OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

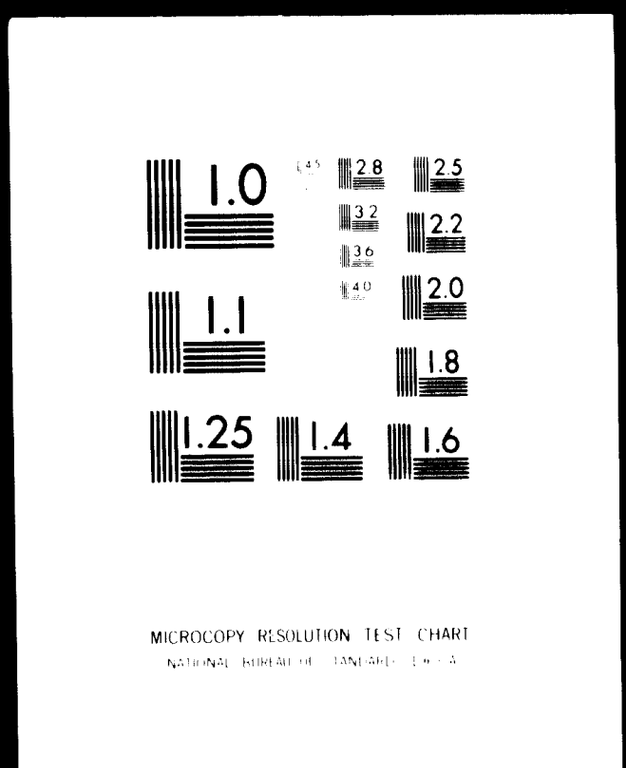
FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org



Restricted circulation

02446

COUNTRY STUDY REPORT

on the

STATUS OF AGRICULTURAL MACHINERY INDUSTRY

in

C E Y L O N

Information compiled
during
a fact finding survey.

UNIDO, Vienna
January 1969

---

* Note: The opinions expressed in this document do not necessarily reflect the views of the Secretariat of ECAFE or that of UNIDO.

INDEX

/Section V

SUMMARY OF COUNTRY STUDY

1. General Pattern of Agriculture

Ceylon has a total area of 6.5 million of ha of which 1.66 only are cultivated and a total population of around 12 million persons. Population pressure upon cultivated land is around 12 persons/ha.

Main crop is paddy with 0.5 million ha of which 0.15 only are really irrigated. Maize, potatoes and other dry crops are being developed in highlands. Tea, rubber and coconut are grown merely by estates - likewise sugarcane in two governmental estates.

Total number of holdings is around 770,000 of which more than 500,000 below.

2. Pattern of Farm Mechanization

Inspite of a great number of working animals (1.9 million), 4 wheel tractors and power tillers are becoming popular with respective population of about 12,500 and 3,200. Free imports are now allowed and demand is expected to reach about 2,000 per year in 1975 for tractors and 3,000 for power tillers.

Harvesting and threshing of paddy is almost entirely made by land and at least threshers are urgently needed. Other implements required are: diesel engines, pumps, sprayers and many hand tools.

3. Industrialization Pattern

Manufacturing facilities and ancillary industries appear to be limited. Only pumps and sprayers are made in significant number by private enterprises and hand tools by two governmental factories.

/4. Conclusions

4. Conclusions

Ceylon agriculture appear to have good potentialities mainly in expanding cultivation of dry crops in highlands.

Power mechanization is needed but demand of tractors is too small for local manufacturing. Power tillers are expected to be made locally by two manufacturers to meet correctly the future demand. New facilities must be provided to private or governmental sector for manufacturing sprayers, threshers, working parts for tillage implements and eventually diesel engines. Technical assistance is needed by pump manufacturers, governmental testing and design centre is to be encouraged in liaison with other regional research institutions.

SECTION I

General Pattern of Agriculture

According to 1966 estimates, the total geographical area of Ceylon is 6.5 million ha of whichtotal agricultural land is 2.3 million ha which constitute about 35% of the total area.

Population in 1966 was 11.5 million to compare with 10.4 million in 1962. Cultivated has increased only at the same time from 1.62 million hectares to 1.66 thus effecting a reduction of cultivated area per head from 0.155 ha to 0.144 respectively.

Population pressure upon cultivated land is around 7 persons by ha.

Total working population is 3.2 million (29%) of total population and total agricultural working population is 1.7 million (15%).

1. Land Utilization

(a) Land distribution by nature

Table 1.1

Distribution of Land Use in Ceylon

		ha (million)	Percentage
Total land area		6.55	
Export crops :	Tea	0.26	3.9
	Rubber	0.23	3.5
	Coconut	0.25	3.8
	Other exports	0.05	0.7
Uplands :	Paddy	0.51	7.8
	Land under development	0.04	0.7
	Others	1.01	15.3
Settlements and non-agricultural lands		0.58	9.0
Wood lands, grass land, marsh and unused lands		3.41	51.8
Salterns		0.20	3.2

(b) Land distribution by crops and agricultural production

Considering the five major crops, the following are the details:

	Crop	Area (000 ha)	% of total
1.	Paddy	537	34.5
2.	Coconut	467	29.9
3.	Rubber	272	17.5
4.	Tea	258	16.5
5.	Karakleam	26	1.6

This shows that if paddy is the more important crop, coconut and rubber are also very significant and tea is the main cash crop in value.

(c) Land distribution by size of holding

Table 1.2

Size in acres	No. of holdings	Percentage to total Nos. of holdings	Extent covered	Percentage to total extent
Less than 1/2	242,690	31.4	58,005	6.4
1/2 - 1	253,823	32.9	147,376	16.4
1 - 2	162,120	21.0	193,794	21.5
2 - 5	85,310	11.1	231,726	25.7
5 - 10	19,705	2.6	122,073	13.6
Over 10	8,260	1.1	146,996	16.3

Coconut, rubber and tea are estate crops with a large holding sizes, whereas paddy is grown by small farmers. Land distribution for paddy only is given as follows:

(i) Paddy land distribution:

Wet zone	155	thousand	hectares
Intermediate zone	100	"	"
Dry zone	254	"	"

(ii) Farm size distribution pattern of developed paddy area

/Table 1.3

Table 1.3

Paddy Area Farm Size Distribution (1964)

Size of holding acres	Number of holdings (000)	% of total numbers	Area (000 acres)	% of total area
Less than 1 acre	863.0	64.3	364.0	24
1 - 2.0 acres	286.0	21.0	340.0	22
2 - 5 acres	150.0	11.1	407.0	25
5 - 10 acres	35.0	2.6	216.0	13
Above 5 acres	15.0	1.1	258.0	16
Total	1,349.0		1,585.0	

Thus it can be seen that 3.7% of number of holding amounting to 50,000 holdings command 29% of the total developed paddy area in the size of 5 acres (2 ha) and above holdings. 25% area is commanded by 150,000 holdings in the range of 2-5 acre farm size (0.8 to 2 ha).

2. Cattle population

Total cattle population is 1.9 million and buffalo population is 1.1 million.

Work cattle in Ceylon are mostly used for highland tillage for subsidiary crops like Chillies, onions, groundnuts, green gran, black gram, etc. under irrigation. But this utilization is very restricted and is not on any appreciable scale to take notice of.

Buffaloes are used to very large extent in wet cultivation of paddy. They are used for tillage with the country plough after impounding water into the terraces. Ploughing, harrowing and levelling are the three operations done by buffaloes. The use of these animals is gradually receding, with the import of more and more tractors and power tillers. In the northern part of Ceylon, namely Mannar, Vavuniya and Jaffna Districts, the buffalo is displaced completed with tractors for paddy cultivation. In the Eastern

/sector

sector namely Batticaloa and Trincomalee there is a significant absence of buffaloes on agricultural work. This trend is infiltrating into the southern and western sector of Ceylon. Polonnaruwa and Anuradhapura Districts are fast moving away from animal tillage. This is perhaps due to limited grazing facilities for animals and also the problem of looking after them the year round for work confined to about two months of the year.

8. Farming Practices and Agricultural Developments

Highland priority is given by the government to food production and the present effort of governmental agencies is directed towards:

(i) Developing and introducing dry land crop as it has been that very large potentialities of dry land exist in the country.

(ii) Improving paddy cultivation.

(a) Dry crops

Maize, potatoes, pasture and animal husbandry must be developed very substantially. Research and extension service work is done in that respect mainly by:

- Dry Zone Agricultural Research Station (Maha - Illupallama)
- Government farm - Pelwehera
- Potato project (with 6 Government seed potato stations located in different places.

More details about these agencies will be given in Section IV.

(b) Improvement in paddy cultivation

From the past seven years, the compound growth of national average in paddy has been 1.82%. The yield per acre of paddy which was 30.5 bushels in 1952 and 36.4 in 1960 has increased to 47.3 bushels in 1967. The farm harvest price which is guaranteed minimum now is Rs. 14 per bushel of paddy. The gross income per acre per season is Rs. 662. The harvest price of paddy is almost equal to CIF international price of imported rice.

With usage of new variety of seeds, fertilizer, water management and cultural techniques, the country hope to reach self sufficiency in paddy by 1980 if growth rate is 5% or even by 1976-77, if the growth rate is about 7%.

(c) Sugar cane

Two Governmental sugar cane estates have been established in the last year in the North of the country.

The one visited by the team - Kanthalai Sugar Project - is remarkable in its attempt to complete mechanization of sugar cane cultivation including laboratory harvesting by sugar cane harvesters manufactured in Australia.

(d) Cash crops

Coconut, rubber and tea are mostly grown by private firms or individual of substantial means, the present effort by the Government is limited in assistance in evolving high yielding harvesting and replanting the old stock with new ones.

SECTION II

Pattern of Farm Mechanization

1. Farm Machinery Population

No systematic survey of farm machinery has been done. The table 2.1 gives estimated population in 1968.

Table 2.1

Estimated Agricultural Machinery Population 1963

Category		Item	Nos.
1) Hand operated machines	a)	Duster	14,000
	b)	Sprayers	29,300
2) Animal drawn implements	a)	Cultivators	8,314
	b)	Improved seed drill cum fert.drill	15
3) Riding tractors	a)	12-18 hp	2
	b)	20-35 hp	1,135
	c)	Above 35 hp	10,581
4) Power tillers	a)	Less than 5 hp	15
	b)	5-10 hp	3,153
	c)	Above 10 hp	1
5) Combine harvester	a)	Less than 1 meter cut	2
	b)	1-2 meters	nil
	c)	Above 3 meters	4
6) Irrigation equipment	a)	Centrifugal pump	2,309
	b)	Sprinkler units	20
7) Tractor drawn implements	a)	Primary tillage implements	11,270
	b)	Seed drill cum fert. drills	15
	c)	Planters cum ferti. distributor	8
8) Plant protection equipment (power)	a)	Duster	150
	b)	Sprayer	1,200
	c)	Tractor mounted sprayer	8

/9) Harvesting

9)	Harvesting equipment (power)	a)	Mower	120
		b)	Reaper	21
10)	Threshers	a)	All types	264
11)	Seed processing	a)	Cleaner	100
		b)	Treater	10
		c)	Rice huller	1,046
12)	Transport	a)	Trailer	4,314
		b)	Transport boxes	191

2. Imports and Production of Farm Machinery

(a) Riding Tractors

(i) Riding tractors imported by local firms from 1950

a. Four wheel tractors imported by local firms -

Ford	1,761	
M.Ferguson	8,494	
International Harvester	786	
Ursus	50	
Fiat	60	
David Brown	74	
Nuffield	11	
John Deere	14	
Zetor	12	
Deutz	6	
Iseki	2	
Kubota	10	
B.M.C. Mini	10	
Imported by Government direct - Farmall	192	(Colombo Plan (gift from (Australia
To farms R.S.O. (East German Gift)	6	
Imported through Co-operative Wholesale Establishment (Fordson Major)	200	
	11,718	(Estimated)

/b. Small

b. Small riding tractors less than 25 hp imported from 1964

Tractors below 35 hp	B.M.C. Mini	Kubota	Iseki
1964	-	-	2
1968	20	20	-
Total	20	20	2

c. Riding tractors above 35 hp imported from 1958

Tractors above 35 hp	Ferguson	Ford	International	Total1/
1958	418	-	11	429
1959	654	108	162	924
1960	607	108	21	736
1961	873	192	19	1,084
1962	740	158	21	919
1963	668	102	7	777
1964	276	62	20	358
1965	144	81	43	268
1966	832	167	50	1,049
1967	1,293	332	210	1,835
1968	709	451	218	1,378
	7,214	1,751	782	9,747

(b) Walking Tractors (Power Tillers) Imported

(i) Walking tractors imported from 1950

2-wheel tractors	Land Master	1,806
	Mitsubishi	683
	Iseki	230
	Komatsu	208
	Shibaura	167
	Kubota	75
		3,169

1/ During middle of 1968, open general import under "TIEDS" of imports of tractors and agricultural machinery was instituted. Hence, many other makes also have been imported.

(ii) Makes and names of importers of two-wheel tractors in 1968

Land Master	-	Browns Group Industries
Mitsubishi	-	Ceylon Services & Supplies
Iseki	-	Sathiyawadi Stores and Motor Transportors Ltd.
Komatsu	-	Photo Cinex Ltd.
Shibaura	-	Freudenberg Ltd.
Kubota	-	General Suppliers & Importers Ltd.
Honda	-	F.R. de Soysa & Co.
Hinomoto	-	Dawson Ltd., (Ceylon Rice Millers Association)
Sato	-	Ceylon Manufacturers and Merchants Ltd.
Yanmar	-	Somasiri Millers (Freedom From Hunger Foundation)

(iii) Walking tractors imported by makes from 1959
Power Tillers - imported

Year	Mitsubishi	Iseki	Kubota	Komatsu	Shibaura	Land Master
1959	-	-	-	-	-	64
1960	-	-	-	-	-	147
1961	-	-	-	-	-	200
1962	-	-	-	-	-	185
1963	28	-	-	-	-	136
1964	114	-	-	-	-	228
1965	57	-	-	-	-	144
1966	82	-	-	-	-	90
1967	57	-	-	-	-	57
1968	345	230	75	208	167	555
Total	683	230	75	208	167	1,806

/(c) Implements

(c) Implements and Attachments Imported

(i) Attachments for 4-wheel tractors imported from 1950

	Fordson	Massey Ferguson	International Harveste-r *	Total
Disc ploughs	269	941	100	1,310
M.B. ploughs	40	557	-	497
Disc harrows	59	678	200	937
Tine trillers	1,035	6,779	500	8,314
Trailers	805	3,909	400	4,314
Rotavators	91	121	-	212
Transport boxes	-	191	-	191
Seed drills	-	15	-	15
Combine harvesters	-	4	-	4
Water pumps	-	7	-	7

* Estimated

(ii) Attachements for 2-wheel tractors imported from 1950

	Land Master	Other Makes *
Reversible ploughs	950	1,000
Water pumps	275	300
Threshers	250	20
Combine harvesters	-	2
Reapers	-	21
Rotavators	-	400
Rotary cultivator sets	850	-

* Estimated

(d) Pumps imported and manufactured locally from 1962

	Imported	Produced	Total
1962	4,729	98	4,827
1963	2,812	174	2,986
1964	4,813	194	5,007
1965	2,795	216	3,011
1966	5,888	276	6,164
	21,037	958	21,995

It is estimated that only about 25-30% of the above are agricultural pumps used for agricultural purposes. Others are industrial, household types. An import duty of 5% from Commonwealth countries and 15% from other countries are levied.

3. Sales of Farm Machinery

Major agricultural machinery sold during the past five years

Items	Nos. sold 1964	1965	1966	1967	1968
1) Riding tractors	358	268	1,049	1,853	1,398
2) Power tillers	342	201	172	114	1,580
3) Primary tillage implements	1,500	1,000	1,700	2,600	3,000
4) Pumps *	1,500	900	1,850		
5) Seed drill ferti. dist.	-	-	-	20	-
6) Plant protection equipment	----------		13,000		----------
7) Threshers	-	6	-	6	6

* 25-30% only for agricultural usage out of total imports.

4. Usage of Farm Machinery

a. The following utilization is reported by official sources:

(i) The popular equipment is the 9 - 11 point tiller with the 35 - 45 hp tractor. Over 8,000 tine tillers have been imported to the country during the last 18 years. Close upon 95% of preparatory tillage work for paddy cultivation is done with this equipment.

(ii) The next stage of preparatory tillage is done with disc plough followed by rotavator or the tine tiller. Use

/of

of the mould board plough is limited. Over 1,200 disc ploughs and over 600 mould board ploughs have been imported so far. However, tine tiller is most popular with tractor for wet tillage.

(iii) Inter-tillage is seldom done with machinery except in Government farms. Even in these farms it is limited to areas cultivated with subsidiary crops and small areas cultivated with paddy.

(iv) Harvesters and threshers are just being introduced. Harvesters are not making headway due to the lodging nature of the Indica varieties of paddy at maturity. Combine harvesters are finding it difficult to harvest the lodged crops and thresh the paddy which is wet at times. Threshers having a stripping action for seperation and a earhead feeding type are just being introduced from Japan. One walking type combine harvester is being tested.

b. Estimated number of hours usage per year

Tractors	1,200 hours/year
Power tillers	400
Seed/Ferti drill	50
Plant protection equipt.	250

c. Estimated usage for custom work

The tractors which are hired out on custom work are either owned by contractors or farmers. The estimated number of acres the unit normally does custom work per year as follows:

/Riding

Riding tractor above	45 hp	-	200 acres/yr
	35 - 45 hp	-	160
	20 - 35 hp	-	120
Power tillers above	5 hp	-	80
Less than	5 hp	-	60

d. Existing utilization pattern of tractors

(i) Total land vehicles including tractors and trailers registered as land vehicles	13,949
(ii) Tractors and other vehicles registered as land vehicles	10,164
(iii) Trailers registered as land vehicles	3,785
(iv) Trailers registered as lorries	2,538
(v) Tractors registered as lorries	1,192

Assuming that all tractors imported after 1958 are in working condition.

The total will be -	Fordson	1,751	
	Massey Ferguson	6,796	
	International Harvester	771	
	Others	257	
		9,575	
	on farms direct	200	9,775

It has been ascertained that most of the farm tractors are partly used for non - farming transport.

5. Estimated Demand of Farm Machinery

Based on the views expressed by others and preliminary investigation, the demand is estimated as follows:

/S'No.

S'No.	Item	Specification	1968	1970	1975
1	Riding tractor	40-50 hp (farming)	1400	600 - 800	1000 - 1,500
		(estate)	50	200	200 - 400
2	Power tiller	5-8 hp	1000	2000 - 4000	5000 - 10,000
3	Pumps agricultures	2" - 4"	1000-1500	3000 - 5000	10000 - 15,000
4	Engine	a) 1-2 hp (sprayers & (pumps	1700-2250	4000 - 7500	10000 - 15,000
		b) 3-5 hp (pumps, threshers)	500- 750	2750 - 5000	7500 - 2,000
		c) 5-8 hp (tillers & (threshers	1800-2000	2500 - 5000	6750 - 12,500
5	Sprayers	a) Hand	5000-7500	10000 - 12,000	15000 - 20,000
		b) Power	1200-1500	2500 - 5,000	5000 - 7,500
6	Threshers (power)	3-5 hp	250	2000 - 3,000	7000 - 10,000

SECTION III

Manufacturing Industries and Ancillary Facilities

1. Farm Machinery Manufactures

(a) Riding tractors

No tractors are manufactured but most of them are assembled from CKD components. That is mainly for the following companies:

Massey Ferguson	Brown and Cies (Colombo)
Ford	Sathiyawadi Stores (Kunuregala)
International Harvester	Ceylon Services and Supplies (Ratmalana)
David Brown Rowsland Ltd. (Colombo)	

These companies have service workshop and repair facilities and important stock of spare parts. Brown and Cies (Massey Ferguson) has also a good training school for mechanics or users and a sales network covering all the country with five branches and 14 dealers.

(b) Walking tractors

Power tillers are not manufactured in present, but

- Brown Group of Companies is assembling the "Land Master" and has plans for progressive manufacturing
- Somasiri Mullers Mfg. are starting to assemble Yanmar power tiller with a scheme towards manufacturing in connection with Freedom from Hunger Foundation (See Appendix III-B).

(c) Agricultural Trailers - 3 to 5 tons range

Being manufactured by the following firms:

1) Browns Group Industries
2) Rowlands Ltd.
3) Walker Sons & Co., Ltd.

/4) Sathiyawadi

4) Sathiyawadi Stores & Motors Transporters Ltd.

5) Ceylon Services & Supplies Ltd.

All firms import the wheel axles, hubs, rims and the hydraulic lift components.

(d) Agricultural Implements and Attachments

All implements for riding tractors are imported. However, for power tillers, attachments such as puddling wheels, rotary tiller components, trailers are being locally fabricated. The following is the local production of attachments for land master 2-wheel tractors:-

Threshers	250
Winnowing fans	70

(e) Cage wheels

Almost all tractor companies manufacture their own with imported raw materials accounting for 80% of the total cost of the cage wheels.

(f) Water pumps

Two companies namely, Jinasena Ltd., Walker Sons & Co., Ltd. manufacture pumps (capacity 1/2" to 6") but with imported engines and electric motors.

(i) Out-put of water pumps

	1962	1963	1964	1965	1966	1967	1968
Jinasena & Co.	98	174	194	216	276	700	207
Walker Industries Limited	"	"	"	"	380	167	352

(ii) Distribution

Domestic	65 percent
Industrial and service	15 "
Agriculture	20 "

Source: Economic Intelligence Unit of London Trade Survey.

/(g) Engines

(g) Engines

No small engines are manufactured in Ceylon.

(h) Threshers

One company, Messrs. Browns, manufacture threshers for their 5 hp land master tractors. About 250 have been manufactured with imported raw materials.

(i) Sprayers

There are several approved manufacturers in knapsack handsprayers and power sprayers:

	Total local production
Baur & Company	23,600
Hayleys Ltd. (see Appendix III-A)	2,900 (500 knapsack type)
Colombo Commercial Co.	Not available
Jinadasa Industries	Not available
Diesel & Motor Engineering Co.	Not available

(j) Agricultural hand tools

State Hardware Corporation (see Appendix III-B)

Mammoty etc.	119,971
Spanners	22,000
Total	141,971

(k) Local seeders and weeders

Department of Agriculture, Implements Factory, Welisara. (see Appendix III-B)

(i) Production during last ten years

Hand weeders	24,954
Hand seeders	14,423
Pullock drawn ploughs	244
Winnowers	78
Hand tools (Mammoty, etc.)	1,637

/2. Other

2. Other production facilities

A few of the firms located in Colombo have facilities available for castings, machining etc. There are also three Goverment Institutions that have such facilities, namely:-

(i) Government Factory of the Public Works Department in Colombo
(ii) State Hardware Corporation in Colombo
(iii) Implements Factory of the Department of Agriculture in Colombo

However, the actual spare capacity, availability of specific machinery for specific operations and cost analysis is not known.

There is also limited manufacturing facilities available with the following:

(i) Brown & Co., Colombo are manufacturers of two-wheel garden tractors called Land Master fitted with imported engines.
(ii) Jinasena & Co., Colombo are irrigation pump manufacturers. Engines and electric motors for the pump units are imported.
(iii) Walker Industries are also irrigation pump manufacturers. Engines for the pumps are imported.
(iv) Somasiri Mullers, Colombo have just recently commenced manufacture of a limited range of Japanese equipment like threshers, water pumps and two-wheel tractor components.

(a) Castings:

Only grey cast iron is available. Some of the firms which has foundry are:

(i) State Hardware Corporation
(ii) Brown & Co.
(iii) Walker Corporation
(iv) Jinasena & Co.

/(b) Forgings:

(b) Forgings:

Only "State Hardware Corporation" has facilities.

(c) Sheet Metal:

No facilities available.

(d) Heat Treatment:

Facilities available only with State Hardware Corporation.

(e) Rubber parts and gaskets:

Only one company (Richard Peeris) manufactures limited range with imported raw material.

(f) Electrical parts:

Only one firm (Mayagams) manufactures certain electrical components on a limited scale. Certain details of the above manufacturing facilities are given in Appendix III-c and List of approved industries in Appendix III-D.

I. Availability of machine tools

No machine tools are manufactured in Ceylon. All machine tools are imported.

II. Availability of iron and steel

All iron and steel is imported. All other basic metals such as copper, aluminum, lead, nickle, zinc etc. are also imported. The following table gives the import of basic metals to Ceylon in 1962 and 1966.

/Table 3.1

Table 3.1

Imports of Base Metals

	1962 volume '000 cwt.	Value Rs.'000	1966 volume '000 cwt.	Value Rs.'000
Iron and steel	1,513.9	63,883.2	5,351.4	48,296.0
Copper	8.4	1,813.5	12.5	4,131.6
Aluminium	57.6	11,007.6	48.4	9,374.1
Lead	4.9	334.8	8.5	746.5
Zinc	2.5	278.7	5.8	594.2
Tin	50.5	1,685.7	61.6	4,106.8
Nickel	-	-	-	6.7
Miscellaneous	.9	215.8	.4	278.9
Total	1,658.7	80,219.3	5,488.6	67,534.8

Source: Customs.

A rolling mill for rolling out round bars for construction purposes from mild steel billets has been partially commissioned.

III. Quality Control and Inspection

Except for the couple of Government firms, no other manufacturer appears to have any quality control and inspection techniques. There are no testing equipment and inspection personnel. This is especially true with respect to various small foundries.

IV. Availability of locally made components

1) Tyres and tubes (not tractor tyres at present)
2) Engine filter elements
3) Batteries
4) Silencers (exhaust)

There are plans to manufacture certain forgings and clutch facing.

/Appendix III-A

Appendix III-A

Details of Government Factories

1.	Name	Agricultural Engineering Factory	State Hardware Corpn.
2.	Address	Dept. of Agriculture Wali Sara P.O. Ragama	Yakkala Ceylon
3.	Total area	NA	NA
4.	Products	Bullock and hand drawn implements such as seeders and weedors etc.	Builders of hardware, cuttlery, hand tools, shovels, hoes, axes, etc.
5.	Facilities	Machine shop, welding, fabrication	Brass foundry - 400 t/yr Machine shop Cold press shop Electro plating Heat treatment Forge shop Tool Room, paint shop etc.
6.	Staff	Total 127 Engineering 4; Workers 112	Total 1,500 Productive 1,073
7.	Wages (Gross)	M.S.I. - Rs. 250-300/pm M.S.II - 175-250/pm US - 120-150/pm Eng.grand.- Rs. 650/pm - Rs. 1200/pm	NA
8.	Total turnover	Rs. 497,000 (1967-68)	NA
9.	Remarks	a) A well maintained shop b) Increase of prices of weeders and seeders has resulted in high inventory c) Need going into other items such as plant protection and threshers.	a) Labour orientated industry b) High labour cost and high cost of productivity prevent export potential c) Product line too limited d) Hesitency to enter into agricultural machinery line because of insistance on high volume.

Appendix III-B

Details of a few private manufactures

1.	Name	Jinasena Limited	Somasiri Hullers Mfg.	Walker Industries	Hayleys Ltd.	Land Master Div.
2.	Address	Hunupitiya Road Colombo	Kohuwala, Nugegoda	208, Korte Boam Str. Colombo-15	21, Foster Lane Colombo-10	Brown Group of Industries, Ratmalana, Ceylon
3.	Total area	NA	NA	NA	NA	NA
4.	Staff	Total 80 workers Offiders 12	Total 100	NA	Total 50	NA
5.	Product line	Pumps for irrigation industry, household	a) Rice hullers, milling & polishing m/c (Collaboration with Kyowa of Japan) b) Assembly & sale of Yanmar Power Tillers	a) Pumps 2" b) 'Wilko' grinders	a) Hand sprayers b) Power sprayers	a) Land master power tillers b) Paddy threshers
6.	Manufacturing Program	1968 - 200 units 1969 - about 100 units 1963 - 30% for agriculture 1968 - 50% for agriculture	a) 30 hullers etc/pm b) Planning to establish new factory for assemble of power tillers	Grinders 10/month Pumps about 350/yr	a) 1969 Handsprayer 2400 Power " 500 b) 1970 Handsprayer 4000 Power " 1000	a) Sold 1800 since 1959 b) Assembled 300 since Jan.67
7.	Imports	a) Velliers gasoline peter diesel engines 3.5 hp, 1.7 hp and 5 hp	a) 5% on processing m/c b) 100% of power tiller	a) Engine and motor imported	a) 98% of power-sprayer incl. engine (Saturnus-snv. Holland) b) Handsprayer from Japan	Proposed import contact: 1st stage-68% 2nd stage-40% 3rd stage-28%

8.	Facilities	a) Foundry CI-20 tons/pm Aluminum) Brass) 1 ton/pm b) Machine shop	a) Foundry b) Machine shop	a) Foundry b) Machine shop	a) Machine shop b) Fabrication	a) Machine shop
9.	Turnover	About Rs. 1.5 million	About Rs. 1.5 million	-	-	-
10.	Future plans	a) Small engine b) Paddy tractor c) Expansion of capacity of pump manufacture	To progressively manufacture power tillers of Japan a) Land area 1 acre b) Proposed cover area 15,000 sq. ft. c) Estd. Rs. 2 million capital d) Capacity - 1000 tiller/year e) Staff - 30 first year -110 fifth year f) Expected selling price 6 hp - Rs. 4,506 7.5 hp - Rs. 5,134	NA	a) To make nozzles, pumps etc. of sprayers.	For the present only cagewheel, puddling wheels fabricated locally. Has plans to make 100 units a month with 32% local content.

Appendix III-C

Existing Industries - in Production

	Estimated production	
Agricultural Tractors	**1967**	**1968**
1. Brown & Co., Ltd.	1,400	800
Mist Blowers and Knapsack Sprayers		
1. Hayleys Ltd.	2,300	2,200
2. M.P.I. de Silva	95	400
3. Colombo Commercial Co., Ltd.	Newly registered	
Water Pumps		
1. Jinasena Ltd.	800	858
2. Walker Industries Ltd.	1,000	632
Agricultural Trailers		
1. Associated Eng. Co., Ltd.	60	
2. Rowlands Ltd.	75	
3. Brown & Co., Ltd.	630	
4. Sathyawadi Stores	Newly registered	80
5. The Colombo Commercial Co., Ltd.	-do-	20
Rice Hullers		
1. Dheerasekera Motors	70	125
2. Somasiri Hullers	151	250
3. Walker Industries Ltd.	46	58
Manufacture of Machinery, n.e.s.		
1. Brown & Co., Ltd. - Assembly/manufacture of power tillers and ancillary components		500 units
Machinery Spares, n.e.s.		
Nelson Industries - Tractor trailer pin Tractor rubber pads Tractor rubber rollers		

/Dias

Dias Industries	- Tractor rim bolts, cagewheel bolts, rivet bolts, tractor tiller armature clamp, tiller universal bolts, tiller pins
Alight Motor Works	- Link pin & nut, top link pin, collar bush, 1 bracket bolt, cotter pins axle-collar, hitch studs, tiller bracket, tiller shovels, axle nuts
Dias Garage	- Togal bolts, tie rod ends
K.K. Ariyadasa	- Tractor nuts and bolts, tiller blades, tar bolts
Raja Eng. Industries	- Hydraulic oil cover, lift shafts, brake drums, trailer hubs, mud wheels axle coblers, brake drums
Metro Industries	- Bushing spindle trailer beam bolts

Source: List of approved industries - Ministry of Industries and Fisheries.

Appendix III-D

Approved in 1967 & 1968 - not yet in production

	Production Capacity Per Annum
Tractor Parts	
Balans Auto Industries	(various) 182,700 units
Mount Motor Ways Ltd.	(various) 307,000 " (Tractor Parts)
Tools & Agricultural Machinery Ltd.	(Mud wheel - 5000 (Ploughs & tillers 5000 (Paddy rice graders 200
The General Finance & Credit Co., Ltd.	1,800 Nos.
Rice Hullers	
J.A. Kamalaratne	2,000 Nos. Huller Nets
Tissa Industries	120 Hullers
Power Tillers	
Browns Group Industries Ltd.	3,000 units
Knapsack Sprayers & Mist Blowers	
A.B.C. Industries & Co., Ltd. (Baur & Co., Ltd.)	900 Sprayers 100 Mist blowers 30 Weed slashers
Jinadasa Industries	9,000 to 12,000 sets
Diesel & Motor Engineering Co., Ltd.	4,000 Sprayers
Mini Powers Ltd.	800 Sprayers

Source: List of Approved Industries - Ministry of Industries & Fisheries.

SECTION IV

POLICY TOWARDS FARM MECHANIZATION

1. General Policy of the Government

Up to 1964, there was import restrictions regarding foreign exchange allotment for import of tractors. In 1965, restriction was liberalized and a quota system was introduced. From the past three years, no more than 1,000 tractors have been imported per year. In 1967, a 'Tractor Committee' was formed to recommend the import policies with respect to quota allotment for tractor for first half of 1968.

(a) Committee on Tractors

A Committee consisting of various representatives from the Ministry of Industries, Finance, Planning and Economic Affairs, and Agriculture and the University of Ceylon was formed in August 1968 to investigate the problems of tractor import, sales and usage and recommend to the government a programme and also advise regarding the import policies for the first half of 1968. The following are its interim observations and recommendations:

(i) There is no accurate figures regarding the number of tractors engaged in agricultural work, number of tractors not in working order, number of tractors used for exclusive transport work. Hence it recommended that a survey to be reorganized on a national scale regarding the tractor population and usage.

(ii) The Committee felt that there is no agency to test the relative merits of tractors and implements imported regarding suitability in Ceylon. Hence it has recommended establishment of a Design, Development and Testing Station.

/(iii) It

(iii) It has also recommended that a policy of imports for agricultural tractors must permit the element of choice, but operating within the framework of suitability and a context of real competition between sellers of tractors in Ceylon.

(iv) Based on their own analysis, the Committee recommended import licence to be issued to import 325 riding tractors above 20 hp, (275 for paddy cultivation and 50 for estates), 6 riding tractors of 10-20 hp and 1,000 power tillers of 5-7 hp with rotary tillers.

(b) Present Programs

The present programme to promote the use of Agricultural machinery is not clearly laid out. The Government however is fully aware that mechanization of agriculture, particularly paddy production, is an urgent necessity. Two institutions have been created to further this end. One is the Tractor Committee and the other is the Designs and Testing Unit. The Tractor Committee largely functions as an advisory and policy making body for the Government and the Designs and Testing Unit functions largely as an evaluation unit with a view to preventing unsuitable machinery getting into the Island causing waste of foreign exchange. The Designs and Testing Unit will also engage in improving and modifying agricultural machinery to suit local conditions.

Government commenced operating tractor units consisting of 10-25 tractors with suitable tillage equipment for hire to farmers. This work commenced in the year 1948 and still continues. These Units function as a non-profit making concern. Within the last two years on Government insistence, the private sector, notably the tractor companies, started operating tractor units for hire of tractors. This venture did not sustain as most Companies

/ran

ran into management problems and did not make substantial business gains. Both the Government and private sector are keenly interested in promoting agricultural mechanization as it is the only means to quick production in paddy and subsidiary crops aimed at self sufficiency.

During middle part of 1968, Government included tractors and farm machinery under open general licence program under "Foreign Exchange Entitlement Scheme" which enables to procure foreign exchange in open market - which is about 40% higher now - for import of farm machinery. An import duty which is less than 10% on tractors and spare parts is levied.

(c) Design and Testing Unit

A Design and Testing Unit has been established at the Dry Zone Research Station, Maha-Illuppallama. The objectives are testing of imported machines, carrying out local modifications, development of animal drawn, naval and power implements and equipments.

2. Rural Development

(a) Credit Facilities to Farm Owners

Government has devised a scheme whereby the People's Bank, Bank of Ceylon and Co-operative Banks will grant loans to Co-operative Societies for the production and marketing of agricultural crops.

The Department of Agrarian Services grants medium-term and long-term loans for the construction of go-downs, fertilizer stores, purchase of pumps, agricultural machinery and equipment for construction of wells, etc.

The maximum credit limit for paddy cultivation has been fixed at Rs. 262.- per acre. The maximum extent on which loans can be taken is limited to ten acres. The amount of loans is split up as follows:-

/(i) Seed

(i)	Seed paddy	Rs. 32.00
(ii)	Ploughing	60.00
(iii)	Fertilizer	95.00
(iv)	Transplanting or row-seeding	25.00
(v)	Hand weeding	25.00
(vi)	Pesticides	25.00
		Rs.262.00

(b) Minimum Harvest Price

The following crops enjoy floor price and subsidy.

		(Rupees per cwt. unless otherwise stated)
1)	Paddy per bushel	Rs. 14.00
2)	Maize	19.00
3)	Kurakkan	15.00
4)	Toor-dhal	40.00
5)	Cotton	60.00 (Grade I)
		50.00 (" II)
6)	Mustard	54.00
7)	Gingelly	38.00
8)	Chillies	252.00 (Grade I)
		196.00 (" II)
9)	Green Gram	49.92
10)	Tamarind	33.60
11)	Black pepper	140.00
12)	Cow pea	33.60
13)	Groundnuts	49.28
14)	Turmeric	84.00
15)	Potatoes	33.60
16)	Red onions	34.72 to 22.40
17)	Bombay onions	35.84

/(c) Cooperatives

(c) Co-operatives and Rural Credit

Feeable attempts are being made. Earlier Tractor Units run by Co-operatives failed after a few years due largely to lack of technical know-how.

There are about 4,000 multipurpose cooperatives in the country. But there are no tractor cooperatives or cooperative usage of tractors. However, many cooperative societies grants loan to members on 6% interest charge. If also supplies inputs to farmers and market the produce. 90% of fertilizer is supplied through cooperatives with 50% subsidy from the government.

The Finance Companies and peoples Bank normally grant loans on tractors up to 75% of value to a maximum of Rs. 15,000 on 8½-9% interest charge.

(d) Irrigation System

An additional of 94,800 ha of land would be provided with irrigation before 1970, and existing irrigation facilities will be improved for 56,800 ha. The first stage of the Mahaveli Ganga Diversion Scheme has commenced. This will provide assured irrigation facilities to about half the total area under paddy in Ceylon.

(e) Fertilizer

A fertilizer plant is to be established for the local production of Urea. All sales of fertilizers are subsidized at 50%. The average usage of fertilizer on paddy is about 60 lb per acre. Total annual subsidy budget is about Rs. 25 million.

/The

The fertilizer plant is expected to produce 280,000 tons of urea and 75,000 tons of ammonium and sulphate utilizing the by-products of the petroleum complex which is expected to be completed in 1969.

(f) Pesticides

Government has given licences to manufacture locally, power sprayers and hand-operated sprayers. Two companies are already in this business. They are Messrs. Hayleys Ltd., and Messrs. Baur & Co., Ltd., both of Colombo. Several companies have been approved for formulation of pesticides locally.

The Department of Agriculture has a net work of Extension Centres, districtwise in charge of Agricultural Instructors. These Centres, if they are located in areas not served by the commercial sector, stock pesticides among other agro-chemicals for sale. A good number of Multi-purpose Co-operative Sociesties too stock pesticides.

(g) Land Ceiling

There is no land ceiling laws. In new settlement areas, normally 1.2 ha of wet land and 0.8 ha of upland is granted to settlers. However, any one or organizations with financial resources can take on 25 years lease land even 400 ha for development and cultivation.

3. Research, testing and educational institutions

(a) Design and Testing Units (Maha Illuppalama)

Established as said later, upon recommendation of the Tractor Committee this unit depends from the Ministry of Agriculture and is located at the Dry Zone Research Station.

With a staff of 5 service members (2 engineers and 3 agricultural instructors it has undertaken significant testing and design work about farm machinery.

/(i) Testing

(i) Testing

Tests are conducted according to the procedures of Institute of Agricultural Machinery of Japan. Emphasis being given to practical performance in normal working conditions. 4 tractors, 4 power tillers and 4 threshers. A combine have been or are being tested.

(ii) Design

Useful information of improvement of existing machines or entirely new units are being designed or tested of which:

- A universal seeding unit to be operated by hand or by two or four wheels tractor
- A paddy thresher rasp bar type
- A rotary weeder
- A cow driving gas plant

With a limited staff and in spite of lack of modern equipment, the Design and Testing Unit has proved to be able to give significant help for developing farm mechanization in Ceylon.

(b) Other Farm Research Agencies

Although interested merely in agronomical research these agencies are to play an important role in demonstrating the use of farm machinery:

(i) Government Farm, Polwehera

This farm has 1065 acreas. Apart from extension work in the field ofagriculture, and animal husbandy, it has training programme for students, namely the practical farm school and six months training in crop specialization for group of students from Kundasale Farm School.

/(ii) Dry

(ii) Dry Zone Agricultural Research Station - Maha-Illuppallama

The Institute has carried out work in the field of cropping pattern, soil classification, water table studies, rainfall and moisture patterns, conservation tillage practices fertilizer usage, crop improvement, agronomical trails on certain crops suitable to dry zone areas. It has developed hybrid varieties of various seeds. It has various research programmes in the field of cash crops, vegetables, horticultural crops, pasture and animal husbandry, industrial crops, soil and water conservation and agricultural machinery and implements.

The research station has 550 acres of land with 155 acres of paddy. 60 acres of trees, 175 acres of permanent pasture, 215 acres of arable high-land and 240 acres of used area. There are 7 agricultural officers, 18 agricultural instructors and 30 other staff apart from 115 permanent labour force.

(iii) Potato Project Units

Five stations are demonstrating potatoes - cultivate and producing improved seeds.

(c) Agricultural Engineering Education

The Faculty of Agriculture of the University of Ceylon is the only institution which imparts education in agriculture in Ceylon. Agricultural engineering is taught as a subject only to all agricultural students; 60 hours in second year, 120 hours in third year and 150 hours in fourth year out of 1100 hours of teaching.

It is proposed to reinforce agricultural engineering section as 'bridge faculty' between Department of Agriculture and Mechanical Engineering.

/4. Training

4. Training and Extension Service

(a) Governmental Agencies

Department of Agriculture - Usage and Training of Farm Machinery

Engineering Division

At present there are workshops and repair depots for farm machinery at Gannuruwa, Anuradhapura, Marahenpita, Polonnaruwa, Sita Eliya, Ambalantota, and Maha-Illuppallama. Besides there are 18 machinery ports scattered all over the country for the purpose of hiring out farm machinery to farmers and other organizations. The following are the current rates for custom work.

1)	Disc ploughing	Rs. 60.00 per acre
2)	Disc harrowing	Rs. 60.00 per acre
3)	Double type tilling	Rs. 55.00 per acre
4)	Ploughing with rotavator	Rs. 35.00 per acre
5)	Threshing and/or winnowing per day of 8 hours	Rs. 80.00
6)	Tractor with trailer per day of 8 hours	Rs. 96.00
7)	Tractor with Harland or similar pump per day of 8 hours	Rs. 96.00

Reference: Transplanting of paddy by hand in local area - Rs. 75.00 per acre.

The department maintains 350 rubber tyred tractors, in working order and 200 tractors which require major overhaul. In 1969, it is expected to add about 200 new tractors and also repair majority of the tractors. The department has also 40 crawler tractors for land development.

/The

The other activities include:

a. Production work at Welisara

b. Kangaroo Tractor Station at Annuradhapura which started in 1953 with a gift of 190 tractors from Australia.

c. Engineering workshop at Gannoruwa.

d. Repair workshop at Maha-Illuppallama to serve the Agricultural Research Station.

e. Repair Depot at Sita-Eliya to serve the potato project station.

(b) Private Sector

The main tractors and power tillers distributors have facilities for repairing and training mechanics. Massey Ferguson as said before has a good training school.

SECTION V

POLICY TOWARDS INDUSTRIALIZATION

1. Incentives to Agricultural Machinery Industries

There is no exclusive privilege given to agricultural machinery manufacturing industries. The general investment incentives given to other industrial enterprises cover the agricultural machinery manufacturing industry. However, the general industrial investment incentives offered consists of:-

(a) protected market

(b) tax concessions

(c) industrial estate facilities

(d) wider promotion functions of the Industrial Development Board, and

(e) export promotion incentives

a) Protected market

When local products are available, it is the policy of government to either ban imports of the particular product or subject it to a tight quota. This appears to be a much more efficient encouragement for industrial development than high tariff protection.

b) Tax concessions

The profits from a newly established industrial undertaking is exempted from Income Tax for a period of five years, also dividends paid to share holders are exempted from Income Tax. The following concessions are also permitted:

/(i) Lump

(i) Lump sum depreciation is granted in respect of plant, machinery fixtures and certain buildings,

(ii) A development rebate of 20% is also allowed as business profits, and it is increased to 40% in the case of Ministry approved projects,

(iii) The salaries and other income of foreign experts not paid in Ceylon are free from Income Tax for three years, if they work for industry entitled to a five-year tax free holiday.

c) Industrial estate facilities

The Government encourages the establishment of small and medium-size industries through industrial estates. The Industrial Estate Corporation established in 1960 provide local manufacturers suitable factory buildings and sites at low rent within easy reach of facilities, like transport, water, power, banking. There is already one such estate established near Colombo. It is proposed to set up three more in Galle, Kandy and Jaffna.

d) Industrial Development Board

The Industrial Development Board of the Ministry of Industries will set up new agencies such as Investment Information Centres and Industrial Supply Agency, Management Development and Productioning Centre. All with the idea of industrial promotion.

e) Export promotion incentives

Industrialists are given special incentives like:

(i) tax holiday for three years on profits derived from export business,

/(ii) income

(ii) income tax rebate of 5% on the F.O.B. value of goods exported, if the export bring in 25% earning in foreign exchange,

(iii) priority issue of foreign exchange for imports of raw material required for carrying out of export orders,

(iv) full rebate on customs duty on imported raw material used for export manufactures,

(v) waiving of business turn-over tax and excise duties on exported goods, and

(vi) permission to offset advertising expenses abroad for export produce from tax.

f) Incentives to foreign investors

Incentives to investors are covered in Section iv (b). Assurance given to Private Foreign Investors are as follows:

(i) Government assurance that foreign investors will enjoy without discrimination all the advantages and incentives open to local interest through an approved investment,

(ii) Remittances can be made freely of (i) profits and dividends accruing to foreign investors, (ii) interest owing to the non-residents on debentures, preference shares, over-drafts, etc., (iii) proceeds of sales or liquidation of investments, (iv) maintenance allowance for families of foreign personnel on retirement, and (v) reasonable royalty payments, technical services fees.

(iii) Foreign investors will be secure from expropriation or nationalization. Investment guarantees have been signed with

/the

the U.S.A. and West Germany, and the Government is prepared to negotiate similar agreements with other capital-exporting countries.

SECTION VI

CONCLUSIONS

1. The Government of Ceylon is anxious to improve the agriculture and introduce farm mechanization.

2. The new policy of the Government allowing free import of farm machinery under "Foreign Exchange Entitlement Scheme" is to follow carefully. It will be favourable to the customers because of competition between dealers involving lower prices and better services. But upon such a small market it could be feared a too large proliferation of different models.

3. There is a good scope for 4 wheel tractors with a market of around 1,400 a year expected to increase to 2,000 by 1975, the most of them in the range of 35/45 hp. Altogether due to the small number and lack of manufacturing facilities no real manufacturing is to be reasonably expected apart from a small percentage of local accessories.

4. Demand for power tillers is expected to increase from 800 at present to 3,000 in 1975 - the existing plans for manufacturing appears to be too sketchy and must be concretised - two local fabrication units could be feasible.

5. There is a good demand for engines mainly small diesel engines from 4 to 8 hp. The feasibility of manufacturing almost are types must be studied considering the necessity of regional co-operation.

6. The ancillary industry has not yet developed. The capacity of existing industries to go in for manufacture - in the real sense - is limited.

/Technical

the private sector, notably the tractor companies, started operating tractor units for hire of tractors. This venture did not sustain as most Companies

/ran

Technical assistance must be given to the existing foundries operating on a very small scale and without good quality control.

7. Supply of pump for irrigation can be made by local manufacturers provided they improve their manufacturing technique, their equipment and their quality control.

8. There is a good demand for many agricultural implements that can be easily made locally, viz. hand tools, seeders, weeders, paddy threshers, implements for tractors, trailers, cultivators and also plant protection equipment.

9. The two governmental factories which have good production facilities could take care of the manufacturing of the most of these implements. The Agricultural Engineering factory is naturally to make the simplest are including threshers. The State Hardware Corpn. because of its forging capacity can undertake the production of working parts for cultivators and rotary tillers.

10. The present manufacturers of sprayers (hand and knapsack) appear to be able to meet the future demand pending they improve their equipment and their quality control. They must manufacture locally all parts including the pump (except the engines which are to be imported).

11. These recommendations involve that the manufacturers must be able to supply raw materials and manufacturing equipment and at reasonable prices. Limited import protection must be necessary at first stage.

12. It is suggested drastic measures to be taken for clearing up numbers of old tractors and of order staying in different governmental agencies including tractor units, experimental farms, sugar cane estates.

/13. Design

13. Design and testing station has made a good start. It is hoped that it will lay sufficient emphasis on practical testing, and designing of improved implements needed by Ceylon farmers and evolve a successful relationship with research institutions of other countries.

Appendix A

References - Literature

1. Country Report for Ceylon on Industries manufacturing Agricultural Machinery for Fact-Finding Team of the ECAFE/UNIDO. Prepared by the Agricultural Machinery Design and Testing Unit, Department of Agriculture - 12.12.68.

2. Interim Recommendations of the Committee on Tractors (20 Dec. 1968)

3. Various Notes submitted by Different Sections of Agricultural Departments.

Appendix B

Persons & Organizations visited

1. United Nations Development Programme in Ceylon
   204, Bhavddha Loka Mawatha
   Colombo-7
   a) Mr. Himalaya Rona
      Deputy Resident Representative
   b) Mr. Amara Sinha
      Programme Assistant

2. Directorate of Agriculture, Ministry of Agriculture
   No. 9, Horton Place
   Colombo-7
   a) Mr. M.S. Perera
      Director of Agriculture

3. Directorate of Agricultural Development
   Ministry of Food & Agriculture
   Colombo
   a) Mr. Neal Pandara Nayaka
      Director of Agricultural Development
   b) Mr. Gamani Irrigolle
      Deputy Director of Agricultural Development

4. Food & Agriculture Organization
   a) Mr. Vidya Sagar
      Agricultural Economist - FAO Special Fund on Planning
      Ministry of Food & Agriculture
      Colombo

5. Agricultural Engineering Factory (Implement Project)
   Department of Agriculture, Wali Sara, Post Pogana
   Ceylon
   a) Mr. J.K.G. Fernando - Engineer-in-Charge

/6. State

with a staff of 5 service members (2 engineers and 3 agricultural instructors it has undertaken significant testing and design work about farm machinery.

/(i) Testing

6. State Hardware Corporation
   Yakkala, Ceylon

7. Janasena Limited
   Engineers
   Hunupitiya Road
   Colombo
   a) Mr. T.S. Jinasena, Chairman

8. Sonasiri Muller Manufacturers
   Kottuwala
   Nugegoda, Ceylon
   a) Mr. M.D.P. Dias, Managing Director

9. Ceylon Fertilizer Corporation
   Colombo
   a) Mr. A.T.M. Silva, Chairman CFC
   (also Chairman Tractor Committee)

10. (i) Brown & Company
   Agricultural Division
   Deva Nambiar Tissa, Colombo
   a) Mr. P.J. Pen Rice, Manager
   b) Mr. Jayesingha A.V., Technical Manager
   c) Mr. A.H. Wilson, Manager-spares

(ii) Walker & Greig
   (Subsidy of Brown & Co.)
   Dias' Place, Colombo
   a) Mr. Gunaratne, Chief Engineer

(iii) Land Master Division of Brown & Co.
   Ratmalana, Ceylon
   a) Mr. Nissanka Perara, Manager

11. Rowlands Ltd.
   103 Turret Road, Colomb-7
   a) Mr. Hepworth, Managing Director
   b) Mr. KMG Atukorale, Secretary

12. Directorate of Industrial Development
Ministry of Industry & Fisheries
Government of Ceylon, Colombo
a) Mr. Vincent Pandita, Director of Development Industry
b) Mr. Muwanendran, Deputy Director

13. Walker Industries (Ceylon) Ltd.
Pump Assembly Section
208 Kortebosm Street
Colombo-15
a) Capt. Wijendra - Manager
b) Mr. M.B.M. Rodrigo - Supdt. Foundry

14. Hayles Ltd.
21, Foster Lane
Colombo-10
a) M.A.S.M. Mohudeew - Manager
b) S.K. Iyer - Works Manager

15. Ceylon Services & Supplies Ltd.
Ratmalana, Ceylon
a) Mr. Hugh de Alwis - Director
b) Mr. A.H.V. de Alwis

16. Agricultural Research Station (Dept. of Agriculture)
Seeta Ellya, Colombo
a) Mr. V. Sathianantham - Dist. Agri. Ext. Officer
Nuwara Ellya Dist.
b) Mr. Bandaranayak
Officer-in-Charge
Tractor Section
c) Mr. Ganeshan S.
Research Officer-in-Charge
d) Mr. Subramanyam K.
Adm. Officer

/17. Chief

17. Chief Engineers Workshop, Engineering Div.
Gannoruwa, Peradeniya
Ceylon
a) Mr. L.R.L. Perara - Chief Engineer
b) Mr. J. Weera Mantry
c) Mr. K. Kanesu

18. University of Ceylon, Faculty of Agriculture
Peradeniya
a) Prof. V.E.A. Wikrama Nayake
Sr. Lecturer in Agri. Eng.,
Consultant Design & Testing
Stn.,Member Tractor Committee

19. Sathiyawadi Stores & Motor Transporters Ltd.
21, Dambulla Road
Kurunegala, Ceylon
a) Senator N.M. Appuhamy
Managing Director
b) Mr. M.M. Dharmadasa
Director

20. Agricultural Station
Dept. of Agriculture
Pelwhera, Dambulla, Ceylon
a) Mr. S. Samarakoon
Farm Manager

21. Kanthalai Sugar Project (Lank Sugar Corporation)
Kanthalai, Ceylon
a) Mr. Amarsena - Chief Engineer
b) Mr. Sambathan - Plantation Manager
c) Mr. Huth -Colombo Plan Expert - Plantation
d) Mr. Wright - Colombo Plan Expert - Factory

/22. Kangaroo

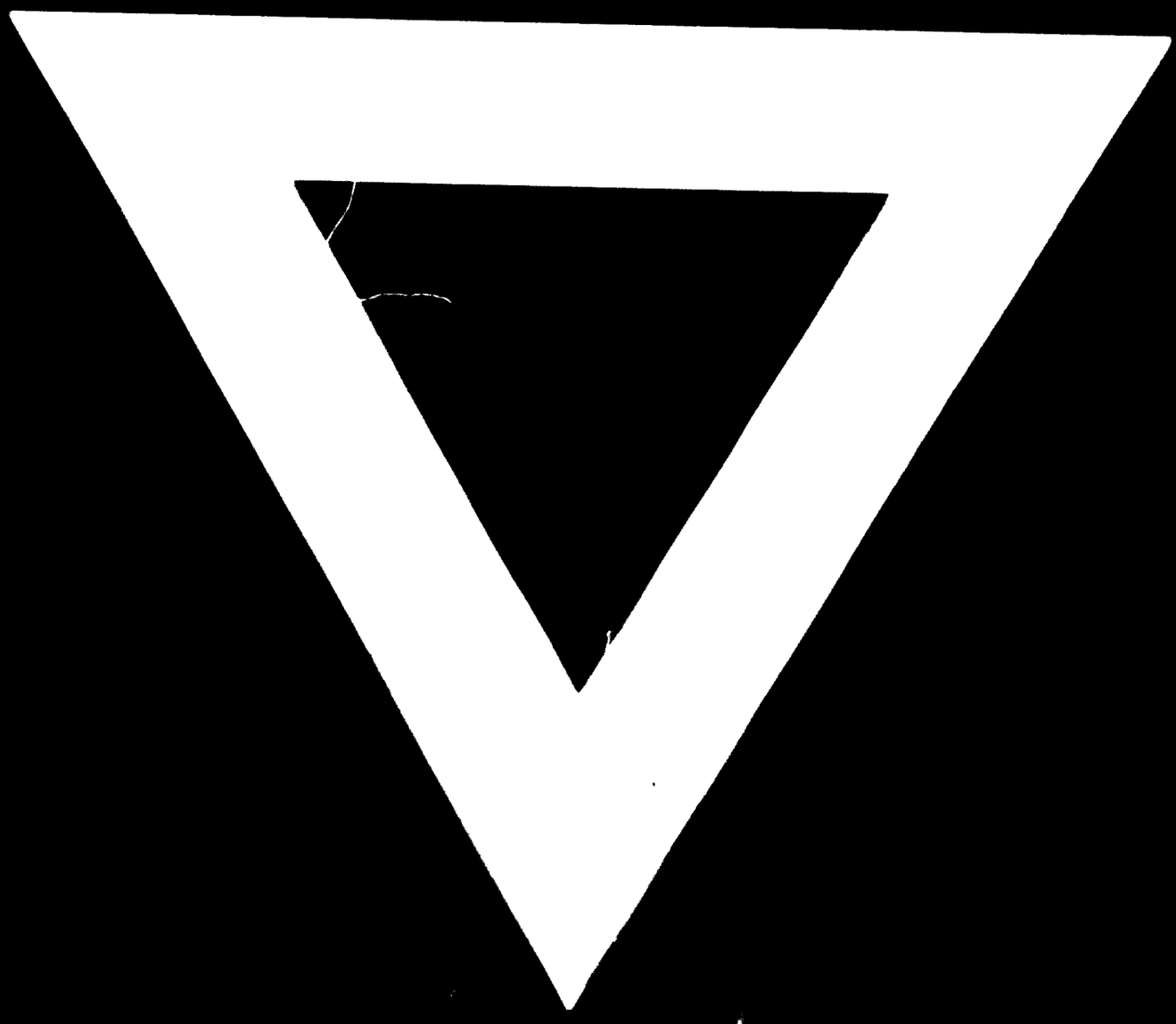
22. Kangaroo Tractor Station
Anuradhapura

23. Dryzone Research Institute
Mahaillupalama, Ceylon
a) Dr. Walter Fernado - Incharge - Research Officer
b) Mr. J.A. Lewis - Water Relation Study
c) Mr. T. Sivanayakam - Irrigation Agronomy

24. Design & Testing Unit
Department of Agriculture
Maha Illuplalama, Ceylon
a) Mr. R. Sathasivam Pillai
Agricultural Officer-in-Charge
(Counterpart - ECAFE Team)
b) Mr. Sam de Alwis
Agricultural Instructor
(Counterpart - ECAFE Team)
c) Mr. T.N. Manicavasagar -Agricultural Instructor
d) Mr. P. Veauthapillai
Engineering Assistant
e) Mr. Silva
Agricultural Instructors

25. Freedom from Hunger Foundation
Colombo, Ceylon
a) Mr. F.M.S. Ambalavaner
Chairman

B-363



80.12.02