average area of these farms is 123 ares.

Finally, only 16.3 per cent of the cultivated land area is farmed by farmers in the over-55 age group. The individual areas of these farms vary from 94 to 127 ares.

From the point of view of the number of persons living on each farm, it may be noted that 52.8 per cent of farms, representing 50.3 per cent of the total cultivated area and having individual areas of 76 - 107 ares, support 1 to 4 persons. The farms supporting 5 - 7 persons represent only 22 per cent of the total number of farms (30.5 per cent of the total cultivated land area) and have an average individual area of 100 ares. Farms supporting 8 - 14 persons represent 15.1 per cent of the total

number of farms (19.7 per cent of total cultivated land area) and have an average individual area of 123 - 140 ares.

4) The agricultural population and the methods used in agriculture

It should be noted that in Madagascar, as in almost all developing countries, three types of agricultural activities are to be found:

1. Agricultural activities carried on by farmers who use the cultivation methods of their forefathers and live in a more or less closed economic and social circle which is essentially outside the money economy. The overall economic profitability of such activities is generally low, as is the standard of living of those living on such farms.

2. Agricultural activities which were originally of the traditional type but where cultivation methods have been or are being modernised, thus permitting an increase in trade exchanges, an improvement in the standard of living, some accumulation of savings, resulting in investments in housing, provision of education for children and young persons, improvement of the agricultural equipment used, and diversification of the farming activities carried on (especially combined stock-raising and crop farming).

3. Agricultural activities of a thoroughly modern type involving more complex crops intended usually for industrial processing or export. The structures of the enterprises carrying on these activities are very varied, involving large land concessions, participation by State or para-State bodies, State control boards, etc. Investments are administered at the level of the boards of management of the enterprises, and the agricultural workers are either farmers employed on various kinds of associate basis or straightforward wage-earners.

This type of agricultural activity makes very considerable contributions to the trade economy, but it is undoubtedly less favourable than the preceding

forms of activity to the formation of a real social stratum of agricultural entrepreneurs.

It does, however, place those engaged in it in a position of greater security and brings them considerable monetary earnings.

Section III: EXTENT OF FARM MECHANIZATION^{1/}

(a,b) Number and types of farm implements in use

The number of rural families at least partly dependent on agricultural production may be estimated at 850,000.

About 53,000 possess the following three basic implements:

1 plow
1 harrow
1 cart

and 1 or 2 "angady" spades,^{2/} 1 or 2 machetes or axes, 1 or 2 rice cutters or sickles.

The remainder have only the simple hand tools - angady, machete or axe, rice cutters or sickles.

Powered machines are of interest only to the larger estates, development companies and the agricultural communal unions (Syndicates des Communes à vocation agricole).^{3/}

The number of farmers benefiting from the use of such equipment under working arrangements may be estimated at 40,000 - 60,000; these arrangements generally cover only land clearance, ploughing and harrowing, later operations being left to animal-draught or hand working; but they are used to some extent at sowing-time and harvest.

^{1/} Prepared by the Rural Engineering Board (Direction du Génie Rural).
^{2/} Described under (c) and (d).
^{3/} Government-sponsored production organizations.

Number of machines and types of equipment used (a,b)

Machines and equipment used on farms	Number	Type	Remarks
Tractors	240	Caterpillar	45 to 130 metric HP
Tractors	3,171	Wheeled	18 to 90 metric HP
Walking tractors	250	Wheeled	1.5 to 12 metric HP
Ploughs	3,400	Tractor-drawn	For the above power units
Disc harrows	350	Tractor-drawn	"
Rotary disc cultivators	200	Mounted	For walking tractors
Combine-harvesters	24	Self-propelled	On large estates
Motor threshers	50	Non-mobile	"
Man-powered threshers	600	Pedal-driven	For small farmers
Shellers-decorticators	200	Motor-driven	Large or small capacity
Ploughs	50,000	Simple swing ploughs	Animal-drawn - 30 to 40 kg
Ploughs	8,000	Light, reversible	Animal-drawn, 45 to 50 kg
Ploughs	2,000	Double brabant	Animal-drawn, 90 to 130 kg
Multi-purpose tool-carriers	300		Animal-drawn
Harrows	65,000	Tines 16/20	99% local manufacture, animal-drawn
Disc harrows	600	6 to 8 discs of 400 mm	Animal-drawn
Expanding coulters	1,000	Light	Animal-drawn
Carts	50,000	2-wheeled, box chassis	Local manufacture except for axle and brakes
Drills	500	Light	Animal-drawn
Ground-cut strippers	200	Hand-operated	Small estates and villages
Maize shellers	1,500	Hand-operated	Small estates
Dusters, hand-operated	37,000	Local	Individual use
Sprayer, hand-operated	500	Imported	Individual use (semi-collective)

Number of machines and types of equipment used (a, b) (continued)

Machines and equipment used on farms	Number	Type	Remarks
Rice cutters and sickles	500,000	Local and imported	Individual use (approximately)
Agadays	1,000,000	Local and imported	Individual use (approximately)
Hand hoes	2,000,000	Imported	Individual use (approximately)
Machetes	1,000,000	Local and imported	Individual use (approximately)

(c) Production of farm equipment

In Madagascar, the output of farm equipment comes from two sources:

1. The nationalized undertaking - SIDEMA - is just emerging from its starting-up period: its main task is the manufacture of basic mass-use farm equipment and tools:

- Angadys (hand tools in very common use); rice weeders;
- Ploughs: four types, the most common 27 to 40 kg;
- Harrows, pitchpole and tine;
- Threshers.

The potential volume of sales for these articles may be estimated as:

- Angadys: 200,000 to 250,000 a year;
- Weeders: 5,000 to 10,000 a year, increasing;
- Harrows: 500 to 1,000; heavy competition from the handicraft sector producing:
10,000 to 15,000 a year;
- Threshers: 200 to 500, certain to increase in future years.

2. Handicraft production: concentrated especially on the manufacture of angadys: output considerable but difficult to estimate precisely (several thousands).

Few weeders are manufactured but production is steadily increasing.

The number of ploughs produced in the handicraft sector may be estimated at about 1,000.

Handicraft production of harrows is much more extensive, accounting for practically all the harrows in use.

(d) Popularity of models and present demand

Angady: the traditional implement (similar to a spade or mattock) used for tilling, clod-breaking, weeding, uprooting and making holes for planting, ditches and embankments; four or five regional types; use long established and assured sale for the output.

Reeders: recently introduced, slowly but surely coming into use - two or three types to suit the nature of the soil - users prefer simple and easily-repaired models.

Ploughs: manufacture limited to four types at the moment - farmers in general prefer the lighter models - 27/35 kg, easily moved about the work-site, and leaving the soil lumpy, as if it had been worked by the traditional method with the ox-draw - a slow but sure growth in sales as a result of the big development projects in progress.

Harrowes: four types in use in different districts, according to the nature of the soil and acreage (light models); tines of 16 cm (average), slightly curved at the point, preferred to the imported models as being cheaper and lighter - demand should follow the same pattern as for ploughs.

Thrashers: preference for the lighter, single operator pedal type - cheaper and easier to move than the two-man model - demand slow but steady.

(c) Future demand 1975-80 and prospects with regard to design

Future demand is bound to increase, in view of the efforts being made by the Government of the Malagasy Republic to promote rapid expansion of agricultural production on the one hand, and the present low level of farm equipment on the other.

Changes in implement design will be slow, and it would be desirable to allow a sound foundation to be established in the shape of a modestly but effectively equipped peasant farming community. As the implements now available are in general satisfactory, it would be best to wait a little before the mass introduction of equipment which might perhaps be more efficient but would be outside the range of the users' technical knowledge and skills.

Section III: MANUFACTURING INDUSTRIES AND AUXILIARY FACILITIES^{1/}

(a) Farm implement manufacturing industries

Although there are some small handicraft-type workshops with rather limited facilities manufacturing a few small agricultural implements, SIDEMA (Société Industrielle Pour le Développement du Machinisme Agricole) is the only industrial undertaking in this field.

SIDEMA is a mixed-economy company with a capital of 80 million Malagasy francs (FMG), with its principal office and plant at Tananarive. There is a subsidiary plant at Tananarive and a small assembly line at Majunva.

Investments amount to 20 million, consisting mainly of:

- Land and buildings;
- Wood-working machinery;
- Cutting, forging and welding equipment;
- Three 150-tonne presses.

There are 93 employees. The company's output is confined to small farm hand tools and small animal-draught machines for rice cultivation:

- Angadys (spade) of a type peculiar to Madagascar, rotary weeders, pedal threshers, winnowers.
- Swing and reversible ploughs (25 to 60 kg), harrows, animal-drawn scoops, carts, traction rollers.

Altogether production results in a turnover of around FMG 80 million, which is quite insufficient.

The reason is that the market is still sluggish, in spite of efforts to popularise methods of cultivation using small agricultural machines.

The national stock of ploughs, for example, is about 50,000 and annual sales vary between 2,000 and 4,000 units.

A market of this order is far from reflecting the real needs of a country with a largely rural population of 5 million.

For this reason, a preliminary study of remedies for this insufficiency of farm equipment must be the basis for the expansion of SIDEMA, the potential of which is far from being fully utilised.

^{1/} Prepared by the Industry Board (Direction de l'Industrie).

(b) Other allied engineering undertakings

SINEMA from time to time has to subcontract the forging or casting of parts.

Castings can be done on the spot by SINFELTA (a metal-fabricating undertaking), the workshop of MAM (Malagasy railways) or the Delabre foundry.

The Diego Suarez arsenal (French naval workshop) can handle steel foundry work.

Forgings can be contracted by SINEMA with the MWPM workshops or DAPP (Public Works Department).

(c) Ancillary and supporting industries

These include the concerns supplying the wood used in making certain farm implements and machines.

Section IV: POLICY IN AGRICULTURAL MACHINERY INDUSTRY^{1/}

(a) Government Support Measures

INDENA is a mixed-company in which the Malagasy Government holds the majority of shares which indicates the degree of government interest in the industry.

In addition, under the Investment Code, an approval order made jointly by the Minister of Finance and Commerce and the Minister for Industry and Mining will very soon give the company substantial concessions, for a period of five years, such as:

- Exemption from import duties on factory equipment and essential raw materials for its production;
- Exemption from profits tax;
- Import quota protection against competing products.

The French Fonds d'Aide et de Coopération (Aid and Co-operation Fund) has awarded INDENA an equipment grant of FFG 11 million.

(b) Design, development and testing institutions^{2/}

A National Committee for Farm Mechanisation was established by decree in October 1964. Its role is to follow all activities in this sphere and to submit to the Government through the Minister of Agriculture, any suggestions or projects it considers desirable for developing farm mechanisation.

The Committee's aims are in particular to define and plan a rational policy for farm mechanisation, determining the needs to which manufactures and imports should be directed and keeping an eye on the distribution and maintenance of the equipment.

^{1/} Source: Industry Board.

^{2/} Source: Rural Engineer Board.

In pursuing these objectives, it maintains close liaison with the agricultural extension services, the ministries concerned and workers' and employers' organisations.

1. It has a permanent secretariat which, in addition to servicing meetings, maintains and keeps up to date general documentation on farm mechanisation and ensures liaison with national or international bodies pursuing the same objects.

2. There is also a National Research and Test Centre for Farm Mechanisation (Centre National d'Etudes et d'Essais du Machinisme Agricole) which has the following objectives:

- Examination and testing of farm equipment and tools for the purpose of advising higher authorities;
- Research and experimentation with prototypes of equipment that might be made locally, by rural craftsmen or industry;
- Testing of locally produced or imported equipment and tools with a view to approval: only approved equipment may be supplied by public establishments or qualify for farmers' loans advanced by the Malagasy National Bank (a State bank);
- Training craftsmen-repairers for farm tools and equipment and instructors in the use of farm machinery;
Instruction in farm mechanisation;
- Keeping up to date of documentation on farm mechanisation.

The work of the Centre is handled by a Director, two engineers, two technical assistants and twelve craftsmen qualified in a variety of trades, together with a varying number of assistants.

Achievements in both the research section and in testing have been considerable and many problems have been solved.

(c) Future needs relate particularly to the training of technicians and the installation of a laboratory for testing motors and tractors.

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INFORMATION ON RECOMMENDED "AREAS OF TECHNICAL ASSISTANCE" IN THE FIELD OF AGRICULTURAL MACHINERY AND EQUIPMENT INDUSTRY

(This information by the country is requested by UNIDO.)

Country	Malagasy Republic	Information supplied by:	Ministry of Agriculture, Rural Engineering Board, National Research and Test Centre for Farm Mechanization	Date: October 1969
Priority No.	Recommended area of technical assistance	Details and nature of assistance recommended	Remarks	
1	Maintenance, preventive inspection and repair of agricultural implements and machinery.	Feasibility study of a handicraft-repairer network for agricultural equipment and machinery. Analysis of potential sources of earnings justifying the establishment of such a network.	Development of the use of agricultural implements and machinery cannot be contemplated without a sufficient maintenance infrastructure to guarantee maximum utilization.	
2	Training for specialist technicians in farm mechanization.	The local agricultural machinery industry has no agricultural technician on its present staff. It therefore seems necessary to train one or two. It also appears to us essential to train a senior technician for testing powered equipment.	The manufacture of agricultural implements and machinery should be supervised both by industrial technicians and agricultural technicians specializing in rural mechanization.	
3	Further training fellowships.	The training of the technicians mentioned above should take place partly locally and partly abroad. The award of fellowships for study abroad would be desirable.		
4	Mission of technicians for testing and preliminary popularisation work.	These technicians would be appointed to undertake tests in specific sectors and preliminary popularisation of the use of agricultural implements and machinery for animal-draught cultivation - duration, three years.	The tasks of these technicians would be determined by the National Research and Test Centre for Farm Mechanization and carried out under its supervision.	

SECRETARIAT OF STATE FOR DEVELOPMENT
OFFICE OF THE COMMISSIONER FOR PLANNING

INFORMATION ON REQUESTED AREAS OF TECHNICAL ASSISTANCE IN THE FIELD OF AGRICULTURE, MACHINERY AND EQUIPMENT, INDUSTRY
(This information by the country is requested by UNIDO)

Country	Information supplied by:	Name: Industry Board (Direction de l'Industrie) Designation: Address: Tananarive	Date: October 1969
Priority No.	Recommended area of technical assistance	Details and nature of assistance recommended	Remarks
1	Possibility study for an industry manufacturing agricultural equipment for hand use and animal-drawn only.	Market analysis and future prospects; product identification; manufacturing policy and technology.	
2	Rationalization and standardization of existing factory.	Adaptation of current production and plant in the light of the study mentioned under No. 1.	The present factory is a converted army maintenance workshop.
3	Possibility study for a manufacturing or assembly industry for tractor-drawn agricultural equipment.		Although there would be nothing against proceeding with studies No. 3 and 1 together, the study referred to here is less urgent
4	Possible establishment of a factory project based on the study in No. 3.		
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