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D2449

COUNTRY STUDY REPORT

on the

STATUS OF AGRICULTURAL MACHINERY INDUSTRY

in

I N D I A

Information compiled
during
a fact finding survey.

UNIDO, Vienna
January 1969

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

INDEX - INDIA

Summary of Country Study

Summary of Country Study - India

1. General Pattern of Agriculture

India has a total land area of 327 million hectares with 511 million population. About 49% of the land is under cultivation. Out of 158 million hectares of cropped area, 23% is under rice, 8.5% under wheat, 8.5% under oil seed and about 5% each under gram, Jowar and cotton. Tltal area irrigated is 26 million hectares. The average size of holding is 2.63 hectares. There are 2293000 number of holdings with 10 hectares and above commanding 28.7% total cultivated area. Agricultural production is increasing at a rate of 3.5% from 1952.

2. Pattern of Farm Mechanization

The estimated present population of tractor is around 75,000; power tillers 5000; Diesel engines with pumps 700,000 and electric pumps for irrigation around 800,000. Tractor concentration is around Punjab, U.P., Rajastan Maharashtra, Madras and Gujarat areas. Import of farm machinery in generally not permitted. Imports may be allowed to suplement the requirement in curtain cases. The production sale of tractors in 1968 was around 19,000 of which 14,000 were produced locally, production of power tillers around 500, Diesel engines 210,000 out of which 140,000 were in large scale sector gasoline engines around 40,000. Power pumps around 440,000 out of which 360,000 were in large scale sector, hand sprayers 150,000, power sprayers 18,000, pedal threshers 15,000 and power threshers 15,000. The demand for all equipment is more than the production in most of the cases. The estimated demand for tractors in 1968 is 30,000, power tillers 3,000, crawler tractors 1000, diesel engines 250,000, gasoline engine 50,000, and power pumps 300,000.

The future demand is expected to go up, for beyond production targets. Regarding the tractors it is anticipated that the demand for higher hp. tractors

/will

will significantly go up. There is also a place for a "Small Paddy Riding tractor" around 25 Hp. Demand for crawler tractor will be around 1000 by 1975. Although it is estimated by the government that demand for power tillers will be 80,000 by 1975 which is quite modest, - taking into existing conditions of market acceptance, need for extension and enhanced production - the demand is estimated to be around 25,000, with 80-85% around 8-10 Hp.

Although diesel engines are manufacture in India in appreciate quantities, the demand for a compact, lightweight high speed diesel engine from 5-15 Hp. which may be suitable for power tillers and other agricultural usage will be go significant. For the present no such engine is manufactured. Demand for micro gasoline engine of 1-2 Hp. will also go up to 75,000 units by 1975 where as the installed capacity of existing unit is only 30,000/year and production around 18,000.

There is a necessity to enhance manufacturing capacity of power sprayers. Considering the trend in agriculture, it is essential to introduce efficient power threshers, reaper binders and combine harvestiers both for paddy and wheat.

3. Manufacturing industries ancillary facilities

Manufacturing industries in the field of tractors, diesel and gasoline engines, power pumps, power sprayers exists with good manufacturing techniques and facilities in the large scale sector. Manufacturing units also exists in the field of engines, pumps, hand sprayers, threshers, agricultural implements in the small scale sector. Regarding the automotive and ancillary industries, excellent facilities exists that can supply most of the local demand for most of the components. There is also good supporting industries such as casting, forging etc. Most of steel and machine tools are also available locally. There is availability of technical personnel in all manufacturing fields.

/4.

4. Requirements to achieve manufacturing targets in farm equipment

The government has exempted the wheel tractor and power tiller production from licensing provisions of the industries.

Government appear to be aware of demand trends and are taking steps to fulfill the same. There appears scope for investment in manufacturing tractors of higher Hp., small riding paddy tractor, power tiller, micro-gasoline engine, high speed diesel engine of 5-15 Hp., power thresher and combines.

5. Policy towards farm mechanization

Many programs to encourage farm machinery usage and production have been introduced by the government Usage of improved seeds, fertilizer, pesticides, ground water, and development of drainage and land are some of the steps which are being successfully implemented. The rural credit institutions are being reinforced.

However, there is a great necessity to reinforce research and development and also training and extension activities.

There are good agricultural engineering institutions in India.

6. Policy towards industrialization

The general trend in economy which was subjected to recession a year back and lower production in industry and agriculture last year appears to have regioned its tempo this year. The incentives for investment have been liberalised.

The government and private sector appears to be eager to participate in industrial and agricultural co-operative ventures with ECAFE grouping countries.

7. Conclusions

India provides a great opportunity for mechanization. Farm machinery and equipment manufacture, ancillary and supporting industries have made a

/good start

good start and are meeting a significant part of the demand. However, by 1975, the demand is expected to go beyond the existing manufacturing activities. There is a good scope for investment in the field of tractor of high Hp. (60-65 Hp.) small riding paddy tractor (20-25 Hp.), high speed compact light weight diesel engine, (5-15 Hp.), micro gasoline engine (1-2 Hp.), power sprayers, power wheat and paddy threshers, reaper binders and combine harvesters for paddy and wheat.

SECTION I

General Pattern of Agriculture

India with an estimated population of 511 million (1967) occupies a total land area of 327 million hecters. Because of the size of the country and different physical regions, variation in temperature and rain fall, the agricultural pattern varies from region to region.

1. Land Utilization

(a) Land distribution by Nature

Out of the geographical reported area of 305.6 million hecters, area under cultivation constitute 48.5% land potentially available for cultivation amounts to 8.7%. Land under pasture and trees is 6.3%.

The details of land utilization is given in Table 1.1.

Table 1.1

Land utilization pattern in India (1964-65)

(Million hecters)

Total Geographical area		326.8	100%
Total Reported area		305.6	
(i) Forests		61.1	20.0%
(ii) Not available for cultivation			
(a) Land put to Non-Agricultural use	15.1		
(b) Barren and uncultivable	35.0	50.1	16.5%
(iii) Land under pastures and trees			
(a) Permanent pastures and grazing lands	14.8		
(b) Land under tree crops and grooves	4.2	19.0	6.3%

/(iv)

(iv) Land Potentially available for cultivation

(a) Fallow Land (Permanent)			
fallow land other than "current fallow"	9.2		
(b) Cultivable waste	17.3	26.5	8.7%

(v) Area under cultivation

(a) Net area sown	137.8		
(b) Fallows (current - 1964-65)	11.1	148.9	48.5%

(b) Land distribution by crops

Net area sown (1964-65)	137.8	million ha.
Area sown more than once	20.2	"
Total cropped area	158.0	"

Out of the total cropped area of 158 million ha. 23% were under rice 15% pulses, 8.5% wheat. 8.5% oil seeds. 5.5% graw, 5% Jowar 5% cotton and the rest to condiments, spieces, fruits, vegetable, potatoes and jute.

The rice growing areas are principally located in Andhra Pradesh, Bihar, Madhya Pradesh, Orissa, Uttar Pradesh, Haryana and West Bengal. The wheat growing areas are in Punjab, Madhya Pradesh, Haryana, and Uttar Pradesh. Sugar cane is planted mainly in Uttar Pradesh, Bihar and Madras. Cotton areas are in Gujarat, Maharashtra and Mysore.

Table 1.2

Area under Major Crops

(000 ha.) - 1965-66

(a)	Cereals	(1)	Rice	35,022	(5) Ragi	2,198
		(2)	Jowar	17,181	(6) Small Millet	4,331
		(3)	Bajra	11,428	(7) Wheat	12,798
		(4)	Maize	4,683	(8) Barley	2,551
					Total	90,192

/(b)

(b)	Pulses	(1)	Gram	7,849
		(2)	Tur	2,402
		(3)	Other pulse	11,199
			Total	21,450
(c)	Total Food grains			111,642
(d)	Oil Seed	(1)	Ground nut	7,171
		(2)	Sesamum	2,456
		(3)	Mustard	2,891
		(4)	Linseed	1,765
		(5)	Castor	356
			Total	14,639
(e)	Fibre	(1)	Cotton	7,827
		(2)	Jute	748
		(3)	Mesta	320
(f)	Miscelleneous			
		(a)	Sugar cane	2,749
		(b)	Potato	473
		(c)	Tobacco	345

/(c)

(c) Land Distribution by size of holdings

Based on the 17th round of the National Sample Survey, the number of operational holdings in 1961-62 was 50.7 million operating 133.4 million ha. The details are given below:-

Table 1.3

Distribution Pattern of holdings by Size

Area of Holdings (Hectares)		Operational Holdings No (000)	Holdings area operated (000 hectares)
Upto 0.198		4341	426
0.202 - 0.401	...	4355	1273
0.405 - 1.008	...	11140	7459
1.021 - 2.019	...	11484	16436
2.023 - 3.031	...	6517	15649
3.035 - 4.043	...	3532	11961
4.047 - 5.054	...	2565	11804
5.058 - 8.066	...	1474	7930
6.070 - 8.090	...	1902	12773
8.094 - 10.13	...	1162	9855
10.117 - 12.136	...	664	7069
12.140 - 20.230	...	1103	16070
20.234 and above	...	521	15471
All sizes	...	50765	133376

From the above table it is seem that average size of holding is 2.63 hectres. About 86.5% of the number of holdings covering 48.3% of area are under 5 ha where as 14.5% holdings covering 51.7% of area are beyond 5 ha as shown in the following table

/Table 1.4

Table 1.4

Percentage distribution of size of holdings

Holding size (ha)	No. of holdings	Area covered	Percentage to total	
	000 number	000 ha	No of holdings	area covered
Less than 2.01	32,320	25,594	62.0	19.3
2.01 - 5.05	12,614	38,614	24.5	29.0
5.05 - 10.13	4,538	30,558	8.8	23.0
10.13 - 20.23	1,772	23,139	3.5	17.3
20.33 and above	521	15,471	1.2	11.4
Total	50,765	133,376	100.00	100.0

2. Agricultural Production and Yield

The agricultural production and yield for major crops for 1965-66 is given below:

Table 1.5

Agricultural Production and Yield per ha

(1965-66)

	Crop	Production (000 tonnes)	Yield per ha/kg
(a)	1. Rice	30,614	874
	2. Jowar	7,492	436
	3. Bajra	3,598	315
	4. Maize	4,632	989
	5. Ragi	1,305	594
	6. Small Millets	1,602	370
	7. Wheat	10,720	838
	8. Barley	2,284	895
	Total	62,247	690

/(b)

(b) Pulses	1.	Gram	4,442	566
	2.	Tur	1,668	703
	3.	Other pulses	3,887	347
		Total	10,017	467
(c) Total Food grains			72,264	647
(d) Oil seeds	1.	Ground nut (in shell)	4,022	561
	2.	Sesamum	407	166
	3.	Mustard & rape	1,268	439
	4.	Linseed	329	186
	5.	Castor	171	200
		Total	6,027	416
(e) Fibres	1.	Cotton(Lint)	4,708	108
	2.	Jute	4,485	1,079
	3.	Mesta	1,244	699
(f) Miscellaneous	1.	Sugar cane (gur)	11,830	4,304
	2.	Potato	3,893	8,227
	3.	Tobacco	273	792

Indias overall agricultural production has been steadily increasing since 1952 by about 3.5% except in 1965 when production was decreased due to draughts. The rate of agricultural production is beyond the 2.4% estimated annual population growth rate.

/3. Population

3. Population

(a) Human population (1966)

Table 1.6

Distribution Pattern of Agriculture
(in 000)

Total population	511,115
Economically active population	
(a) Total	207,598
(b) In Agriculture	145,319

The percentage rate of growth is 2.6/year. Out of the economically active population, 70% are engaged in agriculture. The population density is 3.6 persons per hectre of cultivated land and number of active agricultural population per ha of cultivated land is 1.0.

(b) Cattle population

According to 1966 census, the total cattle population was 363 million with 167 heads of cattle for every 100 nectres of sown area. The number of draft cattle is 175.5 million, and buffalos 51.2 million.

4. Land Reform

With the abolition of "Zamandari System" the land now mostly is operated by the farmer. However, in certain cases, persons may be cultivating through hired labor. Absentee landlordism is discouraged and in most of the states land ceiling acts, limiting the land to be owned per person has been enacted. Normally the ceiling per family is about 12-15 ha and the limit varies from state to state.

Out of 50.77 million holdings covering an area of 133.38 million ha, it is estimated that area under self operation constitute 89%, and area leased in constitute 10.70%.

/5. Farming

5. Farming Practices

(a) Irrigation In 1964-65, the total net net irrigated area was 26.16 million ha of which 37.7% was from government canals, 4.4% from private canals, 18.4% from tanks, 29.9% from wells and 9.6% from the sources. 46% of all wheat growing areas and 37½% of all rice areas were irrigated. These represents 60% of irrigated land in India.

(b) Farm Labor Out of the estimated working population of 188.7 million in 1961, 69.5% are engaged in agriculture of which 75% are cultivators and the rest are farm labourers. Depending upon the state the agricultural wages vary from Rs.2.50 - 2.75 for men and Rs.1.50 to 2.50 for women. The Table 1.7 gives the estimated requirement of human and bullock labour per hectre of crop.

Table 1.7

Utilization of human and Bullock labor per hectre (8 hours day) - 1956-60)

State	Crop	Human labor		Bullock Labor	
		For all Operations	For Preparator of Tillage	For all operations	For Preparator of Tillage
Andhra Pradesh	Paddy				
	1st season	116.12	13.05	39.7	20.16
	IInd season	110.21	17.96	39.34	24.32
	Tobacco	247.75	13.17	48.58	23.77
Haryana	Wheat(irrigat)	49.56	17.35	41.74	31.72
	Wheat(Non-irrig)	45.70	16.48	39.14	28.56
Maharashtra	Jowar(irrigated)	65.5	11.9	27.9	86.2
	Jowar(Non-irrig)	25.5	8.2	20.5	27.2
Orissa	Paddy	101.19	18.48	60.32	25.92

/c. Cultural

(c) Cultural Practices

From the past few years, usage of high yielding varieties for maize, wheat, paddy etc. and usage of fertilizer and pesticides has increased significantly. In general most of the farm operations are done manually with draft animals. However, in certain areas of India, tractors are being used.

Section II

PATTERN OF FARM MECHANIZATION

1. Farm machinery population

The following table gives the population of principal farm machinery for all India as per census in 1961 and 1966.

Table 2.1

Farm Machinery Population

Name of machinery	Number of units 1961	1966 *	1968 (estimated)
Tractors (4 wheel)	30,931	55,222	75,000
Power tillers	n.c.	4,705	5,000
Ploughs - wooden	38,371,787	39,923,291	45,000,000
- iron	2,298,215	3,171,191	5,000,000
Oil engines with irrigation pumps	229,972	448,754	700,000
Electric pumps for irrigation	160,168	390,506	800,000
Improved harrows and cultivators	n.c.	2,691,269	Not known
Improved seed drills	n.c.	1,121,762	-"-
Improved threshers	n.c.	344,292	-"-
Rotary chaff cutters	n.c.	3,637,357	-"-
Sprayers and dusters	n.c.	201,720	-"-
Carts	12,072,390	12,614,664	-"-
Sugarcane crushers (by bullocks	590,210	637,671	-"-
(by powers	33,300	42,959	-"-

Note: N.C. not collected.

* Datas for 1966 are provisional and subject to revision.

/The

Table 2.2

Statewise Distribution of Tractor Population

	1956	1961	1966 (as compiled in December, 1967)
Andhra Pradesh	1,626	1,762	2,911
Assam	159	489	830
Bihar	1,227	1,520	2,132
Gujarat	1,052	1,999	3,248
Jammu & Kashmir	106	132	104
Kerala	187	276	418
Madhya Pradesh	1,311	2,025	2,513
Madras	822	1,387	3,278
Maharashtra	2,066	1,427	3,260
Mysore	807	981	2,595
Orissa	95	194	673
Punjab	3,809	7,840	15,489
Rajasthan	1,274	3,154	4,195
U.P.	5,839	7,139	10,788
West Bengal	450	330	1,891
Delhi	132	258	665
Himachal Pradesh	3	4	23
Manipur	6	-	6
Tripura	7	13	9
Daddra Nagar Haveli	-	-	6
Andaman & Nicobar Island	2	1	-
Pondicherry	-	-	52
Goa	-	-	127
Nagaland	-	-	9
	20,980	30,931	55,222

/2. Import

2. Import and production of farm machinery

Importation of farm equipment in general is prohibited in India. Only a few units are imported for test purposes. Production figures for each item by various sizes and manufacturing units is given in Section III. Only importation of tractors and power tillers are allowed in a limited number and upon special licence by the Government, usually in the horse power ranges not under manufacturing programme in the country.

(a) Tractors

Manufacture of tractors in India started in 1961. Out of the total sales from the past three years, about 25% are through imports.

Table 2.3

Import and production of tractors

Year	Units		Total
	Import	Production	
1956	4,468		4,468
1957	4,792		4,792
1958	3,733		3,733
1959	2,652		2,652
1960	3,843		3,843
1961	3,248	612	3,860
1962	3,033	1,470	4,503
1963	1,523	1,610	3,133
1964	2,999	3,172	6,171
1965	2,064	6,318	8,382
1966	2,884	7,616	10,500
1967	3,705	10,526	14,231
1968 (estimated)	5,000	14,000	19,000

/The

The above import figures include crawler tractors which have been imported in small numbers. Now local production of crawler tractors has now approved and about 150 units are being imported in C.K.D.

(b) Power tillers

Only one unit, - Krishi Engines Pvt. Ltd. - is manufacturing power tillers. The following is the production figures.

Table 2.4

Production of power tillers in India

1965-66	308	Nos.
1966-67	556	
1967-68	479	
1968-69 (upto Aug 68)	95	

About 4,000 power tillers have been imported mostly from Japan as of date. For the current year, i.e. 1968-69, Government has agreed to the import of power tillers as follows:

Mitsubishi	570	Nos.
Satoh	265	Nos.
Kubota	486	Nos.

(c) Engines

(i) Diesel engines

The production of diesel engines are given in table 2.5

Table 2.5

Production of diesel engines in the organized sector

1961	44,482	units
1962	42,835	
1963	55,540	
1964	69,172	
1965	85,577	
1966	107,153	
1967	116,651	
1968	140,000	

/Note

Note: a) The above figures are applicable to the large scale sectors only. In the year 1967, there was a production of approximately 100,000 nos. of diesel engines of 5-10 hp in the small-scale sector.

b) About 80% of the above production figures is for the agricultural sector.

Following is the estimated total production of diesel engines in 1968 for agricultural usage.

Total diesel engines	210,000
Diesel 3-15 hp	120,000
12-30 hp	75,000
30-75 hp (for tractors)	15,000

(ii) Gasoline engines

Total production of gasoline engines in 1968 is estimated to be as follows:

Total gasoline engines	38,000
Micro 1-2 hp	18,000
3-5 hp	20,000

(d) Pumps

The following table gives the production of pumps in India.

/Table 2.6

Table 2.6

Production of Pumps in India

	(000 Nos)
1961	124.7
1962	128.9
1963	161.6
1964	173.4
1965	210.5
1966	293.3
1967	342.1
1968	360.0

Note: a) The above figures do not include the figures of production in respect of the small-scale sector which may have produced about 80,000 in 1968.

b) 95% of the above production is used for irrigation purposes.

Regarding import of pumps, table 2.7 shows the imports.

Table 2.7

Import of Pumps

	Quantity (Unit)	Value (million Rs)
1964-65	5,187	19.76
65-66	6,313	26.71
66-67	4,453	23.59

/The

The above pumps are mostly of new agricultural types used in industry for special purposes.

Production of different types of pumps in 1968 is estimated to be as follows:

Hand pumps	Not known
Power pumps (centrifugal)	300,000
Power deppwell pumps	30,000

(e) Crop protection equipment

The estimated production in 1968 is as follows:

Hand sprayers and dusters	150,000
Power knapsack sprayers and dusters	15,000
Other types of power sprayers	3,000
Tractor mounted sprayers, less than	50

Imports have been negligible.

(f) Threshers

Production of threshers in 1968 is estimated as follows:

Pedal paddy thresher	15,000
Power paddy thresher	5,000
Power wheat thresher	10,000

Imports are almost nil.

(g) Agricultural implements

The production figures of 53 registered units out of which mostly manufacture bullock drawn implements and a few tractor drawn implements, is given in table 2.8

/Table 2.8

Table 2.8

Production of Agricultural Implements

Year	Agricultural implements[a]	Agricultural machinery[b]
1963	19,328	Not available
1964	19,790	-"-
1965	22,750	-"-
1966	22,310	1,200
1967	22,000	1,200

Note: a) Consists of bullock drawn implements. These figures do not include production by unregistered small-scale units.

b) Mostly tractor drawn primary tillage implements. These figures do not include many unregistered small-scale units.

3. Demand and sale of farm machinery

(a) History of farm mechanization

At the time of independence fully assembled tractors were being imported but the domestic market for tractors was small. In 1947, a Central Tractor Organization was set up initially with tractors and bull-dozers. This Organization was to undertake reclamation of land and mechanization of agricultural farming. During the First and Second Plan periods (1951-61) about 450 thousand hectares of land were reclaimed through this Organization and another 450 thousand hectares through the State Tractor Organizations. This Organization was, however, wound up

/in

in October, 1959 and the equipment was made over to Rehabilitation Reclamation Organization.

The number of tractors used for agricultural purposes which was about 10,000 in 1949-50 has increased to 51,000 in 1966. The statewise distribution pattern shows that the Northern region comprising the Punjab, Haryana and Uttar Pradesh, account for more than one half of the total number of tractors inthe country. Statistics about the exact area in each State, where farm mechanization has been employed are not available.

(b) Amount of sales and demand

(i) Tractors

Table 2.9 gives the availability of tractors from 1962-63 to 1967-68.

Table 2.9

Availability of tractors for the period from 1962-63 to 1967-68

Year	Imports	Indigenous Manufacture	Total
1962-63	2,616	1,414	4,030
1963-64	2,349	1,983	4,332
1964-65	2,323	4,323	6,646
1965-66	1,989	5,714	7,703
1966-67	2,591	8,816	11,407
1967-68	3,626	11,394	15,020
	15,494	33,644	49,138

The emphasis during the First and Second Plans (1951-1961) was on introduction of improved manually-operated and animal drawn implements.

/This

This trend continued to be in evidence during the Third Plan as well. It was naturally difficult to embark on a programme of popularization of power operated machinery in the absence of indigenous capacity. The demand for such machinery (tractors, power tillers, etc.) was met by imports which naturally fell short of the demand. The popularization of such implements as mouldboard ploughs, cultivators, seed attachments, chaff-cutters, winnowers, etc. nevertheless contributed towards the modernization of farming techniques.

Towards the end of the Second Plan efforts were made towards conducting surveys of indigenous agricultural implements, setting up of research centres for development of new and improved implements, production and distribution of such implements and organization of training facilities for artisans engaged in the manufacture of improved implements. The imperative necessity of a purposeful and large-scale farm mechanization programme, however, came to be realized during the Third Plan and this was in a large measure due to the recognition of the importance of farming practices based on technological devices. It came to be appreciated that alongside the supply of seeds, chemical fertilizers and pesticides, supply of farm machinery and improved implements must also be organized. Steps were taken to sanction indigenous capacity for manufacture of agricultural machinery and it was realized that farmers must be supplied with credit for acquisition of farm machinery. While during the Second plan, capacity for production of 11,000 agricultural tractors per year was licenced, the actual production commenced only during the IIIrd plan period in the course of which a further capacity of 19,000 per year was sanctioned. As against this, the installed capacity is about 15,300.

/Considering

Considering the demand for agricultural tractors, on an earlier occasion, the demand for tractors by 1970-71 was estimated at 40,000 Nos. According to present trends in demand - according to government thinking - the above estimates require upward revision. It is felt that the demand for tractors and all types of farm machinery has increased manifold on account of several factors; multiple cropping, general shortage of labour, more remunerative prices for agricultural produce and the technological changes taking place in the rural areas. The high yields possible through improved seeds and other intensive farming practices and the general rise in the prices of farm produce have increased the investment capacity of farmers. It is estimated by the government that in the State of U.P. alone about 10,000 tractors are required every year and the requirements of Punjab, Haryana and other States where tractors have become very popular, are much higher than the previous estimates.

During the past few years, availability of tractors from indigenous production and imports has been far below the demand, as a result of which there is a large unsatisfied demand each year resulting in its accretion to the estimate of the subsequent year. As in August 1968, the orders pending with the indigenous manufacturers, agents of imported tractors, agro-industries corporations and the new demands that have been received from the State Governments are about 72,968 numbers as per the following table.

/Table 2.10

Table 2.10

Pending Demand for Tractors from Various Sources

Indigenous manufacturers	24,156
Agents of Russian Tractors	21,912
State Agro-Industries Corporations	10,900
Directorate General of Resettlement (Defence personnel)	2,000
From State Governments for Ayacut areas etc.	5,000
	72,968

Besides the above large pending demand, orders being registered every month with the tractor manufacturers and distributors etc. are of the order of 4,500 nos. This is indicative of the new trend in demand. Taking into account such factors as the pending orders, orders being registered every month, replacement requirements, programme for extending credit facilities by Commercial Banks, Agro-Industries Corporations, Land Mortgage Banks, etc., the demand is expected to increase. The sales in 1968 for wheel tractor was about 19,300 and demand is higher, may be in the order of about 30,000 units.

(c) Power tillers

The demand is not known exactly due to the limited number of machines available. Sales in 1968 are around 800 units but the demand is higher and could be around 2,500 - 3,000 units.

(d) Crawler tractors

Crawler tractors demand could be around 1,000 units a year. But there is actually no local production and imports are few.

/(e) Engines

(e) Engines

The estimated sales in 1968 is given below.

Diesel engine	3-15 hp	150,000
	12-30 hp	75,000
Gasoline engine	1-2 hp	20,000
	3-5 hp	20,000

In general the demand to an extent is met by local sales, although there is a higher demand for high speed compact diesel engines of 3-15 hp and micro gasoline engines of 1-2 hp.

(f) Pumps

The sales for 1968 is estimated to be as follows:

Hand pumps	not known
Power pumps	300,000
Deepwell pumps	Not known

(g) Sprayers and dusters

The estimated sales in 1968 was around 150,000 hand sprayers and dusters, 15,000 knapsack sprayers (power) and about 1,000 miscellaneous power protection equipment.

4. Marketing Organizations

(a) Private sector

Industries in the large scale sector, especially tractors, engines, pumps and plant protection equipment have a well organized sales programme. Industries in small-scale sector mostly meet the local demand.

Considering the tractors, out of the five existing manufacturers, have a sales net work covering most part of the country with branches and

/dealers

dealers with increased rate of production from the past few years, efforts are being made to establish more dealers and also equip the dealers with necessary tools and spareparts. Operational and maintenance training programme for farmers, service training programme for mechanics and dealers have been started. It is also proposed by many dealers to have mobile workshops. From the past couple of years efforts are directed towards increasing the repairand maintenance facilities. The dealers also provide free installation service, 4 free services and honours through the manufacture warranty claim for a period of 6 months.

(b) Public sector

Recently Government has set up Agro-industries Corporations in many States, one of the objectives being to distribute agricultural machinery and other equipment to the farmers, acting as a marketing body. Details of these corporations are given in Section III.

D. Prices

a) Tractors

The selling prices of tractors are controlled by the government under the Essential Commodities Act, based on the cost of production. The following are the sale prices F.O.R. destination.

Table 2.10 (a)

Selling Price of Tractors

	Tractor	Model	Specification	Rupees
1.	International Harvester	B-275	35 Hp, 4 Cylinders, water cooled, diesel	Rs. 19,570
2.	Massey Ferguson	MF-35	35 Hp,3 cylinder, water cooled, diesel	Rs. 21,140
3.	Hindustan	35	35 Hp,3 cylinder, water cooled diesel	Rs. 15,710
4.	Hindustan	50	50 Hp, 4 cylinder, water cooled, diesel	Rs. 22,350
5.	Eicher	27	26.5 Hp, 1 cylinder, air cooled, diesel	Rs. 17,480
6.	Escorts	27	28 Hp, 2 cylinder, water cooled, diesel	Rs. 15,840
7.	Escorts	37	35 Hp, 3 cylinder, air cooled, diesel	Rs. 17,910

The prices of implements are not controlled by the government. The prices of implements vary according to the source of manufacture. It is known that implements normally manufactured by tractor manufacturers are of high quality. But they are relatively more expensive compared to the one manufactured by small scale sector. The prices are as follows:

Table 2.10 (b)

Table 2.10 (b)

Selling Price of Major Tractor Drawn Implements

1)	Mould Board Plow Mounted 2 and 3 Furrow	Rs. 1800 - 3500
2)	Mounted Disc Plow 2 and 3 Furrow	Rs. 1800 - 3500
3)	Mounted Disc Harrow, 12 disc 24"	Rs. 1500-2500
4)	Spring Loaded Cultivator 9 Tine	Rs. 1500 - 2500
5)	Rigid Tine Cultivator	Rs. 1000 - 2000
6)	Planter with Ferti Drill 2 and 3 row	Rs. 2000 - 3500
7)	Blade Terracer	Rs. 2000 - 2500
8)	Tractor Mounted Sprayer	Rs. 3000 - 4000
9)	Pull Type Fertilizer Distributor	Rs. 2500 - 3000
10)	Groundnut Digger	Rs. 3000 - 3500

4) Usage of farm machinery

As mechanization is just starting for a few years in India most of the cultivation work is still done by traditional methods with draft animals or by hands.

a) Tractors

- 4 wheeled tractors

The below table gives the distribution of tractors manufactured in India in the last years by horsepower range.

/Table 2.11

Table 2.11

Horsepower Distribution Pattern of Tractors Manufactured in India

Horsepower	1964/65 Units	%	1965/66 Units	%	1966/67 Units	%	1967/68 Units	%	Total 1964/65-1967/68	
12/18	81	2	59	1.0	-	-	-	-	140	1.0
25/28	365	8.4	796	14.0	1,519	17.2	1,284	11.3	3965	13.0
35/40	3,288	76.0	4466	78.0	6,203	70.1	8,807	77.3	22,764	75.0
50	589	13.6	397	7.0	1,093	12.5	1,303	11.4	3382	11.0
	4,323		5,714		8,815		11,394		30251	

This shows that about 75% of the tractors manufactured are from 35 to 40 Hp and this light medium type is certainly the most suitable for local conditions. But if we consider also the imports the distribution pattern appears appreciably different. The approximately figures for 1967/68 are as follows.

Table 2.12

Horsepower wise distribution pattern of tractors sold in India 1967/68

Horsepower	Production (units)	Imports (units)	Total Sales	%	
20 to 35 HP	1,284	2,700	3,984	26	
35 to 49 HP	8,807	500	9,307	62	
50 HP and up*	1,303	500	1,803	12	* Most of them below 5[illegible]-55

In such a big country than India with so many different conditions of soils, size of holdings and cultivation methods, more type of tractors may be needed in the fututе. Tractors of 60-70 HP will be useful for big farms and contract work. Small tractors with horsepower around 25 will also be needed in significant quantities for small farms, considering that the soils are light in general in India.

/At present

At present tractors are used merely for tillage in dry and wet fields and for transportation.

b) Crawler tractors

Although in some black cotton soils of Maharashtra, small crawler tractors are mainly required for land reclamation, soil conservation, minor irrigation, deep plowing and forestry work.

c) Power tillers

There has been no sufficient data regarding the effective usage of power tillers in India. Most of the power tillers sold are used in paddy area. The case study conducted at Central Rice Research Institute, cuttack has shown the advantages of the usage of power tiller for paddy.

d) Sowing and fertilizer application

Most of the sowing is either done by hand or in line, sown through indogeneous cultivators with seeding funnels attached. Recently a few animal drawn seed drills and fertilizer distributors have been introduced. Regarding the tractor drawn equipment, in most of the cases, seed and fertilizer boxes are mounted on the seed drill. Recently tractor mounted seed of fertilizer drills and planters have been introduced.

e) Crop protection equipment

A significant number of hand sprayers and dusters are in use, power sprayers have been introduced recently and the demand for power sprayers is expected to go up.

f) Irrigation equipment

3-3 Hp centrifugal pumps are most commonly used. From the past few years Sprinkler irrigation systems have been introduced.

g) Engines

Most of the engines manufactured are slow speed diesel engines of 3-10 Hp which are used for irrigation and other stationery work.

5. Future demand and trends in design

a) Tractors - wheel tractors

According to the report for the formulation of the 4th Five Year Plan, the future demand for wheel tractors will be as follows:

Table 2.13

Estimated Demand for Tractors

by 4th Plan Working Group

HP Range	69-70	70-71	71-72	72-73	73-74	Total	% of Total
12-20 dbhp	18000	18000	20000	22000	25000	103,000	26.4
21-35 "	36000	36000	38000	40000	45000	195,000	50
36-50 "	14000	14000	15000	16000	18000	77,000	20
above 50	2000	2000	2000	2000	2000	10,000	2.6
	70,000	70,000	75,000	80,000	90,000	385,000	100

The above estimates by the working group are based on the following analysis:

(a) For a reasonably satisfactory agricultural production, in India about 0.8 Hp per hectare is necessary.

(b) Present available power is about 0.2 Hp per hectare only, draft animals supplying about 75% of motive power.

(c) For 140 million hectares of cultivated area 112 million Hp is required as against 28 million Hp available now.

(d) The proposed 385,000 tractors to be introduced in IV Plan will provide 7.8 million Hp only as against 84 million minimum power requirement. Even this rate of growth will take 40 years to achieve the required minimum power requirement.

/(e)

(e) There are 2,293,000 number of holdings above 10 ha of which 521,000 are above 20 ha

(f) Taking into account the program for 24 million ha under high yielding variety and 4 million ha under multicropping, the estimated requirement is modest.

(g) 20 Hp tractor is needed for economical operation in medium size holdings. It is argued by some that the imported tractros are cheaper and demand may cease to exist under normal pricing. The working group feels that the total demand figures as worked out will hold good even if the figure for 20 Hp is not taken into account.

Now considering the pending orders for around 73,000, the orders registered every month (4,500) and the number of farm holdings above 20 ha (520,000) the estimate by the working group do not appear to be excessive

(i) But it is doubtful that manufacturing capacity and availability of import would be for 70,000 tractors in 1969-70. It is felt that considering realistically, the total demand would be around 40,000 in 1970 and 80,000 by 1975.

(ii) Furthermore the distribution pattern by horsepower could be different from the one worked out by the working group.

(iii) In 1970 most of the production will be covered by the existing models, even if some of them could be proposed for a higher horsepower, primarily through higher engineer displacement and r.p.m.

(iv) In 1970, the distribution could be as follows, taking into account a realistic demand of about 40,000 units

/Table 2.14

Table 2.14

Estimated Horsepower Distribution Pattern and Demand for Tractors 1970

(By Fact Finding Team)

Horse Power	Estimated % of total	Demand Number	Remarks
20-30	25%	10,000	Including imports by Agro Industries Corporation
35-50	60%	24,000	Local production
50-70	15%	6,000	Through limited local production and imports
		40,000	

(v) In 1975, the tendency will be for a greater preventage of tractors in the range of 50 to 65 Hp and above 65 Hp. For tractors below 35 Hp, all depends upon the models that will be available at that time. It does not seem necessary to consider a smaller tractor of horsepower less than 20 Hp and the smallest model - even in paddy tractor - will be between 20 and 25 Hp. A tentative distribution pattern would be as follows:

Table 2.15

Estimated Horsepower Distribution Pattern and Demand for Tractors in 1975

(By Fact Finding Team)

Hp	Estimated % of total	Demand Units
20-35	25%	20,000
35-50	40%	32,000
50-65	25%	20,000
Above 65	10%	8,000
	Total	80,000

/(vi)

(vi) It may be expected that in 1975, the existing manufacturers of tractors in the range of 35-50 may convert a part of their production to a higher horsepower in the range of 40-55 through limited modifications. However there will certainly be a gap in the production and demand for tractors especially in the range of 60-70 Hp with power steering.

(vii) A "small riding paddy tractor" with less weight, lower turning radius, higher ground clearance in an economical price level with horsepower around 20-25 will be needed ingreat quantity for small farms, especially paddy fields. Such a tractor should have differencial lock and designed to work in paddy areas with cage wheels or half track and rotary tiller. Other technical requirements, relatively low weight (around 35-40 kg/hp), a simple mechanical transmission with 6 or 8 gears, with a slow gear around 1.5 km/hour for rotary tillage with differential lock, a high ground clearance (around 40 cm), a powerful hydraulic lift with draft control with standard 3 point hitch and a sturdy rear axle, for tractor to be used with cage wheels. Diesel engine is needed due to the price of fuel. Power take off is needed merely for the use of rotary cultivator.

b) Crawler Tractors

The expected demand for the 4th Plan is 600 units for 1970 and 1500 by 1975 and this seems acceptable with a distribution pattern of 50% between 40 and 50 Hp, 30% for 70 to 90 Hp and 30% for more than 90 Hp. All these tractors are only for agricultural uses including land reclamation. The above estimates - which appears to be acceptable - has been worked out by the working group for IV Plan based on the following criteria

/(i)

(i) Crawler tractors are required for land reclamation, soil conservation, minor irrigation, deep ploughing, forestry and other agricultural schemes. During the Fourth Plan period, 5 million acres of land is proposed to be reclaimed and developed in the command areas of major and medium irrigation projects. Under the soil and water conservation and land development programmes, about 25 million acres of unilrigated land and 5 million acres of irrigated land are proposed to be terraced and treated with other soil and water conservation measures. For meeting the requirements of land development and other agricultural schemes, it is estimated that 6,230 tractors in the 50 to 120 h.p. range would be required as per the following details:-

	SCHEME	Estimated requirement during the IV Plan
(1)	Forestry Schemes	350
(2)	Schemes for land development in the command of major irrigation projects	2,000
(3)	Soil conservation measures in the irrigated areas	100
(4)	Soil & water conservation measures in un-irrigated areas, hilly terrains, etc.	3,000
(5)	Deep ploughing, for use on sugarcane farms, State mechanised farms, for agricultural machinery hire centres and misc. uses	780
	Total:	6,230

(ii) As against the above requirements, taking into consideration that there may be some time lag in the actual procurement of tractors

/by

2. Estimated requirement of raw material in IV plan period

~~SECTION III~~

~~REQUIREMENT OF STEEL DURING IV TH PLAN PERIOD~~

~~(For Farm Equipment Industry)~~

1. IRON AND STEEL

A. TRACTOR: As each tractor manufactured in India is of different specification, it is difficult to accurately forecast the overall requirement of steel for the whole industry for the IVth five year plan. However, assuming a general pattern of specification, the steel requirement is assessed on a broad basis. (~~The details of assumptions are given in appendix-C, Table~~ C1, ~~C2 and C3~~.) The total requirement of steel for the IVth Plan period is about 0.3 million metric tonnes and the requirement during the last year (1973-74) of the plan period is about 80 thousand metric tonnes as detailed below:

Table 4.1

Estimated Steel requirement for Tractors
during IVth plan
1969-70 to 1973-74 (Figs. in 000 Metric-Tonne)

Sr. No.	Description	1973-74	Total IV Plan
1.	Hot rolled carbon steel	1.4	5.3
2.	Hot rolled alloy steel	0.5	2.1
3.	Cold drawn carbon steel	3.6	13.4
4.	Cold drawn alloy steel	0.7	2.6
5.	Hot rolled plate	2.6	9.6
6.	Hot rolled sheets	0.3	1.3
7.	Cold rolled sheets	5.6	20.7
8.	Hot rolled strips	0.1	0.4
9.	Special steel	0.2	0.9
10.	Grey iron casting	46.4	72.5
11.	Malleable castings	1.6	5.9
12.	Steel forgings	16.8	62.7
	Total	79.9	297.3

TABLE - 4.2

ESTIMATED REQUIREMENT OF STEEL AND CAST IRON FOR FARM IMPLEMENTS IN THE YEAR 1973 - 74. (FIGURES IN 000 TONNES)

Sr. No.	Item	Mild Steel	Medium carbon steel	High carbon Steel	Malleable casting	Grey iron casting	Total
1.	M.B. Plows	3.8	2.2	0.8	0.8	-	7.5
2.	Disc Plows	1.4	0.5	0.6	0.7	0.7	3.9
3.	Cultivators	5.5	5.5	13.4	-	-	12.4
4.	Disc harrows	9.6	0.3	7.4	-	4.7	22.0
5.	Sowing equipment	10.6	0.6	1.1	0.4	-	12.8
6.	Levelling equipment	5.4	2.0	1.4	0.7	-	9.5
7.	Plant protection eqpt.	0.5	0.2	0.1	-	-	0.8
8.	Harvesting equipment	1.8	2.2	3.5	0.9	0.4	8.8
9.	Sp. harvesting equipment	0.8	0.6	0.4	0.1	-	1.9
10.	Cho/grind equipment	0.3	0.2	0.2	-	-	0.6
11.	Threshers	5.0	1.2	0.6	-	0.6	7.5
12.	Processing equipment	2.2	0.6	0.4	-	0.1	3.4
13.	Trailer transport	24.0	1.8	-	-	3.7	29.6
14.	Loaders	0.8	0.6	0.4	0.2	-	2.0
15.	Pumping set trailers	0.1	-	-	-	-	0.1
	Total	71.8	18.6	18.2	3.8	10.2	122.6

sr/nair

Although substantial progress has been achieved in the field of indigenous steel manufacture, many type of special steels are yet to be imported. EN-1A, EN-3, EN-8, EN-9, EN-42, EN-45 and other type of steels which are normally used in tractor industry are being manufactured. However, special steels such as EN-16, EN-18, SAE 5140, EN-43, EN-34, SAE 8620 and other steels required for gears, shafts, axles and other critical components are not being yet manufactured. It is recommended that action to be taken to manufacture all required special steel in required sections for the tractor industry.

B. IMPLEMENTS & FARM EQUIPMENT

Today in India, the basic tillage implements are being manufactured indigenously. The cultivators and disc harrows on an extensive scale and Mould Board and Disc Plows on a limited scale are being manufactured in India. A modest beginning has been done with respect to sowing and fertilizer applicators, threshers, plant protection equipment and processing equipment.

Based on the estimated total demand of tractors the type of implements estimated to be required by 1973-74 is given in table 2.22 and table 4.2 gives the total requirement of steel for agricultural implements and equipment by the year 1973-74. Thus it can be seen that about 123 thousand tonnes of steel are required for implements by the year 1973-74, out of which 72 thousand tonnes are structural mild steel and sheets, 19 thousand tonnes are medium carbon steel, 18 thousand tonnes are high carbon steel, 4 thousand tonnes are malleable castings and 10 thousand tonnes are grey cast iron. A few of the problems faced by the indigenous farm equipment industry with regards to procurement of raw material is discussed below:

A. Agricultural Discs: Agricultural Discs will be required in diameters of 20" and 24" for disc harrows and 26" and 28" for disc plows. However, Discs are to be both of plain and notched types. Discs of 12" to 15" are also required as soil openers for sowing and fertilizer application equipment also. The estimated demand in 1973-74 for discs is given below:

Table 4.3

Application	Implement demand (nos.)	Disc per implement (nos.)	Avr. blank wt. of unit disc kg.	Total no. of discs reqd. 73-74 (in 000)	Total wt. of disc material 73-74 (000 tonnes)
Disc Harrow	55,000	12	12 kg.	660	7.9
Disc Plow	12,000	3	16 kg.	36	0.9
Seed/Fert. drills (10%)	4,250	9	8 kg.	37	0.3
		Total ..		733	8.8
		Plus 15% replacement	Appx. 10 kg.109		1.1
		Total requirement		842	9.9

Thus the total requirement of agricultural discs in 1973-74 will be about 8.4 laks. The weight of steel required will be about 10 thousands tonnes, if imported, foreign exchange value will be almost 25 million of rupees.

For the present agricultural discs for indigenous implements are either imported or procured from the indigenous manufacturers. The indigenous manufacturers obtain import the steel. The gauge of steel required for harrow discs are 11/64, 5/32" and 3/16" and for plow discs 3/16, and 7/32 and 1/4" for heavy duty discs. These discs are normally made of En-42 or equivalent sheet steel and is cross rolled. It is recommended that steps are to be taken to indigenously manufacture high carbon En-42 cross rolled sheets to meet the indigenous agricultural disc requirement.

b) Other high Carbon Steel for soil tool points: High Carbon steels equivalent of EN-42, EN-16, EN-45A etc. are required for ground tools. Although these are manufactured in the form of billets or strips in India, the required sections are not available for agricultural usage. There is a necessity of standardization of sections and rolling of the required sections at the steel plants.

c) Soft center high carbon steel: For Mould Board component of M.B. Plow, normally for effective performance and usage the recommended steel is soft center high carbon steel. ie. 1095 over 1024. However, as the same is not available in India, usually mild steel plates are used. Although it is necessary to carburize the mild steel plate, for effective usage, most of the indigenous manufacturers in small scale industry are not carrying out this operations due to limitations in manufacturing techniques and facilities. Hence, it is recommended that soft center high carbon steel be manufactured in India for the usage of indigenous plows.

d) Medium Carbon steels: Medium carbon steels such as EN-8, EN-9 etc. are required for beams, tines etc. Although these are manufactured in India in

the form of billets only, Hence, it is recommended that standard sections be rolled at the steel plants for indigenous agricultural equipment usage.

e) Structural Steel: Normally, the frames of the equipment today are fabricated out of mild steel. However, the present trend of farm equipment manufacturers in other countries is to use medium carbon structural steel for reduction of weight and additional strength. Hence, it is recommended that possibilities of manufacturing medium carbon structural steel for indigenous farm equipment usage be explored.

C. DIESEL ENGINES AND POWER PUMPS

Raw material required, as worked out by the "working group" for Diesel Engine and power pumps is given in Appendix IV-F and IV-G.

3. Requirement of Tyres

One of the major problem more or less commonly faced by the indigenous tractor manufacturers have been the inadequancy of locally available tyres. The hardship of the farmers regarding non-availability of replacement tyres is very accute. The shortage for OE manufacturers is so pronounced th t the Government had to issue licences to the tractor manufacturers for import of tyres, despite the precarious foreign exchange position. Hence, it is recommended by many expert groups that immediate steps are to be taken to make available the tyres in required sizes and quantities for tractor industry to reach the installed capacity and also expand to meet the tractor requirement during the IVth plan period.

The following will be the population of tractors & trailers by 1973-74 is estimated as follows:

	Tractors	Trailers
Production in 1973-74	80,000	37,000
Total population 1973-74	356,500	143,000

Appendix IV-4 gives the estimated production and requirement of tyres for tractor and trailers in 1968 in India. Following table gives summary of estimated production and demand.

		Estimated demand (Figures in 000)	Estd. production
Tractor tyre	front	52.0	57.6
	rear	55.0	40.2
Trailer tyre		17.8	19.0

However by 1973-74, the O.E. requirement and replacement requirement will be very high as detailed below:

Requirement of tyres (1973-74)
(Fig. in 000)

	O.E.	Replacement*	Total requirement
Tractor tyres	320	285	557
Trailer tyres	100 #	114	262
Total	420	399	819

Note: * On total population on 20% basis.
30% of production 4 wheel trailers.

Thus to meet the O.E. and replacement requirement of the tyres for tractor and trailers, an estimated 557 thousand tractor tyres and 262 thousand trailer tyres are required.

Tyre sizes: The following are the common tyre sizes used:

Tractor:	front	4.00 x 12
		4.00 x 15
		5.50 x 16
		6.00 x 16
		6.50 x 20
	rear	8.00 x 24
		10.00 x 28 or 11.2 x 28
		11.00 x 28 or 12.4 x 28
		12.00 x 28
		14.00 x 28
		13.60 x 38
Trailer	..	7.50 x 16

Material required for Tyres: To manufacture 819,000 tyres required during the year 1973-74 of the IVth plan period, the following material is estimated to be required as estimated by some experts.

Item	1973-74 (requirement in 000 tonnes)
a) Rubber (Natural & Synthetic	8.6
b) Rayon filament	2.8
c) Beed wire	0.8
Total	12.2

In addition, tyres will be required for protable pumping sets, implements and portable power threshers. Power tillers may be primarily be used for wet land tillage operations, therefore, pneumatic tyres may be required as an optional equipment.

4. Requirement of Diesel fuel

The estimated population of tractors by 1973-74 is about 350,000 if the significant percentage of anticipated demand is met. The estimated population by Diesel Engine driven pumps for irrigation may be around 2 million (assuming 80% of production is used for irrigation of which 50% is used with Diesel Engine). Assuming 50% load factors and 1000 hrs/year per tractors and 8.0% load factors and 400 hours per year, total diesel oil required for tractor and engines is expected to be around 2 million tonnes by 1973-74.

5. Spare parts and anxillary industry

It has been realised - both in private and government circles - that supply of spare parts on time at reasonable price level is very important, regarding the effective growth of Farm Equipment Industry as well as ancillary industry. The "Panel on Auto Ancillary Industries" of the Development Council for IV five year plan with the assistance of-All India Automotive Ancillary Industries Association has recommend many stages to meet the demand for ancillary parts both for O.E. and spareparts requirements. The total value of all automotive

ancillary components — including that for tractors etc. may be in the order of Rs. 1,700 million by 1973-74. The Indian automotive ancillary production has increased from 289 million rupees from 1963-64 to Rs. 652 million in 1967-68 excluding tyres, tubes, batteries, coil springs, ball and roller bearings, fasteners and items produced in the small scale sector.

The "pannel" has also estimated the requirement for spareparts for tractors (Refer Appendix IV-I) based on Replacement turn over factor. This method of approach is based on the frequency of replacement of a component during a vehicle's - "road worth life" - the frequency of replacement being the replacement turn over factor. (RTF)

The panel has recommend the necessary steps to increase the production, expansion of existing capacity, starting of new ventures - availability of raw material, foreign exchange quality control and export incentives.

6. General Problems regarding Development of farm machinery industry.

In so far as the coventional agricultural implements are concerned, the raw material, the know-how and the facilities are available in the country. With regard to the manufacture of tractors, however, it may be stated that the industry is still dependent on the import of components and certain essential raw materials such as special alloy steels. Efforts are being made to reduce the dependence on imports of components, and assistance is being extended to the industrial units concerned in the procurement and installation of machinery both indigenous and imported. For the large programmes envisaged for tractor production in the years to come, substantial investment would be needed particularly in plant and machinery if the industry is to meet the country's demand. The same would hold good in the case of power tiller industry, but to a lesser extent, because the needs are not so large. Import assistance in a larger measure may be required during the next 3 - 4 years in order to

step up not only the production but also in the importation of such machinery, particularly gear cutting machinery, from abroad. To achieve rapid growth of these industries, it would, perhaps, be advantageous if credit facilities on moderate terms are made available to the tractor manufacturing units to enable them to equip themselves adequately. The capital structure of such industries would also have to be enlarged at the same time.

In the manufacture of agricultural machinery in India, particularly tractors and power tillers, the costs tend to be high particularly when these industries still depend on imports. Apart from this, the high prices of raw materials, both indigenous and imported, tend to make the indigenous products costlier, with the result that it tends to be not competative in the international export market field. With the rapid Indianisation of the tractors and power tillers, the availability of raw materials at international prices would have to be a pre-requisite for any reduction in the prices so that the Indian products could enter the export market. In other words, the main problems faced by the agricultural machinery industry are as under:-

(i) Shortage of foreign exchange to meet the growing needs of the industry

(ii) The high prices of raw materials and of imported components.

(iii) Lack of financial credits on moderate terms for the rapid expansion of the industry.

The types of machinery that are required would have to come from countries like USA, UK and West Germany for which the type of foreign exchange required is difficult to come by.

/Appendix IV-A

by the State Governments etc. and in the implementation of the schemes, the average annual requirements would be of the order of 1,000 Nos. the demand rising to 1,400 Nos. towards the end of the plan period as under:-

1969-70	600 Nos.
1970-71	800 "
1971-72	1,000 "
1972-73	1,200 "
1973-74	1,400 "
	5,000 "

C. Power Tillers

It is difficult to estimate the future demand since the existing population, annual sales and usage has been very small. Very little information is available regarding product acceptance, and present demand, and manufacturing started on a very small scale.

The working group on IV Five-year plan has estimated the demand as follows:

Table 2.16 Estimated Demand for Power Tillers (1970-1975)

(By Working Group)

1969-70	20,000
1970-71	30,000
1971-72	40,000
1972-73	60,000
1973-74	80,000
Total	230,000

The above estimates are based on the following analysis by the working group:

a) Demand for power tillers would be for small farms especially paddy areas and hilly areas.

b) The land consolidation programme has not progressed significantly in the paddy growing areas, and this together with special conditions characteristic of paddy cultivation, preference will be for power tiller.

c) Even where riding tractor are used power tiller may be used as a supplementary power unit for interculture, spraying etc. especially on cotton, potato, maize etc. where usage of general purpose tractor may be limited.

d) There are 7 million operational holdings between 4 to 10 hecters commanding a total of 53.5 million hectares and the working group estimates about 2% of holdings to be equipped with power tiller by 1975.

e) The prospect of availability of light diesel engines being, for the present remote, the working group has no objection to encouraging petrol/kerosine engines.

f) The working group suggests that manufacture of power tiller may be in three ranges (i) 3-4 Hp (ii) around 5 Hp and (iii) 8-12 Hp and that in the first and second ranges, of petrol/kerosine engines may be considered.

In this connexion, it may be pointed out that four ~~ex~~ parties have been sanctioned a total capacity of 26,000 per annum, it remains, however, to be seen whether all of them will commence manufacture immediately. Details of licences issued is given in Appendix II-A. According to the analysis by the fact-finding team, we can, taking into consideration all factors, assume very reasonably that the demand for power tillers would be around 5,000 in 1970 and 25,000 in 1975, the most popular horsepower range - about 80-85% - to be around 8-10 horsepower.

D. Engines

For the present both gasoline and diesel engines are manufactured in India.

a) Diesel Engines Regarding the diesel ~~ex~~ engines the working group on diesel engines for IV five year plan has estimated the requirement for 1969-70 to 1978-79 as follows:

Table 2.17 Estimated requirement of all type of diesel engines (1970-75)

(By working group) (000 units)

Type	Hp	Estimated Requirement 69-70	70-71	71-72	72-73	73-74	Tentative 1978-79
Industrial and Agricultural	3-10	240	255	270	280	290	380
Industrial, Tractors and Irrigation	11-20	-	3	6	9	15	30
Tractors	21-50	10	11	12	13	14	20
Industrial and Agricultural	21-50	4	5	6	6.5	7	12
Industrial, agricultural and crawler tractor	51-120	0.3	0.5	0.6	0.7	0.8	1.2
" "	121-350	0.1	0.2	0.3	0.35	0.4	0.5
TOTAL[X]	-	250	275	296	310	329	445

x/ Includes 21-50 Hp marine, 51-120 Hp marine, above 350 Hp industrial and excludes requirement for vechicular diesel engines.

b) Gasoline engines No estimates have been worked out.

Demand for Diesel and Gasoline Engine for Agricultural Usage:

Taking into account, all aspects, the fact-finding team estimates the demand for both gasoline and diesel engines for agricultural usage as follows:

Table 2.18 Estimated requirement of Engines (1970-75)
(by Fact-finding Team)

Type	Horsepower	Demand in Units	
		Estimated 1970	1975
Gasoline	1-2	30,000	75,000
"	3-5	50,000	100,000
Diesel	3-15	250,000	325,000
"	12-30	15,000	30,000
"	30-70	40,000	80,000

The following trend in design is anticipated

a) The micro gasoline engines of 1-2 horsepower is primarily used for plant protection (knapsack sprayer) and the demand will increase.

b) Regarding gasoline engine of 3-5 Hp which is used for light agricultural operation, demand will increase if used on small power tillers also.

c) For the present most of the diesel engines of 3-15 Hp are mostly slow speed stationary type. They are used for agricultural operations such as pumping, threshing, flour mills, etc. with the rural electrification extension, usage of tractors and power tillers, the rate of growth for this horsepower range diesel engines may be reduced if no compact light weight highspeed diesel engine suitable for power tillers and other agricultural usage is not produced. There is a great necessity to manufacture such an engine as the demand will be very significant.

d) The 12-30 Hp diesel engines are mostly used for stationary purposes. The demand growth may not go up at a high rate due to extension of rural electrification.

e) Diesel engine for tractor usage will go up according to the tractor production

E. Pumps

Hand pumps, power driven centrifugal pumps, low lift pumps and deepwell turbine and submergible pumps are required for irrigation. Hand pumps, power driven centrifugal pumps and deepwell pumps are manufacturedin India.

Table 2.19 gives the estimated demand for power driven pumps as worked out by the working group on pumps:

Table 2.19 Estimated requirement of power driven pumps during IV plan

(By working Group) (000 units)

	Water pumps@/	Total pumps x/
1969-70	395	400
1970-71	420	430
1971-72	455	465
1972-73	485	500
1973-74	520	535
1975-76 79	600	613

Note x/ includes industrial, chemical and miscellaneous types.
@/ 90% for agricultural usage.

Considering all aspects, the fact-finding team estimates the requirement of pumps as follows:

Table 2.20 Estimated Requirement of Pumps
(Fact-finding Team)

Type	Requirement 1970	In Units 197[illegible]
Hand operated	100,000	300,000
Power centrifugal pumps	300,000	600,000
Deepwell pumps	40,000	100,000

It is also to be pointed out that there is a great necessity of introducing low lead paddy propeller pumps with 3 Hp engine as used in Thailand and the Philippines.

F. Plant Protection Equipment

Many varieties of plant protection equipment are manufactured in India. They are stirrup pumps, foot pumps, rocking sprayers, compressed air pumps, pressure retaining sprayers, large volume and moterised knapsack sprayer even duster, duster, etc.

e) Considering 0.8 ha/day with hand operated equipment, 5 ha/day with power sprayers, 3 ha/day with low volume power sprayers, following percentage of area is expected to be covered:

	1969-70	1970-71	1971-72	1972-73	1973-74
Hand operated	80	75	70	65	60
Power sprayer	4	4	5	6	7
Power low volume sprayer	16	21	25	29	33

f) For seed treatment it is expected that out of the 50% of the seed that is likely to be treated, 5% of the seed will be treated by mechanically operated equipment at central plan, 25% by hand operated drums and 20% by improvised local means.

Taking all factors into consideration, the fact-finding team estimates:

	Requirement in Units	
	1970	1975
Hand sprayers	130,000	225,000
Knapsack sprayers	25,000	100,000
Tractor mounted sprayers (low volume)	1,000	10,000
Other type of power sprayers (low volume)	30,000	75,000

G. Threshers

Pedal operated paddy and wheat threshers are manufactured in India. The following are the estimated requirements during IV plan period:

	1970	1975
Pedal Paddy thresher	25,000	125,0
Power Paddy thresher	10,000	50,000
Power wheat thresher	20,000	50,000

H. Harvesting and Threshing Equipment

i) Harvesting being done almost entirely by hand, it is necessary to look for the best way of future mechanization. For wheat and barley, there is a necessity to gather all the straw and chaffed for animal feeding. This implies the use of reapers and binders and of suitable threshers. Reapers have been widely used

The working group on pesticide equipment for IV plan has estimated the requirement of plant protection equipment as follows:

Table 2.21 Estimated Demand for Plant Protection Equipment in IV Plan

(By Working Group) (in 1,000 units)

Item	1969-70	1970-71	1971-72	1972-73	1973-74
1. Hand operated	200	350	400	400	350
2. Power operated	5	7	11	15	21
a) Conventional	1	2.8	4.8	4.8	6.8
b) Low volume	33	55	58	63	73
3. Seed treating machines					
a) Power operated	0.1	0.07	0.07	0.07	0.07
b) Hand operated	25	40	40	40	40
4. Rat Burrow Pump	5	2	2	2	2
5. Bird scarer	1	1.2	1.2	1.2	1.2
6. Fixed wing aeroplanes	21	21	22	20	20
7. Helicopters	6	5	1	2	2

The above estimate is worked out by the working group on the following criteria:

a) Area to be treated per year in million hectares are as follows:

	1969-70	1970-71	1971-72	1972-73	1973-74
From ground	39.2	47.9	56.6	65.3	74.0
From air	0.8	1.1	1.4	1.7	2.0
Total	40.0	49.0	58.0	67.0	76.0

b) Area to be treated per year in rainy season (kharif) and winter (rabi) to be in the ratio 6:4.

c) Area to be treated per season in million hectares are as follows:

	1969-70	1970-71	1971-72	1972-73	1973-74
Rainy season	19.52	28.74	33.86	39.18	49.40

d) Arrangements to be made for treatment (million hectares per day) during 5 plan years are as follows:

	1969-70	1970-71	1971-72	1972-73	1973-74
Rainy season: (25 working days in the month)	0.78	1.15	1.36	1.57	1.8

in Europe, but they are now produced in a very small quantity due to introduction of combines. Designs could be obtained by former manufacturing companies. A sim hand rake is used by an operator mounted upon the reaper, and it is more simple and economical than a mechanical device.

ii) In fact, a better advance towards mechanization could be done with binders - simple one with one conveyer have been used in Europe after world war II and it proposed to test them in India.

iii) For threshing, of wheat it seems that one manufactured in Pakistan with spikes drum would be really suitable for India and it can be manufactured without any difficulty. For paddy, no successful power thresher is yet introduced. Paddy thresher as one developed at International Rice Research Institute, Philippines, may prove to be successful in India.

iv) Combine harvesters will certainly be needed in India in the near future. Large combines manufactured in western combines and small walking and riding combi harvesters manufactured in Japan - both self-propelled and pull type - must be imported and carefully tested. Special attachments for rice, maize and other cereals must be also tested.

v) Maize harvesting by hand is not really uneconomical due to availability of labour. For the future, it is suggested to tend towards the use of combines with attachment rather than the specialized and costly "corn harvesters".

I. Other Equipments

a) Seed drill cum fertilizer distributors.

b) Row crop planter cum fertilizer distributors. There is a great necessity for introducing integral sowing and fertilizer application equipment.

c) Potato planter, spinner and harvester. Recently, local small scale manufacturers have repr duced imported models. However, the quality is questi

The rice mills have been stressed by many in India. The country has about 49,000 rice mills of which 85% are of huller type. It is reported that the greatest loss of edible rice is occuring in the huller mills and hence modernisation of these mills are to be taken up urgently. Modernisation and better storage facilities would save for the country about three million tons of rice.

Ford Foundation and the Union Government have started a pilot project by installing seven modern rice mills in different states. The normal capacity is about 4 tons of paddy per hour. Apart from the need of big driers, small rice mills are also necessary. Other equipment that may be considered are implements and equipment for cash crops such as cotton, groundnut and sugarcane.

J. Implements for Tractors

The main tillage implements used are disc harrow, spring tine cultivator, disc plow, mould board plow and levellers. Estimated demand for all type of implements is given in table 2.22.

K. Rice Processing Equipment

The urgent need for modernizing

Table 2.22

ESTIMATED DEMAND OF TRACTORS & POWER OPERATED EQUIPMENT - IVTH PLAN

Sr. No.	Basic	Type	Estimated demand 1973-74	Estimated demand Total IVth Plan
1.	Mould Board Plow (30-35)*	Conventional, Reversable sub soiler, chisel	25,000	90,000
2.	Disc Plows (15-20)	Conventional, Reversable Rotovators	12,000	45,000
3.	Cultivators (60-75)	Tillers, Spring loaded, inter-Cultivators, spike tooth	55,000	200,000
4.	Disc harrow (60-75)	Offset, Tandem, Paddy	55,000	170,000
5	Sowing Equipment (50-60)	Planter/Fert. Dist., Seed/Fert. drill, gas/liq fert applicators fert. broadcater, drills on cultivators, potato, groundnut planter	42,500	170,000
6	Levelling Eqpt. (40-45)	Blade terracer, land planers, levellers, scrapers, dozer blades clod crushers, packers	27,000	80,000
7	Plant Protection Equipment (10-15)	Sprayer, duster	6,000	16,000
8	Harvesting Eqpt. (25-30)	Mowers, wind rower, reaper, binder combiner, forage harvesters.	17,000	50,000
	Harvesting Eqpt. Special crops (10)	Potato, maize, groundnut	7,500	20,000
10	Grinding Eqpt. (5)	Rotary choppers, Feed mills Feed grinders	3,500	10,000
11	Threshers (30-35)	Wheat, sorgum, paddy	25,000	70,000
12	Processing Eqpt. (25.30)	Seed cleaners, granders driers	18,000	43,000
13	Transport Eqpt. (50-55)	Trailers	37,000	138,000
14	Loaders	Loaders etc.	400	1,350
15	Pumping sets (15-20)	P.T.O. operated	1,200	38,000

* Figures in brackets estimated demand nos. for 100 tractors by 1973-74.

6. Recapatulation

Considering the farm mechinization in India, table 2.33 gives the summary of population, sales, demand and manufacture of farm machinary in India.

TABLE 2.23

Summary of population, Sales, Demand and Manufacture of Farm/Machinery In India

No.	Item	Population 1968	Annual Sales 1968		Annual Projected Demand		Manufacturing Capacity			
							1965		1970	1975 (5 yr. plans)
			Total	Imported	1970	1975	Actual Production	Installed capacity		
	Tractors	75,000	19,300	4,300	40,000	80,000	12,000(Z) 3,000(G)	12,000(Z) 5,000(G)	30,000	50,000
	Power Tillers	4,000	600	300	5,000	25,000	300(.)	2,000(.)	5,000	26,000
	Total Engines (Agr. use)	1,190,000	280,000	Nil	485,000	610,000	248,000	340,000	345,000	370,000
a	Gasoline 1-2 Hp	75,000	20,000	Nil	30,000	75,000	18,000	30,000	36,000	40,000
b	Gasoline 3-5 Hp	75,000	20,000	Nil	50,000	100,000	20,000	30,000	30,000	30,000
c	Diesel 3-15 Hp	725,000	150,000	Nil	250,000	325,000	120,000	150,000	150,000	150,000
d	Diesel 12-30 Hp	200,000	75,000	Nil	15,000	30,000	75,000	100,000	100,000	100,000
e	Diesel#* 25-75 Hp	75,000	15,000	Nil	40,000	80,000	15,000	30,000	30,000	50,000
	Pumps all type									
a	Hand pumps	Nil	Nil	Nil	100,000	300,000	Nil	Nil	Nil	Nil
b	Power pumps	1,500,000	305,000	5,000	300,000	600,000	700,000#	300,000	300,000	350,000
c	Deep well pumps	Nil	Nil	Nil	40,000	100,000	30,000	30,000	30,000	Nil
	Sprayer & Duster all type									
a	Hand sprayers	200,000#	150,000	Nil	130,000	225,000	150,000	150,000	150,000	Nil
b	Knap sack sprayer	100,000	15,000	Nil	25,000	100,000	15,000	50,000	50,000	Nil
	Threshers all type									
a	Paddy thresher (pedal)	300,000	Nil	Nil	25,000	125,000	15,000	20,000	30,000	Nil
b	Paddy thresher (power)	50,000	Nil	Nil	10,000	50,000	5,000	5,000	Nil	Nil
c	Wheat thresher (power)	25,000	Nil	Nil	20,000	50,000	10,000	10,000	Nil	Nil

\# out of about 500,000 sprayers and dusters (both power and hand)

\#\# About 35,000 production from large scale sector

\#* manufactured for tractors.

SECTION III

MANUFACTURING INDUSTRIES AND ANCILLARY FACILITIES

1. Farm Machinery Manufacturers

The manufacturing of hand tools, bullock drawn implements, simple crop protection equipment, centrifugal pumps, engines were started many years back. Only manufacture of engines, primarily slow speed diesel engines were first started in the organized sector. Centrifugal pumps, deep well pumps and other types of engine manufacture were started later. From the past 6-8 years, manufacture of tractors, tractor drawn implements, plant protection equipment, and full range of irrigation equipment, processing machinery have made substantial process. The ancillary industry has also made significant progress from the past 5 years.

(A) Tractors - 4 wheel riding

While during the Second Plan, capacity for production of 11,000 agricultural tractors per year was licensed, actual production commenced only during the Third Plan period in the course of which a further capacity of 19,000 per year was sanctioned. There are, at present, five units manufacturing tractors in the country. Following are the brief particulars of the make of tractor manufactured by each unit, the total fixed investment in each unit etc:-

(a) Eicher Tractors India Ltd, Faridabad: They have taken up for manufacture 26.5 Hp, air cooled diesel tractor in technical collaboration with M/s. Gaber Eicher of West Germany. The authorised capital of the Company is Rs. 7.5 million, while the latest subscribed

/and paid

and paid capital is about Rs. 0.7 million.

(b) Escorts Ltd, Faridabad: The two items initially taken up by this firm for manufacture were Escorts-27 (two cylinddr air cooled) and Escorts-37 (three cylinder Air cooled) diesel agricultural tractors. They have entered into a technical collaboration with M/s. Motoimport of Poland. They have now taken up manufacture of Escort-47 (Four cylinder Water cooled Diesel) tractor. The authorized capital of the company is Rs. 45.0 million made up of Rs. 25.0 million of ordinary share capital and 200 lakhs of cumulative preference share capital. The paid up capital, as on 31-12-66, was Rs. 24.48 million of which the share equity capital was Rs. 19.34 million, the balance being preference share capital.

(c) Hindustan Tractors Ltd., Baroda: Thisfirm is manufacturing 50 Hp and 35 Hp water cooled Diesel tractors in collaboration with M/s. Motokov of Czechoslovakia. The authorized and paid up capital as on 30.4.1967 was Rs. 10.0 million made up of Rs. 7.0 million of equity capital and Rs. 3.0 million of preference share capital.

(d) International Tractor Co. of India Ltd., Bombay: The item taken up for manufacture is the M Cormick International B-275, 35 Hp Water cooled diesel tractor in technical collaboration with M/s International Harvester Co. of U.K. The authorized capital of the company is Rs. 40.0 million and the paid up capital in May, 1967 was Rs. 14.9 million. The share capital held by foreign collaborators, amounting to Rs. 2.55 million lakhs represents about 17% of the total paid-up capital.

/(e)

(e) Tractors & Farm Equipments Ltd. Madras: The tractor being manufactured is MF-1035 in collaboration withM/s Massey Ferguson of Canada and their associates in United Kingdom. The authorized capital is Rs. 20.0 million which is fully paid up. Details of sanctioned capacity for agricultural tractors is given in tables 3.1, 3.2, 3.3. and Appendix III-A.

Installed Capacity

Although the total approved capacity in respect of all the five units is 30,000 tractors per annum, the actual installed capacity is only about 18,000 per annum at present. The short-fall is attributable mainly to the delay in the importation and installation of imported and indigenous capital goods. The industry has already been given capital goods import licences for achieving their approved capacity.

In view of the steep rise in demand, the Agricultural Tractor Industry, has been delicensed and the Industry has also been given a high priority on the programme of Industrial Development in India.

/Table 3.1

Table 3.1

Sanctioned Capacity for Agricultural Tractors

Sl. No.	Name of the firm.	Make of the tractor.	Capacity sanctioned (Nos.)	Installed capacity (Nos.)	Year of original sanction.	Remarks
1	2	3	4	5	6	7
1.	M/s.Eicher Tractors India Ltd. Faridabad (Haryana)	Eicher-115/8 (26.5. hp)	2000	1,000	1959	
2.	M/s. Escorts Ltd. Mathura Road, Faridabad, (Haryana.)	Escorts-27 (22.7 hp) Escorts-27W (28 hp) Escorts-37 (34.5 hp)	7000	3,000	1966	Production commenced in 1964.
3.	M/s. Hindustan Tractors Ltd., Construction House, Ballard Estate, Bombay.	Hindustan-50 (50 hp)	5000	2,000	1966	2000 Nos. was annual capacity sanctioned for these tractors in 1960. It was revised to 5000 Nos. in 1966.
		Hindustan-35 (35 hp)	2000	1,000	1962	
4.	M/s. International Tractor Co. of India Ltd., Akurli Road, Kandivli East, Bombay-67.	Mc. Cormic-International B.275 (35 hp)	7000	3,500	1959	The capacity initially sanctioned is 3,500. Revised to 7000/year.
5.	M/s. Tractors & Farm Equipment Ltd., 202, Mount Road, Madras.	Massey - Ferguson-1035 (35 hp)	7000	4,000	1964	3500 Nos. was the annual capacity sanctioned in 1960. It was revised to 7000 Nos. in 1964. Manufacture of 500 tractors in 35-50 H.P. range within the sanctioned capacity have been agreed to in principle.
		Total:-	30,000	15,300		

Table 3.2

Investment by licensed units in plant & machinery
(Rs. in million)

		Existing Investment in Plant and machinery.	Additional investment required.
1.	M/s Eicher Tractor India Ltd., Faridabad	Rs. 3.0	2.56
2.	M/s International Tractors Co. of India Ltd., Bombay	Rs.25.0	13.8
3.	M/s Tractors & Farm Equipment Ltd., Madras.	Rs.24.8	2.2
4.	M/s Escorts Ltd., Faridabad.	Rs.10	7.5
5.	M/s Hindustan Tractors and Bulldozers Ltd., Baroda.	Rs. 20.3	6.9

/Table 3.3

Table 3.3

Statement Showing the production of Agricultural Tractors from 1961-62 to 1967-68, and Indigenous Content Achieved

	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	Total	Indigenous content - achieved.
1. M/s. Tractors & Farm Equipment Ltd; Madras - 35 hp	681	1100	1450	1970	3066	3397	4087	15751	80.3%
2. M/s. Hindustan Tractors Ltd., Baroda 50 hp	-	100	462	589	397	1093	1303	3964	85.0%
35 hp	-	-	-	812	870	800	343	2825	57.0%
3. M/s. International Tractor Co. of India Ltd; Bombay. - 35 hp	-	-	-	225	-	1301	2901	4427	76.5%
4. M/s. Escorts Ltd., E-37(34.5hp)	-	-	-	281	528	706	1440	2955	73%
Faridabad - HaryanaE-27(28 hp)	-	-	-	221	730	1427	1080	3458	-
E-47 W	-	-	-	-	-	-	36	36	-
5. M/s. Eicher Tractors 26.5 hp India Ltd., Faridabad	116	132	5	144	64	92	204	757	64%
Haryana. 12/18	83	82	46	81	59	-	-	351	-
TOTAL:-	880	1414	1983	4323	5714	8816	11394	34524	

(B) Engines (Refer Appendix D for the list of manufacturers)

(i) Diesel Engines

There are more than 100 manufacturers of diesel engines in India of which about 8-10 are in large scale sector. The total production of diesel engines is about 250,000 per year out of which 200,000 may be for agricultural usage. About 50% of the same is produced by the large scale sector and the balance by small manufactures. An estimated production by different manufactures is given in Table 3.4. A list of manufacturers is given in Appendix D.

(ii) Gasoline Engines

There are about 10-15 manufacturers of which the following manufacturers produce about 20,000 engine of 2-5 Hp and about 18,000 engines of 1.2 Hp per year.

(a) Enfield (India) Ltd. Madras*

2-4 Hp - 11,000/year
1.2 Hp - 18,000/year

(* Note: See Appendix III-B for details of Factory visited)

(b) Krishi Engines, Hydrabad

3.5-5 Hp - about 1000/yr.

(c) Veegal Engines & Engineering Ltd. Calcutta

2-6 Hp - about 5000/yr.

(C) Pumps (Power Driver)

There are about 80-100 total manufactures of which 40 are small scale, 45 mddium scale and about 15 are large scale manufacturers. Total

/production,

Table 3.4

Estimated Number of Diesel Engine Manufactured in India 1968 (Unit)

SI No.	Name of the Company	Total production	Export	Industrial Usage	Transport Usage	Agricultural Usage		
						Total	5-15 Hp	15-35 Hp
1.	Kirlosker Oil Engines	85,000	13,000	8,000	-	65,000	45,000	20,000
2.	Cooper Engineering Co.	24,000	-	2,000	-	22,000	12,000	10,000
3.	Simpson and Co.*	12,000	1,000	2,000	6,000	3,000	-	3,000
4.	Ruston Hornsby Co.	7,000	-	1,000	3,000	3,000	1,000	2,000
5.	Laxmi Rathan Engineering	5,000	-	1,000	-	4,000	4,000	-
6.	Indian Equipment Co.	2,000	-	-	-	2,000	2,000	-
7.	Indian National Diesel Eng. Co.	2,000	-	-	-	2,000	2,000	-
	Total	140,000	15,000	18,000	9,000	101,000	66,000	35 ,000
	Small Scale Sectors	110,000	-	10,000	-	100,000	60,000	40,000
	Grand Total	250,000	15,000	28,000	9,000	201,000	126,000	75,000

Note: * See Appendix III-B for details of factory visit.

production is about 300,000/year of which 80% are below 5 Hp used for agricuture. The following are a few of the manufacturers:

(a) Kirlosker Brothers - Centrifugal Pumps 10,000/yr.

(b) Jyoti Ltd - Centrifugal and deep well pumps 25,000/yr.

Others are:

(a) Cooper Engineering Co. Ltd

(b) Best & Co. Ltd.

(c) KSB pump ltd.

(d) PSG Industries Institute

(e) Ruston Hornsby Ltd.

(f) Johnston Pump (India) Ltd.

(g) AEI (India) Ltd.

(h) Aray Industries

(i) Bharat Foundries

(j) Flowmore Pvt.

(k) Florite Eng. Cropn.

(For details refers to "Buyers Guide" Indian pump manufacturers association. India Exchange. Calcutta-1)

(D) Plant Protection Equipment

There are about 35-40 small scale manufacturers, 6-8 medium scale and 2-3 large ssale manufacturers. Following are a few manufacturing sprayers and dusters:

(1) American Springs & Pressing* Works, Bombay 67.

/Hand

Hand operated; capacity 120,000/year

Power operated: capacity 40,000/yr.

(2) Shaw Wallace Calcutta

(3) S.M. Agrico.

(4) Solo (India) Ltd.

Note: * See appendix III-B for details of factory visit.

(E) Threshers

There are about 60-100 very small sdale manufacturers of which 10-15 may be considered as small scale units. The following are a few of them:

(1) American Springs and Pressing Bombay

(2) Fulia Sheet Metal & Hardware Industry, Calcutta

(3) Jaycee & Co. Calcutta

(4) Lynx Machinery Ltd. Calcutta

(5) New Maharashtra Eng. Co. Poona

(6) Qualitex Machinery Pvt. Faridabad.

(F) Rice Hullers

There are about 20-30 very small manufacturers and about 8-10 small scale manufacturers:

(1) Qualitex Machinery Pvt. Ltd.
Faridabad

(2) New Maharashtra Eng. Co. Poona

(3) Lynx Machinery Ltd. Calcutta

(4) Jaycee & Co. Calcutta.

(For other details refer to "Assocham Farm Input Directory" The Associated Chamber of Commerce and Industry of India. 6, N.Bose Road, Calcutta-1)

/(G)

(G) Farm Implements - Tractor Drawn

There are many small scale manufacturers, primarily manufacturing disc harrows and cultivator. Apart from implements manufactured by Tractor manufacturers, there are about 6-10 other manufacturers who have a total turn over of Rs. 2-5 million per year. The implements manufacturers are:

(a) International Tractor Co. of India Ltd.*

(b) Tractors and Farm Equipment Ltd.*

(c) Tractors and Bulldozers Ltd.

(d) Eichen Tractor Corporation*

(e) Light Cart Private Ltd.

(f) Pritim Singh & Co. Delhi* "

(g) National Tractor and Implements, Karnal

Note: * - Visted by the team

" - Pritim Singh Sons, Motikhan, New Delhi manufacturers 300 implements (Tractor Drawn) a month. Mould Board Plow 60-70/months, Disc plow 50/month, Mounted and Pull Type Harrow 50-60/month. The implements are supplied to Escorts Ltd.

(H) Other Bullock Drawn Implements and Hand Tools

There are many small scale manufacturers.

A list of all type of implements manufacturers are given in Appendix E.

2) Other Engineering Industries

(1) Machine Tools

India is now in a position to manufacture a wide variety of machine tools

/which

which are required in the production of various types of engineering goods including agricultural machinery. There is, however, a gap to be filled, particularly in respect of gear cutting machinery required in the agricultural field for tractors. Large surpluses of finished machine tools are already available from the factories both in the private and public sectors, apart from surplus capacities forundertaking the production of special purpose machine tools. In so far as general purpose machine tools are concerned, these are fairly well covered from indigenous production. Appendix F gives the list of industries manufacturing machine tools and the product produced.

(2) Other Engineering Industries

It has not been possible to give in this report a comprehensive list of the various items of engineering goods that are made in India. However, 'Hand Book of Indigenous Manufacturers of Engineering Stores' published by the Government of India, may be refered to. This book covers the industries only in the organized sector. Quite a number of such industries ~~and~~ as are covered by the Hand Book are also in the small scale sector, but the information on the latter is not readily available. This Hand Book is indicative of the variety of engineering goods that are available from Indian Tractories in the organized sector. In addition, there is a large number of manufacturers of chemical stores which cater to the various needs of the engineering industries such as tyres, synthetic rubber and so on.

(3) Ancillary Industries and Raw Material

(a) Ancillary Industry

Capacities have been established for the manufacture of a wide range of ancillary items which are required particularly in the automotive industry.

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These include among the major items, batteries, Tyres & Tubes, brake linings, clutch assemblies and parts thereof, dynamos, starter motors, fuel injection equipment, valves, gaskets, pistons and rings, filters, thin-walled bearings, wheels etc. In fact most of the ancillary requirements of the automotives and tractor industries can be catered for by the ancillary units in India. All these units are being expanded progessively to keep pace with the variety and increase in demand that is developing, particularly in the agricultural sector. In addition, a number of other ancillary units are also available for making the hardware items. The tyre industry is well established and is also being expanded to meet the rising demand. Inother words, the ancilary field, though very wide in its scope, has been substantially well covered and the production of special requirements could be organized with proper incentives and advance notice to the industries.

It may, however, be mentioned that, in acnillary industries, some raw materials and in some cases some special accessories, have to be imported, the production of which has still to be established. ~~In the case of the position~~ On the whole, the position with regard to the ancillary industries and the machine tool industry is very satisfactory and if these industries are called upon to extend co-operation outside India, It should not present a serious problem. Appendix G gives a comprehensive list of the members of the "All India Automobile and Ancillary Industry" and the details of products manufactured. Appendix III-C gives the details of ancillary industries visited by the team.

(b) Supporting Industries

(i) Ferrous Castings: Capacities for the manufacture of castings such as malleable, spheroidal - graphite, cast iron and other ferrous

/alloy

alloy castings have already been established in the country, both in the organized and in the small scale sectors. Almost every type of ferrous casting can be made within the country except for a few special types which are required for transmission housings etc. of automobiles. Even these are in the process of development. By and large it may be stated that adequate capacity has been created for meeting the internal needs of the country. In fact, there is a lot of unused capacity in these foundries which India can make available to other countries where such facilities are not available or cannot be established due to economic and other easons. Facilities due to economic and other reasons. Facilities are also available formaking the necessary patterns for the castings. Special processes such as shell moulding, pressure die casting etc. have also been developed within the country.

(ii) Non-ferrous castings: Like the ferrous castings, capacity has also been established forthe manufacture of non-ferrous castings where again surplus capacities exist for meeting the requirements of the coun ries outside India.

While in the case of ferrous castings, the raw material viz. the pig iron is available in sufficient quantities, the alloying elements have to be imported.

In the case of non-ferrous castings, tho.gh copper and zinc are available in limited quantities in India, these birgin metals have to be imported to make up the short-fall in indigenous production. Items such as tin and nickel shots would have to be imported for these industries.

/(iii)

(iii) Forgings: Considerable capacity has already been created for both open and closed die forgings. Quite a number of units manufacturing automobiles, railway wagons etc. have forging capacity ofr meeting their own requirements. In addition, there is a large number of forging plants all over the country to cater to the needs of the engineering andother industries. Here also surplus capacity is available. Much of the forging quality steel required in these industries is already being produced in India, but certain special grades of forging quality steels have to be imported. In the not too distant future it is anticipated that even the latter types of steels would also be produced within the country. It may be mentioned , however, that even for very large sized forgings, capacities have been established in thepublic sector for meeting the requirements. Many of the forging plants have their own facilities for the manufacture of tools and dies required by them for their xp production. In addition, a large number of units have also been established for the manufacture of special tools, dies, jigs & fixtures required by the vari industries including the forging industry.

(c) Sources for primary iron and steel products

Large steel plants at Durgapur, Burnpur, Jamshedpur, Bhilai and Rourkela have already been established in the country. Another large steel plant at Bok is also being established. These plants manufacture all the primary iron and st products including pig iron, ingot steel etc. There is a large number of re-roll mills which use the primary steel products from these major steel plants and manufacture various sections and types of steel products required by the industries. Besides these, trial production has already begun in the manufacture of special

/.alloy

alloy steel plants at Durgapur, Bombay and Bhadrawati. These alloy steel plants are also embarking on the production of a wide variety of alloy constructional steel required by the automobile and heavy industries.

For the further growth of steel industry, manufacturing facilities also have/been created for setting up of new steel plants and also expansion of the existing ones. The raw materials for the steel plants are abundantly available and only certain alloying elements are required to be imported at present.

4. Availability of Technical Personnel

There is availability of highly qualified engineering personnel for all aspects of engineering manufacture. Regarding technical personnel for operation of machines and other supervisory jobs, there are many polytechics and engineering diploma colleges. However, most of the industries in India have further in plant training programmes. Engineering personnel in the field of industrial engineering, production engineering, metallurgy, technology, inspection and quality control, planning etc. there is availability of persons of required calibre. In the design and development aspects of engineering field, India has started an active role from the past few years only. However, there is availability of technical personnel in this field also.

APPENDIX III-A

Details of the Tractor Manufacturers Visited

1. Name	Tractors & Farm Equip. Company Ltd.	Escorts Ltd.	International Tractors Co. of India Ltd.	Eichor Tractor Co.
2. Address	Sembium, Madras	Faridabad, Haryana	Bombay- 67(MB)	Faridabad, Haryana
3. Total area	6.5 ha or 65,000 sq.m.	40,000 sq.m	155,000 sq.m.	-
4. Covered area	13,500 sq.m.	20,000 sq.m.	15,500 sq.m. (cost of building Rs.15/sqft)	6000 sqm
5. Total staff	950 total 796 Directm labour 80 Adm. and Sales	1500 total 220 Engineering Staff	1200 total 800 Direct labour	400 total
6. Present capacity	4000-5000 tracts/yr	1968 - 4267 tractors	1968-69 - 2928 Nos.	1969- 600 unit
7. Installed capacity	7000/yr on 2½ shift	1969 to produce 9,600 nos.	3500 tractors/yr to be increased to 7000/yr	2000 tractors/yr
8. Facilities	a) Machine shop b) Heat treatment c) Press shop d) Gear shop e) Quality control f) Assembly	a) Assembly line b) Press shop c) Machine shop	a) Machine shop b) Heat treatment c) Gear shop d) Quality control e) Assembly	a) Machine shop b) Assembly
9. Local content	85%	75%	76%	72%
10. Sales organization	80 dealers. 200 sales points including sub dealers 80 staff in sales including 28 for spare parts.	Own sales organization	Through voltas Ltd	Through dealers
11. Share capital	49% MF. Great Britian 51% indigenous	100% indigenous	17% I.H.	Eicher 30%

12.	Implements produced	Disc plow Disc harrow 9 tine tiller seed box on cultivator etc.	Full range of equipment - Sub contracted	M.B. plow, disc plow, cultivator, harrow	Cultivator, M.B. plow, harrow etc.
		1 implement per tractor	To produce ford 3000 and 5000 models	To increase products to 7000/year by 1970-71.	
13.	Future plans	To produce 50 Hp tractor of Yuglosavian model			
14.	Other information	Uses perkins P_3 Engine manufactured by Simpson & Co. Madras	Uses Kirlosker engines and also imported engines on Escorts 27 and 37 and Perkins P_4 engine on Escorts 47 model.	Manufacture its own engine	Manufacture its own engine.

Appendix III-B

Details of Engine & Sprayers Manufacturers Visited

1. Name	Simpson & Company Madras	Enfield (India) Pvt. Ltd. Madras	American Springs & Pressing Works, Bombay
2. Product line	Perkins Engine - Diesel	Gasoline Engines - Villiers	Sprayers and Dusters Full range, Pedal Thresher
3. No. of workers	1200 - 2 shift	150	700 total 550 workers
4. Area	16,000 sq. meter covered area	4 hectares total	100,000 sq. ft. Total area 40,000 sq. ft. covered area.
5. Production	P_6-6 cylinder 500/mounth P_3& P_4 - 800/month Capacity total 2000/month P_3 - supply to Ferguson MF 1035 P_4 - supply to Escorts 47 P_6 - to supply to Hindustan crawler TG-50 Total production 80% to tractor usage and 20% to industrial 95% local content	a) L.S-34 1.2 Hp at 5500 rpm 34 cc, 1800/year production capacity 36,000/year. b) MK-12 - 1.9 Hp 3300 rpm 120 cc production 4800/year capacity 12,000/year c) MK-25, - 3.4 Hp 3000 rpm 256 cc production 6000/year capacity 12,000/year. Imported component, magneto, carburettor, forgings by Enfield & Castings by associate Company.	Licensed capacity/one shift Hand operated 120,000/yr Power eqpt. 40,000/yr. Pedal thresher 15/day. Has full testing facilities, production in 1968, 10,000 power sprayers and 80,000 hand sprayers.
6. Other information	Price P_3& P_4 - Rs. 7300/- P_6 - 8300/-	90% used for agriculture	Exports to Kenya, Thailand, Indonesia etc. 5% of production

Appendix III-6

Details of Ancillary and Supporting Industries Visited

1. Name	Shardlow India Ltd. Madras	Bimetal Bearing Co. Madras	India Pistons Madras	Engine Valves Madras
2. Product	Forgings 2800tons/yr For Automotive industry	Thin wall bearings for automotive industry	Piston, Sleeve, rings etc.	Tranco Valves.
3. Staff	350	300	2900	300
4. Investment	Rs. 9 million	Rs. 4 million	-	-
5. Facilities & production	a) Die sinking b) Copy milling c) Forging	Facilities to manufacture engine bearings, thrust washers and other thin wall bearings.	Piston 125,000/month sleeve 20,000/month rings 1 mil./month gudgconpin 135000/m. 1967-68 production Rs. 42.3 million.	Production of 2.6 million valve 1968-69 on 1 shift. Capacity 3 million valv /shift. complete manufacture and heat treatment facilitie
6. Imports	Alloy steel imported carbon steel local	-	98% local content	All steel imported
7. Other information	30% spare capacity available	1 shift spare capacity collaboration: clevite corporation: clevland USA	Export 30% has service training centre, technical school, research and Dev. Dept. and complete testing facilities	Area 2-2.5 ha. covered area 80,000 sq feet. 25% product for export. Local 40% for replacement and 60% of market.

1. Name	Lucas - TVS Ltd. Madras	Wheels India Ltd. Madras	Brakes India Madras	Ennore Foundries, Madras
2. Product	Generator, regulator, starter, head lamps, for automotive usage.	Discs, Rims and Wheels	Complete Brake system	All type of cast iron castings for automotive usage.
3. Staff	1500	1000	700	
4. Investment	-	-	-	
5. Facilities and Production	Generator, starter & regulator set 1400/moth supply to tractor industry. production 79000 starter, 75000 generator and 98,000 regulator per year	Licenced capacity 300,000 wheels/year. Production: tractor wheels 300/day. Truck wheels 1000/day. car wheels 500/day.	Master cylinder - 4000 /month. Wheel cylinders 16000/month. Total capacity: 80,000 sets/year. Licenced capacity 96,000 sets/year. Actual production 48000 sets/year.	Capacity 750-1000tons per month of grey cast iron and 50 tons per month of alumium castings. Manufacture for I.H. tractor: engine crank case, head, clutch and hydraulic assembly. For M.F. tractor - engine casing, transmission and hydraulic housing
6. Local content/import	Local content 90% on Generator and regulator and 70% on starter	Certain sections imported.	-	-
7. Other information	Installed capacity about 80,000 sets/year.	80% of cost is of raw material. Requirement of steel about 700 tons of plants and 700 tons of section per month	Used on tractor and automobiles.	Manufacture engine castings for Kirlosker, Perkins and Nissan, standard motor etc. engines.

SECTION IV

REQUIREMENTS TO ACHIEVE MANUFACTURING TARGETS IN FARM EQUIPMENT

Arrangements for Self-Sufficiency in Supply

(i) A significant development has been the exemption of wheeled tractors and power tillers from the licensing provisions of the Industries (Development and Regulation) Act, 1959. Such a measure would enable other intending manufacturers to enter the market. By the end of the Fourth Plan this measure is likely to yield results and the total availability of tractors may go up substantially. The existing units are also likely to be organized more efficiently as a result of keener competition. This may also lead to the diversification of the capacity of existing units which should be welcome.

(ii) Government have also liberalised the allocation of foreign exchange for the import of capital goods in favour of the existing units, and the only constraint with a couple of units appears to be the inability to raise rapid funds.

a) Wheeled tractors

As against the sanctioned capacity of 30,000 wheeled tractors, the installed capacity of the five tractor manufacturers is 15,300. While indigenous production commenced in 1962, the total availability through indigenous manufacture during 1962-63 to 1967-1968 was only 33,984 supplemented by 14,984 tractors imported during the corresponding period.

The present policy of imports is generally to limit the imports to tractors in the horsepower ranges not under manufacture in the country. It is recognized that, ultimately all imports must cease and the demand met entirely by domestic production. It is expected that delicensing of

of the tractor industry should evoke a reasonable response and the industry avail of the liberal allocations of foreign exchange and of institutional credit now available. Such of the units as have consistently fallen short of their production targets -- as recommended by the working group -- should be deemed as not having fulfilled their obligations; and it would be worthwhile examining if such units could not be subjected to regorous correctives. For meeting the requirements towards 1973-74 from indigenous production, the "working group" has recommended that additional capacities of the following order have to be created:

H.P. Range	Present sanctioned capacity.	Capacity needed by 1973-74	Additional capacity to be created
12-20 dbhp	NIL	25,000	25,000
21-35 "	25,000	45,000	20,000
36-50 "	5,000	18,000	13,000
above 50	NIL	2,000	2,000
	30,000	90,000	60,000

The question of taking up production of Zetor-2011 tractors in the public sector is already under the consideration of the Government. The "Working Group" has recommended that may be taken up for production. The Department of Industrial Development has also received proposals for the production of 18-25 h.p. RS-09 - an East German tractor, 14/20 h.p. DT-148/DT-20 tractors; and also tractors in the higher horsepower ranges. The "Working Group" has recommended that makes and types, which, on the basis of tests and trials have been found suitable for local conditions and the collaboration terms and programme for production that have been found to be satisfactory, should be cleared immediately. It also recommends that simultaneously, steps may also be taken to increase the installed capacity of those existing units,

which have shown reasonable progress with respect to total production and indigenous content. While sanctioning new units, it is further felt by the working group that while the initial capacity shall be adequate for organising economical production, it shall not exceed the number, the firm is likely to achieve over a period of 4 to 5 years, the capacity may be increased later on based on actual performance. The existing units may also be encouraged to diversify production by including in their manufacturing programme tractors in another horsepower range. The line of action recommended by the working group regarding expansion of existing units and further units to be set up is given in Appendix IV-A.

Regarding the price and future manufacturing programs of tractor, there appears to be certain problems faced by the local manufacturers at present, "on completely built up tractors, custom and excise duties are not levied, on the other hand, although finished components are imported by the tractor manufacturers are duty free, imported raw castings, forgings and other raw materials are not so. Components imported by ancillary manufacturers are subjected to custom duty and the end products to excise duty. The position is furth r aggravated by expensive raw material and locally brought out items. This results is an unfavourable selling price of locally manufactured tractors, compared with those imported complete."

"In spite of selling price of the indegeneous tractors being controlled under essential commodities act, based on the cost of production, selling prices of tractors are notably high" The cost of bought-out raw materials and components is approximately 60-65% of the retail selling prices. The selling expenses amount to approximately 12½% of the retail selling price. In view of this, the scope of reduction of the conversion cost through greated efficiency, higher utilization of Equipment and economics by way of larger volume is marginal."

"Although the selling price of tractors would still continue to be governed by the essential commodities act, the Government has delicenced the manufacture of tractors. It is therefore possible that a few more units would establish facilities for the manufacture of tractors. Although local development of tractors is not more than a decade's standing, serious complaints of the quality of the domestic tractors have not been received from customers. It certainly is a great tribute to the Indian Tractor industry that the Tariff Commission, during its recent public enquiry on tractor prices, gave expression to the commendable quality of locally manufactured tractors".

b) Power Tiller

In regard to power tiller, indegeneous production has been insignificant, and a total of 2881 power tillers have been imported from Japan under the III, IV, V and V few credits. As against the estimated demand by "working group" of 80,000 tillers towards 1973-74, the capacity sanctioned is 26,000 units. Details of the capacity is given in Appendix IV-B. Except for M/S Krishi Engines Ltd., the other units are yet to organise production. In sanctioning new units, the "working group" recounts that preference may be given to schemes which envisage achieving 90 to 95% indegeneous content in 3-4 years time.

c) Crawler Tractor

The demand for crawler tractors so far has been met from imports and their production in India is yet to be organised. The Hindustan Tractors and Bulldozers Ltd. have already been allowed import of 150 tractors in C.K.D. form.

For the manufacture of crawler tractors, licences have been issued to the following two firms.

	Model	Hp	Nos
1. Hindustaw Tractors	TG-50	50	200
Baroda	TG-90	90	200
2. Brittania Engineering Co.	Marshall	70	150
Calcutta		55	

Besides the above two firms, M/s Bird and company Calcutta has been issued a letter of intent for the Production of 150 nos of K-5 (50 Hp) and K-7 (87 Hp) models of Hanomag tractors in collaboration with a German firm. M/s Bharat Larth movers Ltd. Bangalore, a public sector undertaking -- Last taken up Production of crawler tractors of 180 Hp and above and it is expected that this organization would take up production of crawler tractors in the 70-120 range required for agricultural purposes. Besides the tractors in the above range, crawler tractors of 30-50 may be required for light levelling and normal agriculture operations in the Lilly areas and Sugarcane farms. The existing evidence is too inadequate to enable a forecast of the demand or a recommendation to the effect that manufacturing may be considered. These tractors may be introduced as an experimental measure and as for manufacture, an existing unit could organise it, if the demand justifies the Program.

Appendix IV-C gives the foreign exchange requirement for tractors, power tillers, crawler tractors.

d) Engines

The "Working Group on Diesel Engines" for the IV plan period have recommended many steps and have estimated the requirement of diesel engines for all purposed during IV plan (refer Section II). It has also estimated the requirement of raw material and foreign exchange to achieve the target. (Refer Appendix IV-D for foreign exchange requirement). One of the

recommendation is that to cope up with the anticipated increase for the demand for diesel Engines, the availability of fuel injection system, forgings, castings etc. would have to be ensured.

F. PUMPS

The "Working Group on Power Pumps" for the IV plan has accessed the requirement of all type of pumps (refer Section II) and has estimated the requirement of raw material and foreign exchange required to achieve the target. (For foreign exchange requirement refer appendix IV-E)

g) Plant protection Equipment

The "Working Group" on pesticides for the IV plan has accessed the demand (Referred Section II) for all type of plant protection equipment.

Appendix IV-A

Expansion Program of existing units and new units to be set up

(Recommended by "Working Group")

Manufacturer	Estimated production in Nos. 1969-70	70-71	71-72	72-73	73-74	Total during IV Plan period.
TAFE	4,600	5,500	6,500	7,200	8,000	31,800
International	5,000	6,000	7,000	9,000	10,500	37,500
Escorts	4,400	5,200	6,000	6,750	7,500	29,850
Hindustan Tractors & Bulldozers						
35 H.P.	2,400	3,000	3,000	3,500	4,000	15,900
50 H.P.	3,000	3,500	4,200	4,750	6,000	21,450
Eicher	600	800	1,300	1,800	2,000	6,500
	20,000	24,000	28,000	33,000	38,000	143,000
New units expected to be set up.	-	6,000	12,000	17,000	22,000	57,000
	20,000	30,000	40,000	50,000	60,000	200,000

Appendix IV-B

SANCTIONED CAPACITY FOR POWER TILLERS

Sl. No.	Name of the Party.	Make of Power Tiller.	Capacity sanctioned.	Year of sanction.	Remarks
1	2	3	4	5	6
1.	M/s. Krishi Engines Private Limited A-7 Unit Industrial Estate, Sanat Nagar, Hyderabad-18	Krishi (5-7 hp)	3000 Nos.	1963	Letter of intent for a further 3000 has been issued.
2.	M/s. V.S.T. Motors Pvt. Limited, Laksmi Villas, High Ground, Bangalore,	Mitsubishi CT-85.	5000 "	1966	-
3.	M/s J.K. Cotton Spinning & Weaving Mills Co. Ltd., Kamla Tower, Kanpur.	Satch-IB-17 (5 to 7.5 hp)	6000 "	1967	-
4.	M/s. F.W. Heilgers & Co. Pvt. Ltd., Process Engineering Division, Dakhindari Calcutta-48	Kubota-KHB-200 (10 hp)	12,000	1968	-

NOTE: M/s. Hyderabad Allwyn Metal Works Limited was granted a licence in 1967 for the manufacture of 12,000 "Iseki" Power Tillers. The licence has since been cancelled.

Appendix IV-C

FOREIGN EXCHANGE REQUIREMENTS

Item	Requirements during plan period (Nos)	Estimated availability from indigenous production (Nos)	Balance (Nos)	Average estimated unit price (Rs.)	Value (Rs. in crores) (Rs.)
Tractors 12-50 h.p.	3,85,000	2,00,000	1,85,000	14,000	259,000
Power tillers	2,30,000	1,11,500	1,18,500	5,000	59.25
Crawler tractors	5,000	3,500	1,500	60,000	9.00
Misc. equipment	-	-	-	-	13.00
				Total:	3,40.25

Note: - The forcing exchange requirement would be lower if indigenous availability exceeds the above estimates.

Appendix IV-D

STATEMENT SHOWING THE INVESTMENT AND FOREIGN EXCHANGE REQUIRED FOR DIESEL ENGINES ON CAPITAL MAINTANCE ACCOUNT

(By Working on Diesel Engines)

(Rupees in million)

	1969-70	70-71	71-72	72-73	73-74	Total IV plan	Total V plan
Investment for new and replacement equipment	30	30	30	30	30	150	150
Foreign exchange reqd. for capital equipment	20	15	10	5	4	54	40
Foreign exchange reqd. for maintance	37.5	34.5	29.6	23.5	16.4	141.0	80

The above figures exclude the requirement of the Public Sector units to be set up for high HP range engines.

Appendix E

STATEMENT SHOWING THE INVESTMENT AND FOREIGN EXCHANGE REQUIRED FOR POWER DRIVEN PUMPS ON CAPITAL MAINTENANCE ACCOUNT

(By Working Group)

(Rupees in million)

1.	During the period of					Total	Anticipated
	1969-70	70-71	71-72	72-73	73-74	IV plan	V plan
1. Investment on Balancing Machinery and replacement	40	40	40	40	40	200	200
2. Foreign exchange content in (1) above	5	4	3	2	1	15	15
3. Foreign exchange required in maintance account	20	17	14	15	16	82	80
Power Pump (in rupees only)	(50)	(40)	(30)	(30)	(30)		

Appendix IV-F

STATEMENT OF RAW MATERIAL REQUIRED FOR THE PRODUCTION OF DIESEL ENGINES DURING IV & V PLAN PERIOD

(By Working Group in Diesel Engines)

(000 Metric Tons)

	1969-70	70-71	71-72	72-73	73-74	IV plan Total	V plan Total
Pig iron	50	55	60	62	66	293	89
Forging steel	11.25	12.37	13.5	13.95	14.85	65.92	20.25
Alloy steel	0.25	0.275	0.300	0.31	0.33	1.465	0.445
Bar steel	2.5	2.75	3	3.1	3.3	14.65	4.45
Steel sheets	1.5	1.65	1.8	1.86	1.98	8.79	2.67

Assumption for 1000 Engines requirement in metric tons.

Forging steel 45, Barsteel 10, Alloysteel 1, Pig iron 200, Steel sheet 6.

Appendix IV-G

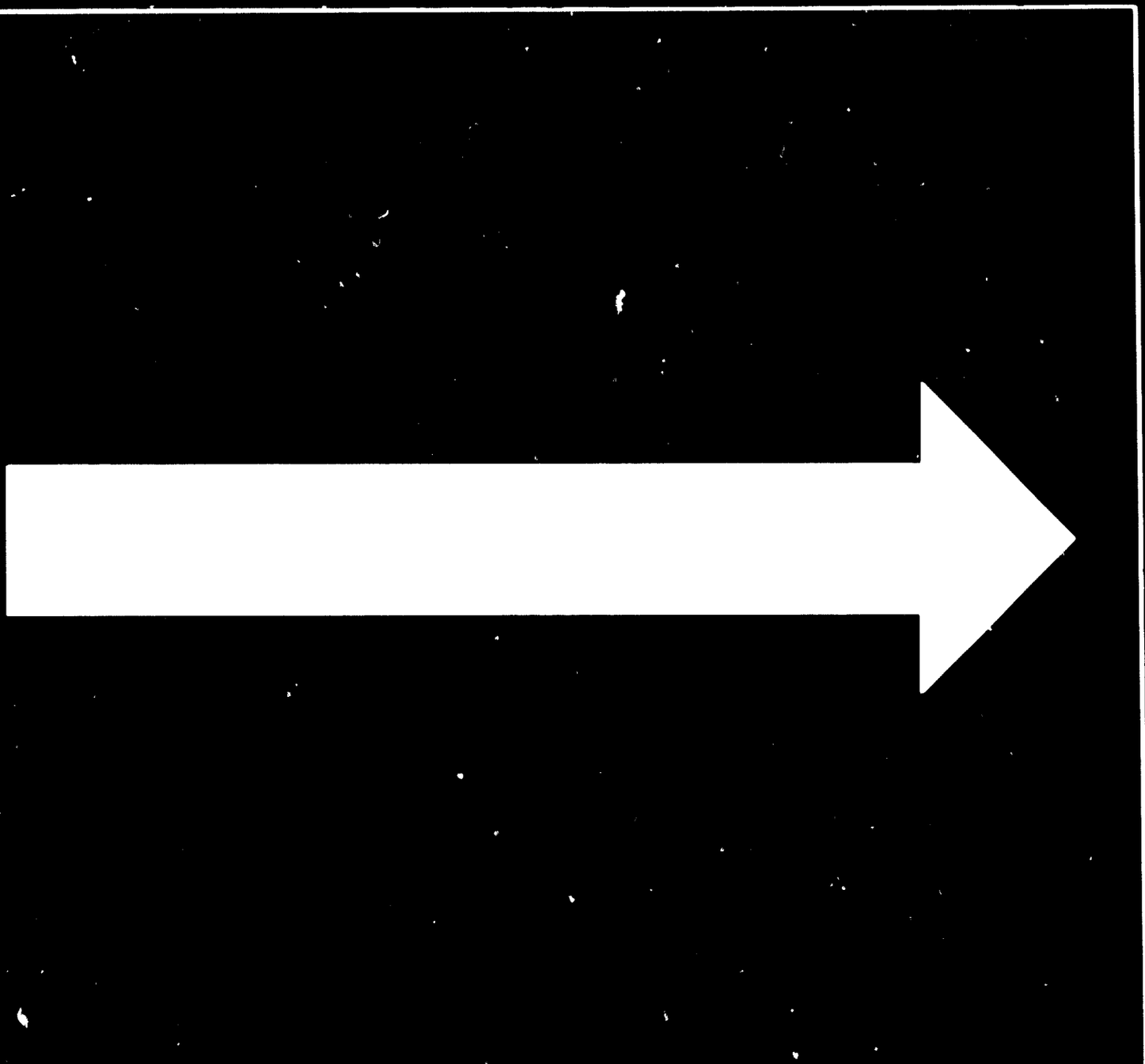
REQUIREMENT OF INDIGENOUS RAW MATERIAL FOR THE PRODUCTION OF POWER DRIVEN PUMPS DURING IV & V PLAN

(By Working Group)

(Metric Tons)

	1969-70	70-71	71-72	72-73	73-74	1968-79
Pig iron	35,000	36,000	37,000	37,700	38,300	41,600
M.S. Shafting	2,310	2,520	2,590	2,640	2,680	2,910
Non Ferrows alloys (bronze)	6,600	7,200	7,400	7,540	7,660	8,320
Stainless Steel Shafting	900	1,100	1,100	1,130	1,150	1,250

B-365



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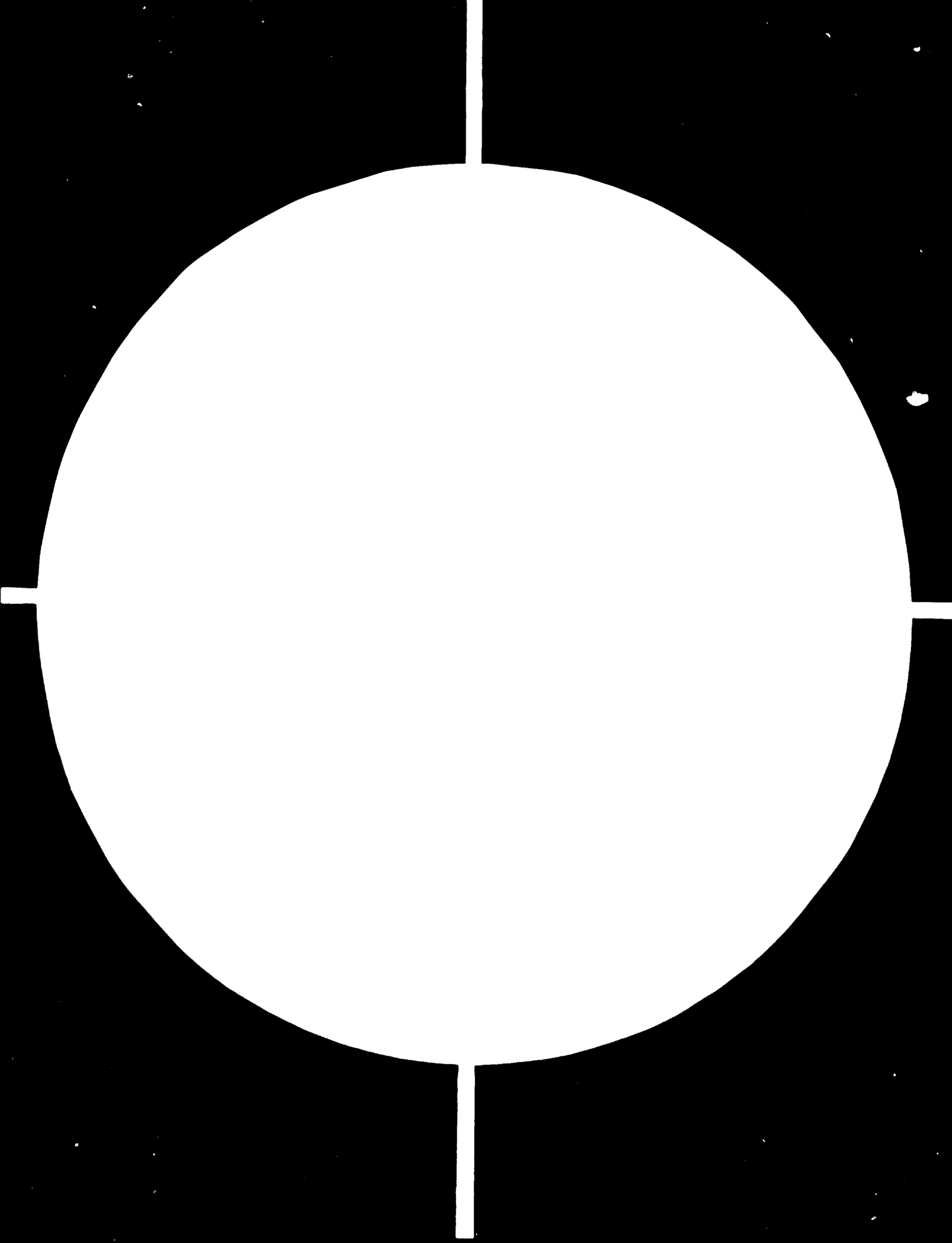

APPENDIX - IV-4

TYRE INDUSTRY

ESTIMATED PRODUCTION & MARKET REQUIREMENT - 1968

(ASSOCIATE OF INDIAN AUTOMOBILE MANUFACTURER - FEB. 1968)
(TYRE FIG. IN NOS.)

(FIGURE IN BRACKET - PERCENTAGE OF TOTAL)

A. ESTIMATED PRODUCTION 1968

Tyre Category	Dunlop	Goodyear	Firestone	Ceat	Premier	MRF	Inchek	Total
Front tractor	29.8 (51.7)	9.5 (16.5)	12.0 (20.8)	2.7 (4.7)	-	3.6 (6.3)	-	57.6 (100)
Rear tractor	16.9 (42.0)	6.5 (16.2)	12.0 (29.9)	2.7 (6.7)	-	2.1 (5.2)	-	40.2 (100)
Tractor trailer	8.3 (43.7)	1.5 (7.9)	6.0 (31.6)	2.0 (10.5)	-	1.2 (6.3)	-	19.0 (100)

B. ESTIMATED DEMAND - 1968

	O.E.	Repl. & otheruses	Export	Total
Front tractors	32.0 (62.0)	19.0 (36.0)	1.0 (2.0)	52.0 (100.0)
Rear tractors	32.0 (58.0)	22.0 (40.0)	1,0 (2.0)	55.0 (100.0)
Tractor Trailer	8.0 (45.0)	9.8 (55.0)	-	17.8 (100.0)

sr/nair.

Appendix IV-I

ESTIMATED REPLACEMENT TURNOVER FACTOR (RTF)*

(Frequency of replacement of a component during tractors effective life period)

S/No.	Item	RTF
1	Pistons	2
2	Piston pins	2
3	Piston rings	4
4	Gaskets	10
5	Inlet & Exhaust value	4
6	Valve guides	2
7	Valve spring	1
8	Valve Tappets	1
9	Push rods	1
10	Timing chain	4
11	Fuel inj. pump	1/20
12	Fuel inj pump nozzle	6
13	Fuel inj pump nozzle holder	1/20
14	Fuel inj. pump elements	4
15	Fuel inj. pump del. valve	4
16	Filter	1/100
17	Filter elements	15
18	Fly wheel ring year	1
19	Water pump	1
20	Water pump repair kit	4
21	Radiator & core	1
22	Silencer muffler	3
23	Thinwall & curing	3
24	Starter motor	1
25	Generator	1
26	Viltage regulator	4
27	Steering wheel	1/100
28	Steering gear	1
29	Tie rod End	3
30	Drag link	3
31	King pins	2
32	Wheels	1/100
33	Clutch Assembly	2
34	Clutch plate	2
35	Clutch linining	4
36	Gear	1
37	Crow wheel & pinior	1
38	Rear axle shaft	1
39	Oil seals	4
40	Brulae lining	6
41	Brulae drum	1/20
42	Hobs	1/100
43	Electric horn	1/100
44	Head lamp	1/10
45	Control cable	2
46	Panel instruments	1/10
47	Battary	4
48	Tyres	4

* - Estimated by Panel on Auto Ancillary Industries Development Council.

Section V

POLICY TOWARDS FARM MECHANIZATION

1. INCENTIVES BY THE GOVERNMENT

a) Programmes for promotion of agricultural machinery

As a corollary to adoption of new strategy and intensification of cultivation, the demand of agricultural machinery, particularly the tractor and power tillers has increased and more so in the agriculturally progressive areas. The cost of unskilled labour for harvesting crops has gone up. In order to meet the internal demand, the production capacity for tractors has since been raised and shortages are being met by imports from abroad. Important agricultural implements are also being employed increasingly by the farmers.

The following significant steps have been taken to promote the use of agricultural machinery:-

i) Tractor and power tiller industry has been exempted from the licensing provisions of the Industries (D&R) Act, 1951. This measure would enable intending manufacturers to enter the market. The existing manufacturers are also likely to organize themselves more efficiently as a result of keener competition. These measures are likely to show results by the end of the Fourth Plan.

ii) Tractors and power tillers industry has been include in the list of priority categories and foreign exchange upto the full installed capacity is allowed to these units to import components from abroad.

/iii) Government

iii) Government have also liberalized the allocation of foreign exchange for import of capital goods required by the existing units.

iv) Five schemes have been approved for the manufacture of crawler tractors in various ranges. These will be useful for levelling and normal agricultural operations in hilly areas and sugarcane farms.

v) Tractors and power tillers are being imported to fill the gap between the present demand and supply from the indigenous sources.

vi) The production of different types of tillage implements is being organized.

vii) Credit facilities are being extended to farmers for the purchase of tractors and implements through co-operative institutions, land mortgage Lanks etc.

(i) Improved seeds

The recent introduction of genetically superior varieties of crops have brought the country on the threshold of technological break-through in agriculture. Arrangements for production, multiplication and distribution of seeds have been strengthened. The National Seeds Corporation, State Governments and Agricultural Universities are organizing efforts to ensure adequate supply of improved seeds. The Government of India is setting up a number of Central Mechanized Seed Farms of 5,000 to 10,000 acreas in are for production of foundation seeds of high quality. Further multiplication of the foundation seeds would be undertaken by the registered growers, preferably in compact areas around the seed farms. For this purpose, seed villages

/are

are being established exclusively for seed multiplication. The Seed Act, 1968, has been passed and organizations for processing and certification of pure seed are being built up.

The country has now reached a stage of self-sufficiency in seeds of all high-yielding varieties. In fact, we are now in a position to export these seeds to other countries and are making efforts to develop an export market.

(ii) Plant protection

With the introduction of new cropping patterns involving the use of high yielding varieties of different food and cash crops and the extension of areas put under multicropping, there is a continuous cycle of diseases and weeds throughout the year in one part of the country or the other. Plant protection practices have therefore to go hand in hand with progressively greater introduction of the inputs.

The coverage of area benefited by plant protection measures has risen from 16.5 million hectares in 1965-66 to about 36.4 million hectares in 1967-68. The target for 1968-69 is 54.6 million hectares. The Government have ensured through increase in indigenous production and imports, adequate supplies of pesticides and plant protection equipment. The area covered under aerial operations is likely to increase from about one million hectare in 1967-68 to 1.5 million hectare in 1968-69.

The Pesticides Industry has established itself on a sound footing and now 32 chemicals are manufactured in 66 establishments in different parts of the country. The total production during the year 1967-68 was 33,000

/tonnes

tonnes against the sanctioned capacity of 70,273 tonnes. Some established pesticides like endrin, aldrin, chlordane, dieldrin, India-ne, endosulfan, diazinon, DDVP, Phorate, captan, calcium cyanide and raw materials like copper, lead, tin, zinc, mercury, phosphorous sulphur, ethylene diamine, maleic anhydride, along with small quantities of newer chemicals have to be imported. With the rapid industrialization of the country, it is hoped that more and more intermediates will become progressively available from indigenous sources.

The various types of manually operated ground equipment for dispersing sprays and dusts are manufactured indigneously in the organized sector and a larger number of units in the SSI sector. It is estimated that over 2 lakh such machines are currently being manufactured to meet the full demand for this type of equipment. As regards requirement of large volume power operated sprayers, it is being met from indigenous production.

(iii) Groundwater exploitation

Recent developments like the change of emphasis from extensive to intensive irrigation under the revised strategy of agriculture, impact of high yielding varieties of crops, occurence of successive droughts, have resulted in a great upsurge in the demand for the ground-water development schemes like dug-wells, boring and deepening of dugwells, pumpsets, tubewells, etc. The increasing achievements under the main items are indicated below:

/Table 5.1

Table 5.1

Achievements in Ground-water Exploration

Scheme	Achievement during 3rd Plan	Achievement during 1966-1967	Achievement during 1967-68	Expected achievement during 68-69
1. Dugwells	6,37,000	1,86,000	1,97,000	2,13,000
2. Boring in wells	1,36,000	74,000	84,000	1,05,000
3. Deepening of wells	87,000	41,000	42,000	33,000
4. Private tubewells including filter points	64,000	34,000	47,000	76,000
5. Diesel pumpsets	2,35,000	60,000	65,000	61,000
6. Electric pump sets	3,22,000	1,37,000	1,83,000	1,86,000
7. State tubewells	2,500	890	1,000	1,570

It is visualized that the total useable groundwater potential might not be more than 75 to 80 per cent of the total estimated potential of 215 million acre feet. Taking the useable groundwater potential as about 165 million acre feet, the long term potential for groundwater development is assessed to be of the order of 22 million hectares (gross). A potential of about 10.8 million hectares out of this is expected to have been exploited by the end of March 1969.

The State Governments have been gearing up their technical organizations for handling larger programmes by acquiring more drilling rigs. Measures have been taken to step up the indigenous production of rigs of various types and it is felt that during the Fourth Plan almost the entire requirements of rigs would be met indigenously.

/The

The Department of Agriculture had set up an Exploratory Tubewells Organization in 1954 for carrying out Scientific surveys and investigations of the available groundwater resources in the country with a view to accelerating groundwater development programme. With increasing accent on groundwater development, particularly shallow tubewells and boring and deepening of dug-wells, the Department of Agriculture introduced in 1967-68 a Centrally sponsored scheme of groundwater surveys and investigations to supplement the efforts of the E.T.O. The scheme envisages the setting up of groundwater investigational organizations by the States with a view to carrying out scientific investigations of shallow aquifers (upto 250 feet) for providing support to programmes for construction of shallow tubewells in the boring and deepening of dugwells.

(iv) Irrigation and drainage

During the Third Five Year Plan, an area of about 5.2 million hectares has received irrigation benefits from small irrigation schemes. During the two years 1966-67 and 1967-68 about 2.8 million hectares have been covered by this programme while the target for 1968-69 is 1.5 million hectares. An additional 2.4 million hectares would have been covered by the major irrigation programmes during the three years 1966-67 to 1968-69. A significant qualitative change in minor irrigation development is the rapid increase in providing tubewells and filter points and installation of electric and diesel pumping sets in addition to the increasing trend towards construction of masonary wells to tap underground resources of water fully. The private investment in minor irrigation has increased considerably during the last two years, particularly with the assistance from credit institutions such as Land Development Banks,

/Agricultural

Agricultural Refinance Corporation, Agro-Industries Corporations and Commercial Banks. Plan funds are largely utilized for State and community works which are intended to benefit particularly the small farmer.

For utilising un-utilized irrigation potential, programmes of land levelling and development, evolving suitable crops for newly irrigated areas, arranging demonstrations, training to farmers and supplying inputs and credit, are being taken up. Great attention is being given to proper linking up of irrigation and drainage.

(v) Land Development, Land Levelling, Land Shaping etc.

The additional area benefited by soil conservation measures on agricultural lands during 1967-68 is anticipated to be 1.40 million hectares. For 1968-69, a target of 1.36 million hectares of additional area is envisaged.

In the past, neglect of land levelling operations has resulted not only in a certain waste of water resources but also in creating problems of water logging and salinity in some areas. Schemes of land reclamation and land shaping have been taken up on an integrated area basis over 0.66 million hectares mainly in the command of major river valley projects. The estimated cost of this programme totalling Rs. 34 crores is being met with refinance assistance from the Agricultural Refinance Corporation. These schemes are at various stages of execution. So far, 110,000 hectares have been levelled and developed by manual labour, bullock power and agricultural machinery.

Land development efforts during the Fourth Plan will cover an area of approximately 2 million hectares falling within the command of irrigation projects and tubewells. This includes 1.2 million hectares of the previously created irrigation potential and 0.8 million hectares of new irrigation potential.

/(vi) Fertilizers

(vi) Fertilizers

Fertilizers consumption is rising rapidly. The levels of consumption in the year 1967-68 rose by 340 per cent over the levels in 1961-62 in terms of nutrients. As compared to the level of 760 thousand tonnes of plant nutrients in 1965-66, the anticipated achievement for 1967-68 is 1580 thousand tonnes, while the target for 1968-69 is 2,800 thousand tonnes. New fertilizers factories are being set up within the country and indigenous production is catching up rapidly; and there is the assurance that the gap between the demand and internal production will be made good through imports. The import of fertilizers is receiving a high priority in the matter of foreign exchange allocation.

The consistent increase in the popularity of fertilizers may be seen from the data on annual consumption for that period at Appendix V-A. The following data shows the current fertilizer application programme:-

Year	Consumption (in million tonnes)			Rate of growth Over the preceding year			
	N	P	K	N	P	K	NPK
1967-68	1.070	0.340	0.170	27	36	42	31
1968-69	1.700	0.46*	0.210*	59	34	24	50
1969-70	2.000	0.680	0.300				

* These are figures of likely production plus imports during the year. Accepted targets of consumption are 650,000 tonnes (P) and 450,000 tonnes, (K) respectively.

During the forthcoming Five Year Plan, 45% of the additional agricultural production is expected to flow from the application of fertilizers. It is estimated that the consumption of fertilizers during those 5 years would go up by 150% as shown below:-

/ N

	N	P_2O_5	K_2O
1968-69 (Target)	1.7	0.65 (Target) 0.46 (Revised)	0.45 (Target) 0.21 (Revised)
1973-74 (Target)	3.73	1.74	1.11

(vii) Credit facilities

(i) Land Mortgage Banks

Land mortgage banks have been giving assistance to purchasers of tractors. In a few states, loan assistance for the purchase of agricultural tractors is given directly by the State departments of agriculture. In some other States such as Madhya Pradesh, loans have been given both by the State Department of Agriculture and the Land Mortgage Bank. However, loans given by the State Governments for purchase of tractors have remained at relatively modest levels.

((ii) Commercial Banks

The Commercial Banks have lately evinced interest in supply of agricultural credit. However, due to the nature of terms and conditions, there has been only a small flow of credit for such purposes. They could promote the purchase of tractors and other farm machinery and could also supply the finance for custom agricultural enterprises.

(iii) Farm credit corporations

Agricultural credit corporations are proposed to be set up in Assam, Bihar, Orissa, West Bengal and Rajasthan and the Union territories of Manipur and Tribura in the next financial year.

In the country as a whole, co-operatives have established themselves as the principal institutional agency for providing agricultural credit. The

/co-operative

co-operative movement in these States and Union territories is, however, weak and even though co-operatives in those areas have made considerable progress in the last few years. It was felt that by themselves they would not be able to make a substantial impact in meeting the growing needs for farm finance.

Hence, autonomous credit corporations have been envisaged for these areas to take care of the increasing demands for agricultural credit.

Loans

The agricultural credit corporation will be a supplementary and traditional agency for provision of agricultural credit. The corporation will provide loans to individuals, groups of cultivators and co-operatives. Its financing policy is expected to be modelled on the principles of crop finance. Co-operatives will be simultaneously strengthendd to ultimately take over the entire work of provision of agricultural credit in these areas. Each of the five States and the two Union territories will have a separate agricultural credit corporation.

The Union Government will subscribe to the extent of 30 per cent of the share capital in the case of a corporation established in a State and 50 per cent in the case of a corporation in a Union territory. The Reserve Bank and the State Government concerned will contribute each to the extent of 20 per cent of the capital. The balance will be contributed by the State Bank of India, the Food Corporation and banking companies.

Committees

The State Governments have been advised to set up State-level committees consisting of representatives of the co-operative and agriculture departments

/and

and of the co-operative credit structure in the States concerned to demarcate areas of operation for the co-operatives and the corporations. The regional office of the Reserve Bank in each concerned State is to associate itself with the work of the State-level committee.

Early setting up and functioning of the agricultural credit corporations is expected to go a long way in meeting the growing credit needs of agriculture in areas where co-operatives are now not equal to the task and will take a long time to develop.

(iv) Credit needed

The credit requirement for tractors, power tillers and other agricultural machinery is estimated at about Rs. 517.9 million during 1969-70 and about Rs. 1,562.4 million during 1973-74 as per the following details:-

Item	Average credit amount Rs.	1969-70 Nos to be supplied on credit	1969-70 Value million Rs	1973-74 No. to be supplied on credit	1973-74 Value million Rs
1. Tractors & implements for them	18,000	25,000	450.0	60,000	1,080.0
2. Power tillers and implements for them	7,000	2,000	14.0	32,000	224.0
3. Tractor windpowers, reapers and binders	3,500	-	-	5,000	17.5
4. Combine harvesters & driers	12,000	50	0.6	2,000	24.0
5. Power maize shellers	2,700	700	1.89	5,000	13.5
6. Power threshers for wheat, paddy and sorgum	2,800	3,000	8.4	22,000	61.6
7. Crawler tractors and implements	60,000	50	3.0	300	18.0
8. Misc. equipment	-	-	36	-	99.8
9. Improved implements like seed-cum-fertilizer drills, power chaff cutters, etc.	-	-	4.0	-	24.0
			517.8		1,562.4

The credit requirements for the different years during the Plan period is estimated as under:-

1969-70	....	520 million
1970-71	....	700 million
1971-72	....	950 million
1972-73	....	1230 million
1973-74	....	1560 million
		4960 million

Out of the above, it is expected that the Land Mortgage Banks would be able to support a programme of about Rs. 1,000 million and Agricultural Refinance Corporation a programme of about 100 million. The Agro-Industries Corporations with augmentation of their equity capital and by availing facilities offered by the State Bank of India and other Commercial Banks for rediscounting the hire purchase documents are expected to support a programme of Rs. 2,700 million during the Plan period. Out of this, Rs. 500 million is expected to be needed for supporting hire purchase programme for electrical and diesel pump-sets by the Agro-Industries Corporations. Thus the total credit availability through the Agro-Industries Corporations, Land Mortgage Banks and Agricultural Refinance Corporation, for supporting a farm machinery supply programme would be of the order of Rs.3,300 million. For carrying out a programme of credit as envisaged above, it is felt that it would be necessary that commercial banks develop an active programme so that financing to the extent of Rs.1,600 million could be made by them.

Cooperative institutions may also expand facilities for granting long and medium term loans to cultivators for acquiring improved implements, tractors, power tillers (together with attachments) and small machines.

/The

The need for mechanisation is the largest in irrigated areas as well as in areas receiving new irrigation. In the latter, the programme generally consists of land levelling and land grading. All credit agencies should preferably consider compact area schemes so that there is an appreciable population of farm machinery in a relatively smaller area. This would facilitate not only the recovery of credit but also the organization of repair and maintenance facilities.

(vii) Agro-Industries Corporations

In view of the inadequacy of credit for acquisition of agricultural machinery and equipment and the insufficiency of activities in the agro-industrial sector, the Government of India have suggested to all State Governments that they might set up agro-industries corporations which might have the following principal objectives:

(a) promotion and execution of industries having a bearing on production, preservation and supply of food;

(b) enabling persons engaged in agricultural and allied pursuits to own the means of modernising their operations;

(c) distribution of agricultural machinery and implements as well as equipment pertaining to processing, dairy, poultry, fishery and the industries connected with agriculture;

(d) undertaking and assisting in the efficient distribution of inputs for agriculture; and

(e) providing technical guidance to farmers and persons concerned with agro-industries with a view to enabling efficient conduct of their enterprise.

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In pursuance of these suggestions, agro-industries corporations have been set up in the States of Andhra Pradesh, Assam, Bihar, Haryana, Kerala, Madras, Maharashtra, Mysore, Orissa, Punjab, Uttar Pradesh and West Bengal. These Corporations are 'Government Companies' within the meaning of Section 617 of the Companies Act, 1956 (Act 1 of 1956) and the Government of India and the State Governments concerned participate almost equally in their equity. The following statement indicates the authorized and paid-up capital of each corporation and the shares of the State and Central Governments therein as on 12th August, 1968.

(Rupees in million)

Name of the Corpo ation	Date of incor-poration	Authorised capital	Paid-up capital		Total
			Contri-buted by State Govt.	Contribution by Central Government	
Andhra Pradesh	5. 3.68	20.0	10.2	9.8	20.0
Assam	25. 1.67	20.0	3.4	1.0	4.4
Bihar	28. 3.66	40.0	15.3	14.7	30.0
Haryana	29. 3.67	20.0	3.8	3.8	7.6
Kerala	22. 3.68	20.0	7.6	7.3	14.9
Madras	5. 7.66	20.0	2.5	2.5	5.0
Mysore	1. 9.67	20.0	7.5	7.2	14.7
Maharashtra	15.12.65	20.0	7.5	7.5	15.0
Orissa	7.2.68	20.0	3.8	3.6	7.4
Punjab	11. 2.66	20.0	3.7	3.7	7.4
Uttar Pradesh	29. 3.67	50.0	15.0	15.0	30.0
West Bengal	16. 8.68	20.0	-	-	-
		300.0	80.3	76.1	156.4

/One

One of the functions of the Corporations would be to supply agricultural machinery and equipment on hire-purchase terms. There has hither-to been little effort to promote hire-purchase sales of agricultural machinery and equipment.

Besides hire purchase, the Corporations have undertaken various activities, chief among which is the distribution of imported tractors. In pursuance of a policy decision the Corporations of Uttar Pradesh, Bihar, Punjab and Haryana have undertaken the distribution of Zetor - 2011 tractors imported from Czechoslovakia and have made arrangements for maintenance and after-sales service. The Corporation of U.P. has since undertaken the assembly of these tractors which would be imported in c.k.d. packs and distribution of the assembled tractors through sister Agro-Industries Corporations. Some of the Corporations have also been authorized to import spare parts for imported tractors in use in the country in view of the scarcity of supply and large-scale overcharging by the agents. Some of the Corporations have also commenced distribution of other agricultural machinery and equipment.

(viii) Agricultural machinery hire centres

"Working group" has Plan period at least 50 Agriculture Machinery Hire Centres be set up, in pursuance of a plan scheme, each centre being equipped with a certain number of crawler and wheel tractors as well as ancillary equipment with a workshop.

(ix) Repair centres

It has been recommended by the "Working Group" to start at least 50 agricultural machinery repair centres in the IV Plan period.

/(x) Minimum

(x) Minimum support prices

Appendix V-E gives information into minimum support and procurement prices for 1966-67, 1967-68 and 1968-69 (Rabi) seasons (winter).

2. RESEARCH, TESTING AND EDUCATIONAL INSTITUTIONS

(a) Research and testing

Most of the tractor manufacturers have recently established development department especially for the manufacture of implements and other equipment. All the States have a directorate or Department of Agricultural Engineering within the Department of Agriculture who are conducting research and development, mostly in the field of small implements.

During the Third Plan, 16 Research-cum-Testing-cum-Training Centres were set up. At these Centres work on development of new and improved implements and research on Agro-Implement Practices have been taken up. Facilities for training village artisans in the repair and production of improved implements were organized by setting up 46 workshop wings to Gram Sevak (village worker) Training Centres. Two centres were established at Budni and Hissar for training farmers in the operation and maintenance of tractors and other agricultural machinery. The centre at Budni was also developed into a testing station for tractors and other power operated machinery modelled after the National Institute of Agricultural Engineering, England.

During the Third Plan period several tractors, power tillers and other agricultural equipment were tested at this station and has recommended approved machinery for indigenous manufacture. It is now proposed to

/strengthen

strengthen the Budni Central Testing Station to handle official testing and certification of tractors, power tillers, pump sets and other power driven equipment. If provision of Rs. 3.2 million is estimated for strengthening the testing facilities at Budni Station and Sub-Centre.

There are other Research Stations such as Central Potato Research Institute, Sugarcane Research Institute, Rice Research Institute etc. where apart from agricultural tests, usage of farm machinery and development is also conducted.

The agricultural engineering workshop of the "Intensive Agricultural District Programme" also conducts research and development of new machinery.

However considering the existing facilities and programme for research and development, the team feels that it is necessary to streamline the existing organizations and programmes so as to result in a more effective contribution.

(L) Agricultural engineering education

In all most all of Agricultural Colleges, Agricultural engineering as a subject for a year or two. However, about six universities as mentioned below give degree in agricultural engineering in all aspects.

(i) Indian Institute of Technology, Kharagpur

(ii) Allahabad Agricultural Institute, Allahabad

(iii) Punjab Agricultural University, Ludhiana

(iv) U.P. Agricultural University, Pantnagar

(v) Rajastan Agricultural University, Udyapur

(vi) M.P.Agricultural University, Nagpur

/Following

Following agricultural universities will also be starting agricultural engineering institutions.

(i) Andhra Pradesh Agricultural University, Hyderabad

(ii) Mysore Agricultural University - Bangalore

(iii) Maharashtra Agricultural University

(iv) Orissa Agricultural University

Ultimately all the States will be having agricultural universities with agricultural engineering courses.

(c) Training and extension service

The State Agricultural Departments, Agricultural Engineering Sections, the Machinery Division and Extension Directorate of the Ministry of Food and Agriculture, the Regional Testing and Training Centres and Private Manufactures have a wide net work of extension service. However, it is necessary to strengthen the same.

With increase in the availability of tractors, power tillers and other agricultural equipment several farmers who would otherwise not have owned such equipment would do so, it is realized that it would be necessary to expand the existing facilities of training so that the new operators are trained in the efficient utilization of the equipment. It is recommended by the Working Group that a training centre on the pattern of the Budni and Bissar centres may be established during the Fourth Plan in one of the regions not covered by the present centres. An outlay of Rs.4.3 million is proposed for the establishment of a new centre. Simultaneously, the existing capacity of the Budni and Bissar Centres may be expanded to provide for the training of about 250 students per annum per centre in the

/regular

regular courses. These centres are recommended to also conduct refresher and special courses on operation maintenance and repair of agricultural machinery for engineering students, for personnel of Agro-Industries Corporations and other institutions who would be setting up Agricultural Machinery hire and repair Centres. The courses so organized may also include a programme for training trainees from training centres and would be set up by the State Governments. It is estimated that this programme would involve a total expenditure of Rs. 4.8 million during the Plan period.

The population of tractors towards the end of the Fourth Plan would be several times higher than the present population. A similar rise would also come about in the case of pumpsets, power threshers and other machines and implements. The existing training facilities and those proposed earlier would be inadequate considering the number of new owners of these machinery. Some of the State Governments are already conducting training programmes extending to three to four weeks on tractors, pumpsets, etc. for owner operators; these training programmes, however, are not organized on a regular basis. During the Fourth Plan it is recommended by the "Working Group" that each State may set up a minimum of 2 training centres for providing training to owner operators for about three weeks, each centre conducting about 12 courses per year with about 40 persons per course. Assuming that 30 such centres are set up, training would be available for about 14,400 persons which by all accounts, is a modest target. The Working Group recommends that the outlay could be kept low if the training could be organized in agriculture universities and colleges, State mechanized farms and workshops belonging to the State Governments.

/It

It is suggested that with an approximate expenditure of Rs. 0.8 million per centre, these centres could be organized and surplus and repairable tractors, power tillers etc. available with the State Governments could also be used for equipping these centres. The total expenditure, which may feature in the Plan outlay of the States, would be of the order of 24.0 million.

The Working Group recommends that the workshop wing of the Extension Training Institute, Nilokheri should be strengthened to impart training to extension personnel in the maintenance and production of agricultural implements. An outlay of Rs. 0.46 million has been estimated.

(d) Future programme

The programme of farm mechanization does not necessitate a large financial outlay; it however, requires considerable organization both at the Central and State levels. The State Directorates of Agriculture and the organization in districts with large intensive farming programme is expected to be strengthened on the agricultural engineering aspect. The State Agriculture Department also have evolving policy designed to increase the availability of power for the farms.

Appendix-C contains an estimate of the proposed outlay for the programmes in the Central and State Sectors as recommended by the "Working Group".

/Appendix V-A

Appendix V-A

Progress of Consumption of N.P.K. during 1961-62 to 1967-68

Year	Consumption (in million tonnes)			Rate of growth over preceding year			
	N	P	K	N	P	K	NPK
1961-62	0.250	0.082	0.303				
1962-63	0.306	0.110	0.036	22	34	20	25
1963-64	0.410	0.120	0.050	34	09	39	29
1964-65	0.430	0.150	0.070	5	25	40	12
1965-66	0.550	0.130	0.080	28	13	14	17
1966-67	0.840	0.250	0.120	53	92	50	59
1967-68	1.070	0.340	0.170	27	36	42	31
1968-69 (Target)	1.700	0.460*	0.210*	59	34	24	50
1969-70	2.000	0.680	0.300				

* These are figures of likely production plus imports during the year. Accepted targets of consumption are 6.80 lakh tonnes (P) and 4.50 lakhs tonnes (K) respectively.

Appendix V-B

Minimum support prices and procurement prices for 1966-67, 1967-68 and 1968-69 (rabi) seasons (winter)

(Rs. per quintal)

Commodity	Variety	Minimum support prices			Procurement prices			Remarks
		1966-67	1967-68	1968-69	1966-67	1967-68	1968-69	
Paddy	Standard	35.00 to 40.00	42.00 to 44.00		41.00 to 74.64	45.00 to 56.25		
Jowar	Yellow	38.00	42.00		45.00 to 56.00	43.00 to 56.00		
Bajra	FAQ	40.00	42.00		47.00 to 54.00	47.00 to 55.00		Prices guaranteed by Govt.
Maize	FAQ	36.00	42.00		48.00 to 80.00	47.00 to 55.00		
Ragi		-	-		50.00 to 52.00	47.00 to 55.00		
Wheat	Red	45.50	49.50 to 52.75	52.00 to 54.00				
	Common white	49.50	53.50 to 56.75	56.00 to 59.00	54.00 to 65.00	65.00 to 95.00	76.00 **81.00**	
	Superior	53.50	57.50 to 60.75	60.00 to 63.00				
Gram		40.00 to 49.50	43.00	46.00				

Note: 1. Marketing year for paddy, jowar, bajra, maize and ragi starts from the month of November of the year shown.

2. Marketing year for wheat and gram starts from the month of April of the year shown.

Appendix V-C

Statement of the Proposed Outlay during the Fourth Plan - Central & State Sector

(By Working Group)

(Rs. in million)

Sr. No.	Name of scheme	Classification	Central share	State share	Total	Remarks
1.	Agro-Industries Corporation contribution to Equity Capital of Central/State Corporation	-	600.0	450.0	1,050.0	Includes loan to A.I.Cs for setting up Agricultural Machinery Hire & Repair Centres
2.	Expansion of training facilities at at Ludhi & Hisar centres	Central	4.8	-	4.8	
3.	Intensification of testing facilities at Ludhi	"	3.2	-	3.2	
4.	Establishment of tractor training centre	"	4.3	-	4.3	
5.	Expansion of Workshop King at the Extension Education Institute, Nilokheri	"	0.461	-	0.461	
6.	Strengthening of workshops	State	-	20.0	20.0	
7.	Training of owner operators	"	-	24.0	24.0	
8.	Strengthening of Agri. Departments in States/Centre		0.75	4.5	5.25	
		Total	613.511	498.5	1,112.011	

SECTION VI

Policy Towards Industrialization

1. General Trend of Economy

The gross national product in 1965 was US$49.2 billion of which contribution from agriculture was 47%, and from manufacturing industries was 18%. Per capita income in 1965 was $86.00. Steel consumption (1965) was 7.5 million metric tons, cement production 10.6 million metric tons and electricity productions 31.38 billion Kwh.

In the year 1965-66, - when there was many drought and food shortage - the real national income fell 4.7% and per capita income lowered by 7.1%. This one bad year to a great extent wiped out the gains during the first four years of the IIIrd Five year plan (1961-66). The plan which proposed 30% rise in national income, but the increase was only 12.7% with a 15% decline in agricultural output. By June 1967, the economy was caught between spiraling prices and recession. The growth of industrial out put was 3.5% only during the 10 month period of 1966-67 compound to an average of 7.8% per year in 1961-65.

However, due to good monsoon in 1967-68 and 1968-69, the agricultural production has shown a significant rise. The economic assistance for Aid-India consortions and liberalised industrial policies of the governments, India appears to have pulled itself out from the economic recession and the rate of growth from the pas t 8 months appears to be significant.

As of February 1969, the government is planning for a three per cent increase in the national income for this financial year, which was previously set at 6 per cent. The increase in national income last year was six per cent. Results recorded last year showed a recovery in agricultural and industrial production. The deficit in the 1967-68 budget will be lower than the forecast despite a drop in tax receipts.

/2. Incentives

2. Incentives for Investments

Although the Government of India has not formally enlarged its program of incentives for investment, nearly most of the recent changes in the economic policy have contributed to the formation of a better climate for the foreign and domestic investment. Some of the more rigid controls on private enterprise have been lifted and administrative procedures are being speeded up. Although industrial licence is the basic requirement, under 1966 reform, licences are no longer required for many industries including internal combustion engines and agricultural equipment, tractors and power tillers.

The Industrial licencing system has been relaxed further the allow firms to step up out put to a maximum of 25% without prior government approval and also allow diversification into new fields except for presented items which are manufactured by small scale record.

The incentives include 5 years tax holiday for selected industries, rebate, on electricity, sales tax, etc. in selected location. There are attractive corporate tax incentives which allows tax exemption on income up to 6% of the cpital employed for 5 years after the start of production and in each of the 5 years, the amount by which profits lag behind 6% of the capital employed may be carried forward to the succeeding years. Manufacturers in priority industry may deduct an amount equal to 8% of their profits when computing taxable income.

Another major tax relief is the development rebate, a deduction from taxable income of 20% to 35% of the value of the newly installed machinery or plant provided it is not sold for 8 years. Second hand plant and machinery, provided it is imported may also qualify for the development rebate.

/The effect

The effect of the rebate is to allow depreciation of 120 or 135% of the cost of new plant and equipment. However, 75% of this tax savings must be pur into a reserve for 8 years or until it is used for acquisition of new assets or other investment. The balance of rebate may be carried frwards for a maximum of 8 years, if the total pre-tax income falls short of the full amount of the development rebate. The development rebate on plant and machinery for scientific resea rch facilities installed after March 31, 1961 is 35% and all capital expenditure for scientific research after that date may be deducted in full.

Personal income tax benefits for foreign technicians - approved by the government of India - may be from 3 to 8 years. The various states have industrial development banks that extend medium and long term loans and some times take equity in new projects.

3. International Co-operation

There appears to be a strong desire, both in government and private circles, to participate in industrial co-operative ventures especially in ECAFE group countries. In the field of industries manufacturing farm machinery, India is in a position to effectively contribute in the areas of manufacturing techniques, ancillary industries, technical training, testing, agricultural engineering education etc.

INDIA

SECTION VII

CONCLUSIONS

1. India is the biggest country in the region visited and its need for main farm machinery is at least equal to the almost of all other countries visited by the team.

2. Due to variety of geographical conditions, soil types, crops and appreciable number of large size holdings, India has a tremendous scope for farm mechanization at all levels.

3. The general policy of the government is to supply entirely the local demand by complete local production, except temporarily for a few main items namely tractors and power tillers for which the local manufacturing facilities are not still sufficient to meet the demand.

4. The demand for all farm machinery and equipment is steadily increasing from the past five years. The demand is expected to go up by 1975, for beyond the existing local production facilities for most of the major items.

5. For tractors, sale in 1968 has been around 19,000 of which 60% were in 35-50 HP. range. Only 14,000 tractors were locally manufactured. Demand is expected to reach 40,000 by 1970 and 80,000 by 1975, where as the existing production capacity by 5 manufacturers is only 30,000 out of which 70% is in the 35-40 HP. range. By 1975, although government feels that distribution pattern of horse power will be 26.4% for 12-20 HP., 50% for 21-35 HP, 20% for 35-50 HP. and 2.6% for tractors beyond 50 HP.

/...

It is felt by the team that taking into account the changing pattern of mechanization in India and surrounding countries, the demand distribution pattern may be 20-35 HP 25%, 35-50 HP. 40% 50-65 HP 25% and above 65HP. 10% by 1975.

It is proposed that future manufacturing programmes take into account the share of market of the other countries, particularily those as of Iran, Thailand and Philippines for larger HP. tractors (65-70) and in Pakistan, Malaysia and Ceylon for smaller ones (40-45) HP.

6. There is a necessity of introducing a small riding paddy tractor around 25 HP with suitable wet land tillage implements.

7. There is also necessity to introduce and manufacture a compact, light weight, high speed diesel engine around 5- 15 HP, which are not yet manufactured.

8. The capacity for production of gasoline micro engines of 1-2 HP. has to be greatly increased to meet the demand of 1975.

9. There is a necessity to increase the manufacturing capacity of power sprayers.

10. The existing power threshers manufactured are not efficient. There is a necessity to manufacture good quality power threshers and also introduce Reaper Binders and combine harvesters on a significant scale.

11. The automotive and tractor ancillary industry has made very good progress, and Indian tractor industry can achieve almost 95% local content within a couple of years.

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12. The supporting industries such as casting and forgings have also made good progress.

13. There is a great necessity to streamline the Research and Development activities and facilities in India.

14. It is also necessary to reinforce the training and extension service.

15. The general trend in economy which was subjected to recession a year back and agriculture last year appears to have regained its tempo this year. The incentives for investment have been liberalised.

16. The government and private sector appears to be eager to participate in industrial and agricultural cooperative ventures with ECAFE grouping countries.

APPENDIX - A

Literature - References

1. "Survey Mission on industries manufacturing agricultural machinery being sponsored by ECAFE - collection of Material" - by Indian counterpart to the Team October 1968.
2. Report of the working group for the formulation of Fourth Five year plan proposals on Agricultural Machinery and implements - Ministry of Food and Agriculture, Community Development and Co-operation, Government of India, New Delhi.
3. Indian Agriculture in Brief. (1968) Ninth editionDirectorate of Economies and Statistics. Ministry of Food and Agriculture CDGC Government of India.
4. Hand Brok of Indigenous Manufacturers of Engineering Store. Directorate General of Technical Development. Government of India, New Delhi April 1968.
5. Asian Productivity organization - Expert Group Meeting on Agricultural Mechnization Vol. 1.
6. ECAFE Economic Survey of Asia and the Far East 1967.
7. Report on the Sub-Group for Diesel Engines for the IV five year plan 1968.
8. Report on the Working Group on Power Driven Pumps for the IV five year plan 1968.
9. Report on the Working Group for Pesticide Equipment for the IV five year plan 1968.
10. Report of the Panel on Auto Ancillary Industries. (Development Council for Automobiles, Automobile ancillary industries, transport vehicle industries tractors, earth moving equipment and internal combustion engines) - IV five year plan 1968.

/11. List of Firms

11. List of Firms Borne on the automobile ancillary industries directorate. Directorate General of Technical Development Government of India 1966.

12. Assocham Farm input Directory the Associated Chamber of Commerce and Industry of India and Netaji Subhas Road Calcutta-1, February 1968.

13. Buyers Guide - 1968. Indian Pump Manufacturers Association India exchange, Calcutta-1.

14. "Automobile ancillary Buyers Guide - 1968". All India Automobile and Ancillary Industries Association. 80. Dr. A. Besant Road, Bombay - 18(WB).

15. Guide to Indian Machine Tools 1968. Indian Machine Tool Manufacturers Association. 12, Rampart Row, Bombay-1.

16. "An Analysis of the Problems and Prospects of Tractor and Agricultural Machinery Manufacture in India" - Swamy Rao. A.A. Indian Society of Agricultural Engineers December 1967.

17. "A pragmatic approach to Indian Agricultural Productivity through Farm Power and Machinery" - Swamy Rao A.A. - Farm Journal. Vol. II, No.6 April 1967.

18. Agricultural implements and the New Agricultural Strategy - Swamy Rao A.A. Indian Science Congress. January 1968.

19. "Shortage of Tyres affects Manufacture of Tractors" - Mr. K.V. Sardesai. Capital July 1968.

APPENDIX - B

List of Persons and Organizations Visited

1. United Nations Development Program in India - 21 Curzon Road New Delhi.
   a) Mr. John McDiarmid, Resident Representative
   b) Mr. V. P. Morozov, Deputy Resident Representative
   c) Mr. Kim, Assistant Representative
   d) Mr. Malhotra, Program Officer.
2. Ministry of Industries and Commerce
   Government of India, Udyog Bhavan, New Delhi.
   a) Mr. R.V. Subramanjam, Joint Secretary
   b) Mr. Radha Krishnan , Deputy Secretary (counter part)
   c) Mr. Bharat Bushan Bakshi, Section Officer
   d) Mr. Prabhakar K.S., Development Officer (DGTD) (Counter part)
   e) Mr. B.S.V. Rao, Development Officer (DGTD)
   f) Mr. Vadi M.M., Senior Industrial Adviser (DGTD)
   g) Mr. Brij Raj Bhadur, Director, Ministry of Commerce
   h) Mr. S.R. Kapoor, Under Secretary, Ministry of Industrial Development
3. Ministry of Food and Agriculture and Community Development,
   Government of India.
   a) Mr. A. Prakash, Joint Secretary
   b) Mr. M.L. Raj, Deputy Secretary
   c) Mr. John P. Zachariah, Joint Commissioner (Agricultural Machinery)
   d) Mr. J.C. Verma, Deputy Commissioner (Agricultural Machinery)
   e) Mr. M.L. Taneja, Implements Specialist
   f) Mr. P.I. David, Under Secretary

/4. Indian Agricultural

4. Indian Agricultural Research Institute: Pusa, New Delhi

a) Mr. Kanakundu Roy, Agricultural Engineer

b) Dr. A.M. Micheal

5. Planning Commission, New Delhi

a) Mr. K.V.S. Moorthy

6. Ministry of Finance, New Delhi

a) Mr. P,K. Gupta, Under Secretary

7. Pritam Singh & Sons: Motia Khan, New Delhi-1.

a) Mr. Swindel Singh

b) Mr. Devinder Singh

8. American Springs and Pressing Works: Bombay - 57 (MB)

a) Mr. L.M. Patel, Managing Director

b) Mr. S.L. Patel, Works Manager

9. International Tractor Company of India Ltd., Bombay 67 (MB)

a) Mr. B.K. Sule, Executive Director.

b) Mr. Iran Syer, Director

c) Mr. K.V. Sardesai, Chief Executive

d) Mr. Gadikar, Works Manager

e) Mr. Ali Mohamad, Assistant Works Manager

f) Mr. V.K. Pargal, Purchase Manager

g) Mr. K.K. Busrur, Service Manager

h) Mr. K.V. Krishnan, Chief Inspector

i) Mr. H.M. Utta, Assistant Development Manager

10. Pump and Diesel Engine Manufacturers Association, Bombay.

a) Mr. T.G. Ranganathaw, Resident Liaison Officer, Simpson & Co. Madras.

b) Mr. Shreekant S. Kirloskar, Indian Pump Manufactures Association.

c) Mr. V.B. Kirtane, Chief Executive, Kirloskar Oil Engine Ltd. and also Indian Diesel Engine Manufactures Association.

/d) Mr. K.V. Despande

d) Mr. R.V. Despande, Kirloskar Brothers Ltd. Kirlos Karvade , Office Poona -9

e) Mr. S. Viswanathan, Director - Administration, Enfield (India) Ltd. Madras - 19.

f) Mr. R.R. Nair, Branch Manager, Jyoti Ltd. Bombay

11. Amalgamations PVT. Ltd., Madras-2.

a) Mr. A. Sivasilam, Chairman

b) Mr. K.P. Ramaswami, General Manager, Export Promotion Division.

12. Tractors and Farm Equipment Ltd. - Madras

a) Mr. M. Ramaswami, Manufacturing Manager

b) Mr. D.P. Lalwani, Marketing Manager

c) Mr. V.R.V. Raghavan, Deputy General Manager.

13. Shardow India Ltd., Madras

a) Mr. Krishna Moorthy, Director

b) Mr. S.R. Srinivasan, Design Engineer

c) Mr. Holloway, Manufacturing Manager.

14. Bimetal Bearings Ltd., Madras

a) Mr. Kumar Swamy, Marketing Manager

b) Mr. G. Raman, Sales Manager

c) Mr. T.V. Girish, Secretary

d) Mr. Dietzel, Project Engineer.

15. India Pistons Ltd., Madras

a) Mr. M.K. Raju, Director and.General Manager

b) Mr. R. Ranganathan, Production Manager.

16. Simpson & Co. Plant No.-1, Madras

a) Mr. Anantha Ram, General Manager.

/17. Engine

17. Engine Valve Ltd., Madras-16

a) Mr. L. Laxmi Narayaw, Managing Director

b) Mr. T.G.K. Raman, Joint Managing Director

c) Mr. B.R. Baliga, Production Manager

18. Lucas - TVS. Ltd., Madras-50

a) Dr. J.E. Maund, Managing Director

b) Mr. J.T. Bowcott, Chief Engineer

c) Mr. R. Rathnam, Administrative Director

d) Mr. Chopra, Sales Manager

19. Wheels India Ltd., Madras-50

a) Mr. V. Raman, Deputy Works Manager

b) Mr. E.R. Desikan, Sales Manager.

20. Brakes India Ltd., Madras-50

a) Mr. Ramanujum, General Manager.

21. Eunore Doundries Ltd., Madras-57

a) Mr. F. Holdsworth, General Manager

b) Mr. C.S.S. Setty, Works Manager

c) Mr. Vasudewa Rao, Secretary

22. Escorts Ltd. Faridabad

a) Mr. Rajan Nanda, General Manager, Plant Nat.

b) Mr. Madan Agarwal, General Manager - Spare parts Division

c) Mr. B.S. Chauhan, Deputy General Manager of Factory Nol.

23. Eicher Tractor Corporation of India Ltd, Faridabad

a) Mr. Malhotra H.D.S., General Manager

b) Mr. S.L. Bali, Administrative Officer

c) Mr. Virmani, Works Manager.

d) Mr. Khosla.

/24. All India

24. <u>All India Automotive Ancillary Association, New Delhi</u>

a) Mr. W.N. Talwar, President

25. <u>Others</u>

a) Mr. P. Sharan Gupta, Auto Lamps Ltd., Jt. Managing Director
Kashmeri Gate, Delhi-6

b) Mr. D.R. Sondhi, J.M. Industries, Faridalad.

APPENDIX - D

List of Engine Manufacturers

A. ANDHZA — India

(1) Krishi Engines, Hydrabad

B. BIHAR:

* (1) Tata Engg. & Locomotive Co. Ltd., Jamshedpur-4.

C. DELHI:

(1) Himalayan Exporters, 5/22-B, Roop Nagar, Delhi-6.

(2) Good Earth Co. Ltd Sunderson Court 10, Ajmeri Gate Extn., New Delhi.

(3) Machines & Spares (India) Ltd., Fountain View, Darya Ganj, New Delhi-7.

D. GUJARAT:

(1) Bharat Foundry & Engg., Limda Lane, Jamnagar.

(2) Gujrat Engg. Co., Jay Bharat Mang Shalla Compd., Saraspur, Ahmedabad.

(3) Modern Engg. & Moulding Co., Shahpur Mills Compd., Ahmedabad.

(4) Nagardas Lechardas & Bros., Naroda Road, Near Railway Bridge, Amdupura, Ahmedabad-2.

(5) New Bharat Engg. Works, Bedi Road, P.B. 131, Jamnagar.

(6) Panchali Engg. Works, Dariapur, Char Rasta, Ahmedabad.

(7) Patel Mavji Kanji & Bros., Jail Gate Road, P.B. No. 32, Rajkot

(8) Sigil India Services (P) Ltd., 1-3, Industrial Estate Garden Road Baroda-3

(9) U.B. Dave & Co., Chotalal Bldg., Relief Road, Ahmedabad.

* (10) Indian Equipment Co.,Ltd.

E. MADRAS:

(1) Ashok Layland, N.S.C. Bose Road, Madras.

(2) Dhandayuthapani Foundry Ltd., Pappanaickenpalayam, Coimbatore.

* (3) Simpson & Co. Ltd., Mount Road, Madras.

* (4) Textool Co. Ltd., Post Box 221, Coimbatore.

(5) Enfield (India) Ltd. Madras-19

F. MAHARASHTRA:

(1) Acme Mfg. Co. Ltd., Behind Antop Hill, P.Bo. No.7102, Wadala, Bombay.

* (2) Automobile Products of India Ltd., Bhandup, Bombay.

/(3)

(3) Cooper Engg. Ltd.,
Satara Road,
Satara District.

* (4) Cooper Engg. Ltd.,
Chinchwad,
Poona.

(5) Indian Commercial Co.,Ltd.,
45-47, Apollo Street,
Fort, Bombay-1.

(6) International Tractor Company
of India Ltd.
Bombay-67 (NB)

(7) Jayems Engg. Co.,
Warden House,
Sir P.M. Road,
Fort, Bombay-1.

* (8) Kiroskar Oil Engines Ltd.,
Elphinstone Road,
Kirkee,
Poona-3

* (9) Kirloskar Cummins Ltd.,
Elphinstone Road,
Kirkee,
Poona-3.

(10) Kulko Engg. Works Ltd.,
Ichalkaranji,
Kolhapur Dist.

(11) M.G. Karjagar Engg. Works,
33, Shivaji Udyam Nagar,
Kolhapur.

(12) Mahindra & Mahindra Ltd.,
Gateway Bldg.,
Bombay-1.

(13) Mazagon Dock Pvt. Ltd.,
Dockyard Road,
Mazagon,

* (14) Menon & Menon,
Shivaji Udyam Nagar,
Kolhapur-2.

(15) Packo Engg. Ltd.,
Laxmipuri,
P.B. 14,
Kolhapur.

(16) Parshottam Kheraj & Co.,
Local Board Road,
Mulund,
Bombay

* (17) Premier Automobiles,
Kurla
Bombay.

(18) Rocket Engg. Works,
84, Shivaji Udyam Nagar,
Kolhapur.

(19) Ruston & Hornsby (India) Ltd.,
Chinchwad,
Poona.

(20) Roopa Engg. Corpn.,
141, Shivaji Udyam Nagar,
Kolhapur.

(21) Tex Rej Corpn.,
39, Yusuf Bldg.,
4th Floor,
Bombay.

(22) Tractors & Bull Dozers (P)Ltd.
Koliwada Road,
Sion, Bombay.

(23) Utkur & Co.,
26, Shivaji Udyam Nagar,
Kolhapur.

G. PUNJAB/HARYANA

* (1) Laxmiratan Engg. Works Ltd.,
Industrial Area,
Faridabad

(2) New Bharat Engg. Works,
Bedi Road,
P.B. 131, Yamuna Nagar.

(3) Oriental Engg. Works Ltd.,
Yamuna Nagar,
Ambala.

H. UTTAR PRADESH:

(1) Shree Guru Nank Engg. Co.,
G.T. Road,
Ghaziabad.

/(2)

(2) Metal Industries,
84-14, Factory Area,
Fazalgarh,
Kanpur.

(3) Pusat Oil Expeller Co.,
Chaziabad.

I. WEST BENGAL:

* (1) Hindustan Motor Corpn. Ltd.,
India Exchange Place,
Calcutta.

(2) Indian National Diesel Engine Co., Ltd.
Hall & Andersan Blds.,
Park Street,
Calcutta-16.

(3) Veegal Engines and Eng.Co.,Ltd.
Calcutta.

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* Manufacturers of Significant Quantity.

Appendix E

LIST OF AGRICULTURAL IMPLEMENTS & MACHINERY AND THEIR SOURCE OF AVAILABILITY

1. Indian Farm Equipments, Naini, Distt. Allahabad (U.P.)
* 2. American Spring & Pressing Works, Malad, Bombay-64.
3. Agricultural Implements & General Industries, 10, Alipur Road, Delhi-6.
4. Amar Nath Khandelwal, 24/157, Shakti Nagar, Delhi-7.
5. Aggarwal Iron Works, Moti Lal Nehru Road, Agra (U.P.)
6. Arthur Bulter & Co. (Moz) Ltd., Muzaffarpur (Bihar)
7. Amin Chand Pyarelal, Tanda Road, Jullundur City (Punjab)
8. Bali & Co., Opp. P.O. Chandni Chowk, Delhi-6.
9. Bharat Krishi Yantra Udyog, 7, Gokhale Market, Delhi-6.
* 10. Cossal & Co., Pvt. Ltd., The Mall, Kanpur, (U.P.)
11. Carl Ohmes & Co., 28, Waterloo Street, Calcutta (W.B.)
12. Civil Engineering Co., Arya Samaj Road, Karol Bagh, New Delhi-5.
* 13. Cooper Engineering Ltd., 658, Jangli Maharaj Road, Poona-4 (Maharashtra)
14. Charan Safe Works Pvt. Ltd., 6-2, Industrial Estate, Kanpur (U.P.)
15. District Cooperative Federation, Sardhan Road, Meerut. (U.P.)
16. Dandekar Bros., Sangli (S. Rly.) (Maharashtra)
17. Delhi Iron & Steel Co., Ltd., G.T. Road, Ghaziabad (U.P.)
18. Delhi Iron Works Ltd., Churiwala, Delhi.
19. Dharma Engineering Co., G.T. Road, Patala (Punjab)
20. Pt. Devi Prasad Malviya, Rajgaddi, Matia, Kanpur (U.P.)
* 21. Escorts Ltd., 19/6, Mathura Road, Faridabad (Haryana)
* 22. Friends Own Foundry & Workshop, Gill Road, Ludhiana (Punjab)
23. Government Agricultural Workshop, Talkatora Road, Lucknow (U.P.)

* 24. Goodearth Pvt. Ltd., 16-A, Asaf Ali Road, New Delhi.

* 25. Ghaziabad Engineering Co., 42, Janpath, New Delhi.

26. Gresons Agricultural Works, Pathankot Road, Jullundur (Punjab)

27. "GEPCO" B-1, Industrial Estate, Sonepat (Haryana)

28. Indo German Industries, 1, Young Road, Asansol (W.B.)

* 29. Joyti Ltd., Baroda-3 (Gujrat)

30. Jain Steel Rolling Mills, Deputyke Parao, Kanpur (U.P.)

31. Kapoor Engineering Works, 8218, Roshan Ara Road, Delhi-7.

32. Krushi Sadhan Kendra, Mahadeo Nagar, Bilimora (Gujarat)

33. Kishori Industries, Baghpat Road, Meerut (U.P.)

34. Kumar Industries, Edathara Post, Palghat, Distt., Kerala State.

* 35. Kirloskar Bros Ltd.,Kirloskar Vadi, Satara (Maharashtra)

* 36. Krishi Engines Pvt. Ltd., A-7, Unit Industrial Estate, Sanatnagar, Hyderabad (A.P.)

* 37. Krishi Engines Pvt. Ltd., 9, Electric Lane, New Delhi.

38. The Kumaon Nursery, Ram Nagar, Nainital (U.P.)

39. Elsectee Industries, P.B. No. 28, Trichy Road, Coimbatore-5 (Madras)

* 40. Light Carts Pvt. Ltd., 207, West End Road, Meerut Cantt (U.P.)

41. Lyallpur Traders, Lamba Building, Nabha Gate, Patiala (Punjab)

42. Land Equipment Corporation, 37, Naiwala, Karol Bahg, New Delhi-5.

43. Mudhar Allied Traders, 10186, Arya Samaj Road, Karol Bagh, New Delhi.

44. Mysore Implements Factory, Hassan (Mysore)

45. Marshall Sons & Co., Marshall House, Hanuman Road, New Delhi.

46. Mukand Lal Gaba, c/41, Subzi Mandi, Karnal (Haryana)

47. Maharashtra Token Yandra, Industrial Estate, Kard, Distt. Satara (Maharashtra)

48. Metal Industries, 84/14, Factory Area, Kanpur (U.P.)

49. Modern Industries, Sahibabad, P.O. Malaknagar, Distt. Meerut, (U.P.)

50. National Manufacturers & Traders, Kaithal (Punjab)

51. Nahan Foundry, Nahan (H.P.)

52. National Engineering Co., Ambala Cantt (Punjab)

53. Nair & Co., Kashipur, Nainital (U.P.)

* 54. New Maharashtra Engineering, Maharashtra Mandal Compound, Tilak Road, Poona.

55. New Bharat Industries (Regd) Industrial Area, Moga (Punjab)

56. N. Cooper & Co., 3, Queens Road, Poona (Maharashtra)

57. N.S. Industries Ltd., Khandari Road, Agra (U.P.)

58. Punjab Oil Expeller Co., Patel Marg, Ghaziabad (U.P.)

59. P.S.T. & Co., 3939, Roshanpura, Egerton Road, (Nai Sarak) P.B. No. 1250 Delhi-6.

* 60. Pritam Singh & Sons, 10, Rani Jhansi Road, New Delhi-1.

61. Parakash Engineering Co. & Rolling Mills, Freegang, Agra (U.P.)

62. Peepul Iron & Steel Industries Ltd., 34/35, Factory Area, Fazalganj, Kanpur. (U.P.)

63. Qualitex Machinery Pvt. Ltd., 64, Industrial-cum-Housing Estate, 21, Milestone, Mathura Road, Faridabad (Haryana)

* 64. R. Raikhy Enterprises, Raikhy Building, G.T. Road, Ludhiana, (Punjab)

65. Rajasthan Government Agricultural Workshop, Jaipur (Rajasthan)

66. Shiva Industries, Tumkur (Mysore)

67. Swastik Manufacturers Ltd., 128-B, Mahatma Gandhi Road, Secunderabad (A.P.)

68. South India Metal Co., Shoran-ur, (Kerala)

69. Signa Steel Industries, A-2, Industrial Estate, Ludhiana (Punjab)

70. Steel Equipment & Engineering Co., P.B. No. 2304, 34, Strand Road, Calcutta-1 (W.B.)

71. S.R. Engineering Works, Hebbal, Bangalore-24 (Mysore)

72. Swadeshi Krishi Yantra Udyog, Cooperganj, Kanpur (U.P.)

73. Sunbeam Corporation, L-4, Connaught Circus, New Delhi-1.

74. Sharda Engineering Works, Fahimabad, Kanpur (U.P.)

* 75. Shaw Wallace & Co., Ltd., 9-A, Connaught Place, New Delhi.

* 76. Tractor & Farm Equipment Ltd., 1/E-2, Link Road, Jhandewalan. Extension, New Delhi.

77. Union Tractor Workshop 5, Amar Park, Zakhiara, New Delhi-15.

* 78. Voltas Ltd., Jeewan Mansion, Kutab Road, New Delhi.

79. Tube Well Corporation, Chandni Chowk, Delhi.

80. Jeewansons (Agencies) 220, Dr. Joshi Road, Karol Bagh, New Delhi.

81. Agarwal Fabrications, 3, Wilson Garden, Poona-1 (Maharashtra)

* 82. Dass Motors (P) Ltd., Pyareylal Building, Kashmeri Gate, Delhi-6

* 83. International Tractor Company of India, Ltd.

Note: Manufacturers in significant quantity.

S. No.	Name of the implements	Manufacturers (Ref. S.No. on page 1 to 4)
1.	Bund Farmer	1, 10, 23, 32, 39,44,48,64,66,67,71,74.
2.	Buck Scraper	1,10,15,16,23,32,39,43,44,50,52,66,67,71.
3.	Bullock Gear	52,63.
4.	Cultivator	1,6,10,15,19,23,32,38,39,40,41, 43,46,48,50,52,53,62,64,66,74.
5.	Chaff Cutter	8,15,16,23,32,39,41,43,52,74,67.
6.	Cane Crusher	15,23,35,39,41,50,51,74.
7.	Centrifugal Pump	16,29,35,36,45,51,67.
8.	Disc Harrow	1,10,19,23,24,38,40,49,50,52,53,74.
9.	Dusters	2,4,8,10,11,48,56,59,69,73,74,75.
10.	Expansion Cultivator	10,15,23,48,50,52,67,71,74.
11.	Electric Motor	29,35,51.
12.	Ground Decorticator	16,35,50,52,58,81.
13.	Groundnut Digger	81.
14.	Green Manure Trampler	20,32,39,66.
15.	Horticultural Tools	1,8,10,11,15,23,34,38,43,44,52,56,63,74, 79,80,32.
16.	Hay Bailer	1.
17.	Farmer Mill	40.
18.	Hand Hoe	1,2,4,7,8,10,15,17,23,30,32,38,43, 48,50,61,63,64,74.
19.	Lawn Mover	8,43,40
20.	Mould Board Plough	1,5,6,9,10,14,15,17,19,20,23,30,31,32,33, 25,38,39,41,43,44,48,50,51,52,57,60,62, 66,67,68,71,74.
21.	Maize Sheller	1,10,16,21,23,41,51,63,64,74,81.
22.	Olpad Thresher	1,10,15,23,32,48,50,52,63,74.
23.	Oil Engines	13,15,36.
24.	Oil Expeller	58.

S.No.	Name of the implements	Manufacturers (Ref. S.No. on page 1 to 4)
35.	Paddy Pedal Thresher	1,2,4,10,11,15,23,38,48,52,63.
36.	Power Paddy Thresher	1,41,72.
37.	Puddler	1,2,4,10,32,39,41,66,67,71,74.
38.	Paddy Weeder	1,10,11,2,4,15,23,32,38,39,48, 50,52,63,66,67,71.
39.	Paddy Sheller	39,63.
40.	Petela, Leveller & 'Karaha'	1,10,15,23,44,48,53,56,74.
41.	Power Tiller	28,36,37.
42.	Power Operated Sprayers and Dusters	2,4,8,59,69,73,75.
43.	Potato Digger	81.
44.	Plant Mower	81.
45.	Ridger	1,6,9,10,13,15,23,32,35,31,33,38,39, 44,46,48,50,52,53,60,65,71,74.
46.	Reaper	27,76,78.
47.	Rice Huller	63.
48.	Rice Polisher	63.
49.	Spike Tooth Harrow	1,10,23,41,48,52,74.
50.	Spring Tooth Harrow	1,10,23,48,74.
51.	Seed Drill	1,3,10,23,48,50,52,70,74.
52.	Seed-cum-fertilizer-drill	1,3,10,23,26,35,47,52,67,72,81.
53.	Single Row Seeder	2,11,63.
54.	Sprayers	2,4,8,48,56,69,73,74,79,75.
55.	Seed Cleaner	10,32,63,81.
56.	Triphali	10,15,41,48,50,52,71,74.
57.	Tractor Drawn Implements	9,10,23,24,25,21,26,31,40,45,53,60, 76,77,78,81,82,83.

S. No.	Name of the implements	Manufacturers (Ref. S.No. on page 1 to 4)
58.	Tractor	21,24,25,76,78,82,83.
59.	Trailor	21,25,76,78,83.
60.	Wheel Hoe	1,2,4,8,10,11,15,23,38,41,43,46,48,52,64,74.
61.	Wheat Thresher	3,22,41,42,55,63,72,81.
62.	Winnowing Fan	1,10,11,15,23,32,38,43,48,63,74.
63.	Wheel Barrow	1,10,11,34,40,44,48,63,66,68,71.
64.	Water Lifts	1,10,15,16,34,39,48,50,52,74,78.

Annex - F

Manufacturers of Machine Tools in India

Short Name	Name & Address of Participant	Machine Tools
ADDISON	Addison & Co. Ltd. 158 Mount Road Madras-2	Tool and Cutter Grinding Machines; Shaping and Slotting Machines; Drill Point Grinder.
AMAR	Amar Machine Tools Pvt. Ltd. 758-761 Industrial Area B Ludhiana-3	Centre Lathes; Shaping and Slotting Machines.
AMSTEEP	Amsteep Machine Tools Pvt. Ltd. 57 G.B. Road Delhi-6	Plate Bending Rolls; Shearing Machines.
ASHOK	Ashok Manufacturing Co. Pvt. Ltd. 37 Panchkuin Road Delhi-1	Double Ended Grinders; Polishing Machine; Metal Forming Machines.
BECO	Batala Engineering Co. Ltd. Grand Trunk Road Batala	Centre Lathes; Planning Machines.
BATLIBOI	Batliboi & Co. Pvt. Ltd. Forbes Street Bombay-1	Milling Machines; Drilling Machines.
BHARAT FRITZ	Bharat Fritz Werner Pvt. Ltd. Peenya Bangalore-22	Milling Machines.
BRITANNIA	Britannia Engineering Co.Ltd. Titaghur	Woodworking Machines.
CIMOTEC	Cimotec 44-B, Seshadripuram Main Road Bangalore-20	Milling Machines; Cutting Off Machines; Power Presses-Hydraulic; Plate Bending Rolls; Metal Forming Machines.
COOPER	Cooper Engineering Ltd. Construction House Ballard Estate Bombay-1	Vertical Boring and Turning Machines; Planning Machines; Spur and Helical Gear Cutting Machines; Shaping and Slotting Machines.
C.P. TOOLS	Consolidated Pneumatic Tool Co. Ltd. 301/302 Agra Road Mulund, Bombay-80	Machine Tool Accessories and Power Tools.

Short Name	Name & Address of Participant	Machine Tools
DAULAT	Daulat Industrial Corporation Pvt. Ltd. Civil Lines Ludhiana	Centre Lathes; Shaping and Slotting Machines.
EX-CELL-O	Ex-Cell-O India Ltd. 78-B Dr. Annie Besant Road Worli Bombay-18	Milling Machines; Drilling Machines; Fine Boring Machines; Surface Grinding Machines; Double Ended Grinder; Centre Lapping Machine; Facing and Centering Machines; Special Purpose Machines.
FORBES	Forbes Forbes Campbell & Co. Ltd. Forbes Building Home Street Bombay-1	Machine Tool Accessories and Power Tools; Centre Lathes; Cutting Off Machines; Power Presses - Mechanical.
	Agents for	
Choonilal Foundry Mechaids Saraswati	Choonilal Foundry & Engg. Co. Mechaids Corporation Sri Saraswati Iron Foundry	
GARLICK	Garlick & Co. Pvt. Ltd. Haines Road Jacob Circle Bombay-1	Cutting Off Machines.
GODREJ	Godrej & Boyce Manufacturing Co. Pvt. Ltd. Lalbaug, Parel Bombay-12	Press Brakes - Mechanical; Power Presses - Mechanical; Shearing Machines.
HMT	Hindustan Machine Tools Ltd. P.O. HMT Bangalore-31	Centre Lathes; Turret Lathes; Milling Machines; Drilling Machines; Cylindrical Grinding Machines; Spur and Helical Gear Cutting Machines; Special Purpose Machines.
INDIAN OXYGEN	Indian Oxygen Ltd. 48/1 Diamond Harbour Road Calcutta-27	Welding and Flame Cutting Equipment
TURN-O-MAT	Indian Turn-O-Mat Industries 22/23R Industrial Area B Ludhiana-3	Turret Lathes; Automatic Lathes; Milling Machines; Drilling Machines; Tapping & Threading Machines; Metal Forming Machines.

Short Name	Name & Address of Participant	Machine Tools
INDUSTRIAL PLANTS	Industrial Plants Ltd. 36 Ganesh Chandra Avenue Calcutta-13	Turret Lathes
KIRLOSKAR BROS.	Kirloskar Bros. Ltd. Kirloskarvadi Dist. Sangli	Drilling Machines; Vertical Boring and Turning Machines; Shaping and Slotting Machines.
MADRAS MACHINE TOOLS	Madras Machinetool Manufacturers Ltd. Singanallur Post Coimbatore-5	Centre Lathes.
MALIK	Malik Electric Works 13 Victoria Road Low Level, Bombay-10	Welding and Flame Cutting Equipment.
MAPA	Mapa Tools Pvt. Ltd. Gamdevi Road Ghandup Bombay-78	Double Ended Grinders.
MAYA	Maya Engineering Works Pvt. Ltd. 200-A S.P. Mukherji Road Calcutta-26	Drilling Machines.
MODGIL	Modgil Company Kashmir Road Batala	Shaping and Slotting Machines; Shearing Machines; Metal Forming Machines.
MUKAND	Mukand Iron & Steel Works Ltd. Agra Road, Kurla Bombay-70	Shearing Machines; Furnaces; Foundry Equipment.
MYSORE KIRLOSKAR	Mysore Kirloskar Ltd. P.O. Yantrapur Harihar	Centre Lathes; Turret Lathes; Cutting Off Machines; Machine Tool Accessories and Power Tools.
NATIONAL	National Machine Tool Industries O/S Industrial Area Sahipur Jullundur City	Machine Tool Accessories and Power Tools.
NEW BEMCO	New Bemco Products Private Ltd. P.O. Udyambag Belgaum	Power Presses - Hydraulic; Plate Bending Rolls; Machine Tool Accessories and Power Tools.

Short Name	Name & Address of Participant	Machine Tools
NSE	New Standard Engineering Co. Ltd. N.S.E. Estate Goregaon, Bombay-63	Drilling Machines; Tapping & Threading Machines; Cutting Off Machines; Plate Bending Rolls; Shearing Machines; Metal Forming Machines.
NSIC	National Small Industries Corporation Ltd. Near Industrial Estate Okhla, New Delhi-20	Centre Lathes; Turret Lathes; Milling Machines; Tool and Cutter Grinding Machines Double Ended Grinders; Press Brakes - Mechanical; Power Presses - Mechanical; Plastic Machinery.
PEARL	Pearl Mechanical Engineering & Foundry Works Pvt. Ltd. G.T. Road Ludhiana	Centre Lathes.
PERFECT	Perfect Machine Tools Co. Bell Building Sir Phirozshah Mehta Road Bombay-1	Centre Lathes; Automatic Lathes; Milling Machines; Drilling Machines; Tapping & Threading Machines; Cylindrical Grinding Machines; Surface Grinding Machines; Surface Grinding Machines; Tool and Cutter Grinding Machines Double Ended Grinders; Shaping and Slotting Machines; Drill Point Grinder; Wood Working Machines.
	Agents for	
Allied	Allied Industrial Products	
Elmeca	Elmeca Works	
E & I Foundry	Engineering & Industrial Foundry Co.	
National Wire	National Wire Products	
Parmar	Parmar Mechanic Works	
Sonex	Sonex Machine Tools	
Smithson	Smithson (Engg.) Products	
Surat Engg.	Surat City Engineering Works	
Traub	Traub India Pvt. Ltd.	
PRAGA	Praga Tools Ltd. 6-6-8/32 Kavadiguda Road Post Box No. 70 Secunderabad-3	Drilling Machines; Machine Tool Accessories and Power Tools.

Short Name	Name & Address of Participant	Machine Tools
PSG	P.S.G. Industrial Institute Pellamedu Coimbatore-4	Centre Lathes
RALLIWOLF	Ralliwolf Ltd. 21 Ravelin Street Bombay-1	Machine Tool Accessories and Power Tools
REMIT	Remit Manufacturing Co. Block No. 11, 2nd Floor Prabhadevi Industrial Estate Cadell Road, Bombay-28	Tapping & Threading Machines
SIMTOOLS	Scottish Indian Machine Tools Ltd. 2nd Pokhran Road Thana	Plate Bending Rolls Shearing Machines
SRM	Shree Ram Mills Ltd. Engineering Division P.O. Baroda Rayon Surat Navsari Road Udhna, Dist. Surat	Machine Tool Accessories and Power Tools
SUPERCRAFT	Supercrafts Pvt. Ltd. 163 Kasba Road Calcutta-42	Centre Lathes
TEXMACO	Textile Machinery Corporation Ltd. P.O. Belgharia 24 Parganas	Centre Lathe Turret Lathes
UMS	U.M.S. Machine Tools Gopal Bagh, Avanashi Road Coimbatore-1	Turret Lathes Automatic Lathes
WILLIAM JACKS	William Jacks & Co. Ltd. Hamilton House Ballard Estate Bombay-1	Surface Grinding Machines Tool and Cutter Grinding Machines Double Ended Grinders Power Presses - Mechanical Plastic Machinery
	Agents for	
Ameteep	Ameteep Machine Tools Pvt. Ltd.	
Brimco	Brimco Plastic Machinery Corporation	
Globe	Globe Engineering Co.	
Praga	Praga Tools Ltd.	

ANNEX 3

PRODUCTS BY AUTOMOTIVE AND TRACTOR ANCILLARY INDUSTRIES IN INDIA

1. ACME BATTERIES PRIVATE LTD.
1/485 G. T. Road, Delhi, Shahdara

Products: Electric horns, batteries and jacks

2. ACME MANUFACTURING CO., LTD.
Construction House, Ballard Estate, Bombay 1

Works: Antop Hill, Wadala, Bombay 31

Products: Inlet & exhaust valves, valve guides, valve inserts, flywheels, brake drums, clutch housings, hub caps, speedometer housings, fan pulleys, screw jacks and brackets

3. AGRIND FABRICATIONSLTD.
6 Ganesh Chandra Avenue, Calcutta 13

Works: P 2/2 Taratolla Road, Garden Beach, Calcutta 24

Products: Trailers of all types, oil tankers, tar boilers, road rollers etc.

4. AHMEDABAD STAR ENGINEERING WORKS LTD.
1730 Haribhai's Dchla, Outside Prem Gate, Ahmedabad

Products: Tyre inflators, battery terminals

5. ALLIED INDUSTRIAL ENGINEERS
Opp. Five Bungalows, Andheri-Kurla Road, Bombay 59

Products: Voltage regulators, contact sets for horns, lock ignitions, burglar alarms, central sealing assembly, light change over switches, electro pneumatic horns, spark plug caps, starter switches, horn switches and dipper siwtches

6. ALLIED MANUFACTURING INDUSTRIES
94, Kansara Chawl, Kalbadevi Road, Bombay 2

Works: C-16, Industrial Estate, Sanatnagar, Hyderabad

Products: Brass stampings and forgings

7. AMCO BATTERIES LTD.
Mysore Road, G.E.F. Post Office, Bangalore 26

Products: Lead acid batteries for automobile vehicles, motor-cycles and scooters, fork lifts/platform trucks, locomotives, telephones and generating stations

8. ANAND AUTOMOBILES
P.O. Yusuf Serai, New Delhi 16

Products: Bus & truck bodies

9. ANANDJI HARIDAS & CO. PVT. LTD.
165A, P.D'Mello Road, Bombay

Works: Fosbery Road, Bombay 15

Products: Clutch and brake pedals, door locks, window regulators and automobile pressings

10. ANTIFRICTION BEARING CORPORATION LTD.
Marshall Buildings, 20, Ballard Road, Bombay 1

Works: Bhangerwadi, Lonavla

Products: Ball, thrust and roller bearings

11. ASHOK LEYLAND LIMITED
'TIAM' House, 11/12, North Beach Road, Madras 1

Works: Ennore, Madras

Products: Heavyduty bus and truck chassis and industrial engines

12. ASSOCIATED AESBY INDUSTRIESPVT LTD.
81, Akshoy Kumar Mukherjee Road, Calcutta 1

Products: General purpose trailers

13. ASSOCIATED BATTERY MAKERS (EASTERN) PVT LTD.
59 C, Chowringhee Road, Calcutta 16
Works: 67, New Chord Road, P.O. Shamnagar

Products: Automobile batteries

14. ASSOCIATED BEARINGS CO., LTD.
Mahatma Gandhi Memorial Bldg, N.S. Road, Bombay 2

Works: Chinchwad, Poona 19

Products: Ball and roller bearings

15. ASSOCIATED ENGINEERING WORKS LTD.
Kashmere Gate, Delhi 6

Works: G.T. Road, Delhi-Shahdara

Products: Hydraulicand mechanical jacks, hand and foot pumps, tyre inflators, bulb horns, starting handles, wheel braces, hangers, shackles, brackets, 'U' bolts, centre bolts and nuts

16. AUTO ACCESSORIES (INDIA) LTD.
Fobbes Building, Home Street, Bombay 1

Works: Malav Bridge, Old Kurla, Bombay 70

Products: Spark plugs, nuts and bolts for automobile industry

17. AUTO LAMPS LIMITED
6, Alipur Road, P.B. No. 1741, Delhi 6

Works: 21-A Faridabad

Products: Auto electric bulbs — miniature types for head, tail, side, panel, direction indicator, dome and door

18. AUTOMETERS LIMITED
Mahants Building, 22A, Asaf Ali Road, New Delhi

Works: Mathura Road, Ballabgarh

Products: Dashboard instruments - speedometer gauges, ammeters, clock panels, tachographs and thermometers

19. AUTOMOBILE ANCILLARIES OF INDIA PRIVATE LTD.
Plot No. 31, Kandivli Industrial Estate,
M.G. Road, Kandivli (West), Bombay 67

Products: Radiators and cores for automobiles, agricultural and industrial diesel engines and heat exchangers for transformers

20. AUTOMOBILE & AGRICULTURAL INDUSTRIES CORPN.
497/3, Sardar Vallabhbhai Patel Road, Bombay 4

Works: Ghodbunder Road, Borivli, Bombay 66

Products: Chasis parts - brackets and shackles, spring pins, spring bolts, bushing (both phosphorus and steel), king pins, hubs, brake drums, clutch and flywheel housings, flywheels, water pumps and parts, pulleys, axle studs, wheel studs and jacks

21. AUTOMOBILE PRODUCTS OF INDIA LTD.
Agra Road, Bhandup, Bombay 78

Products: Scooters and three wheelers (Lambrettas), complete clutch assembly and parts (Borg and Beck, Fichtel and Sachs and Borg-Warner), complete brake assembly and parts (Lockheed, Alfred Teves and Fiat), brake linings and brake blocks (API) and brake fluid (Lockheed)

22. AUTOMOTIVE & ALLIED INDUSTRIES PRIVATE LTD.
216, Vithalbhai Patel Road, Bombay 4

Works: Kalyanpur Nagar, Malwan, Lonavla

Products: Grease nipples, oil nipples, relief valves, valve caps, grease guns (lever and push types), suction guns, oil guns, grease gun nozzles and adaptors

23. AUTO PINS (INDIA) REGD.
Kashmere Gate, Delhi 6

Works: Industrial Area, Faridabad

Products: Leaf springs, oil seals, dynamo pulleys, starting pulleys, king pins, spring pins, transmission pins and tail lights

24. AUTO STEERING INDIA PVT LTD.
Scindia House, New Delhi 1

Works: 7, New Industrial Township, Faridabad

Products: Steering wheels

25. AVDEL (INDIA) PVT LTD.
409, Himalya House, Palton Road, Bombay 1

Products: "Chobert" and "Avex" blind rivets and Avex blind riveting equipment

26. BAJAJ AUTO LTD.
Bombay-Poona Road, Chinchwad, Poona 19

Products: Vespa scooters and three wheelers

27. BAJAJ TEMPO LTD.
Bombay-Poona Road, Chinchwad, Poona 19

Products: Tempo Hanseat three-wheeler commercial vehicles and Tempo Viking four-wheeler commercial vehicles

28. BEST & COMPANY PVT LTD.
13/15, North Beach Road, Madras 1

Works: 298, Tiruvottiyur High Road, Madras 21

Products: Dynamos, alternators, starter motors and voltage regulators

29. BHAGWAN & ANAND
18-H, Connaught Circus, New Delhi 1

Works: i) 75, Rani Jhansi Road, New Delhi 1
ii) 62, Industrial Area, Najafgarh Road, New Delhi 15

Products: Commutators, armatures for dynamos and self-starters, field coils, contacts, bush bearings, connectors for self-starters and fibre stampings

30. BHARAT BATTERY MANUFACTURING CO. PVT. LTD.
238A, Acharya Jagadish Chandra Bose Road, Calcutta 20

Works: 56, Bondel Road, Calcutta 19

Products: Automobile batteries, battery plates and battery containers

31. BHARAT FORGE CO. LTD.
Mundhwa, P.B. No. 57, Poona 1

Products: Steel forgings for all industries

32. BHARAT MOTORS
35, Mount Road, Madras 2

Works: Industrial Colony, Pettai, Tirunelveli 4

Products: Fibroflex rubberised fibre products - automobile seat cushions and backseats

33. BHARAT RADIATORS PVT LTD.
Central Salsette Road, Kalina, Santacruz East, Bombay 29

Products: Radiators and radiator cores for automobiles, industrial engires and air compressors

34. BHARAT SPRINGS PVT LTD.
Bombay-Agra Road, Vikhroli, Bombay 79

Products: Automobile leaf springs, spring leaves and accessories

35. BHAVNAGAR OIL & CHEMICAL INDUSTRIES PVT LTD.
Bombay Mutual Bldg., D.N. Road, Fort, Bombay 1

Works: Mahatma Gandhi Road, Bhavnagar (Gujarat State)

Products: Hydraulic brake fluid

36. BIMETAL BEARINGS LTD.
Huzur Gardens, Semibiam, Madras 11

Products: Thinwall engine bearings, bushings and thrust washers for internal combustion engines

37. BOMBAY ALLOYS & CASTINGS
Lake Road, Bhandup, Bombay 78

Products: Aluminium die castings, flywheels, valve tappets and brake drums. Air cooled cylinder blocks, pressure plates and hydraulic brake cylinders

38. BOMBAY MOTOR TRADING CO.
Kapurthala (Punjab)

Products: Automobile leaf springs and spring leaves

39. BRAKES INDIA LTD.
Padi, Madras 50

Products: Foundation brakes for automotive and non-automotive vehicles

40. BRAKEC SURI PVT LTD.
1655, S.P. Mukherjee Marg, Delhi 6

Works: G.T. Road, P.O. Malaknagar, Ghaziabad (U.P.)

Products: Brake linings, clutch facings, asbestors tapes, asbestos yarn and other frictional materials for automobile, earthmoving, construction and aircraft industry

41. CANARA WORKSHOPS LTD.
P.B. No. 712, Mangalore (Mysore State)

Works: i) Maroli, Mangalore
ii) Hadi, Nagpur

Products: Leaf springs, 'U' bolts, brake drums, hubs, cylinder liners, bus and truck bodies

42. CARBURETTORS LTD.
29, Mount Road, Madras 2

Products: Carburettors, carburettor repair kits, fuel pumps (petrol) and fuel pump repair kits

43. C. COMMENS & SONS LTD.
103/3, Diamond Harbour Road, Behala, Calcutta

Products: Trailers and tankers, jeep trailers and heavy duty trailers upto 20 tonne capacity

44. CEAT TYRES OF INDIA LTD.
Bhandup, Bombay 78

Products: Automotive tyres and tubes for trucks, buses, cars, scooters and animal-drawn vehicles and tread rubber and retreading materials

45. CHOPRA MOTORS
139, Regent Park, Calcutta 40

Products: Bus and truck bodies, bodies for delivery vans, water and oil tankers, ambulances and insulated milkvans, tipping bodies and such other types of bodies

46. C.M. SMITH & SONS
Dasarath Wadi, Court Road, Nadiad (Gujarat State)

Products: Brake drums, cylinder heads, water pump bodies, flywheels, flywheel housings, clutch housings, pressure plates and bell housings

47. CONTACT CORPORATION
B-31, Sarvodaya Nagar, Panjarapole Road, Bombay 4

Works: Simson Compound, 1-B, Patel Road, Goregaon (East), Bombay

Products: Contact sets for automobiles, motor cycles, scooters and mopeds

48. DAVIS & WHITE (INDIA) PVT LTD.
15, Miles Main Mathura Road, Faridabad

Products: Hydraulic brake hoses, oil/fuel lines, wheel cylinder and master cylinder repair kits

49. DEVIDAYAL METAL INDUSTRIES PVT LTD.
P.B. No. 6215, Gupta Mills Estate, Reavy Road, Bombay 10

Products: Brass, copper and phosphur bronze and nickel silver sheets, strips and coils

50. DELTA PRODUCTS PVT LTD.
Mody Chambers, French Bridge, Bombay 4

Works: Kolshet Road, Thana

Products: Automobile leaf springs

51. DELTA SPOKES MANUFACTURING CO.
12, Nanabhai Lane, Bombay 1

Works: Dharamchand Industrial Estate, Devnar, Chembur, Bombay 71

Products: Spokes and nipples for motor cycles and mopeds

52. DUNLOP RUBBER CO (INDIA) LTD.
57B, Free School Street, Calcutta 16

Works: i) P.O. Sahaganj, Dist Hooghly;
ii) Ambattur, Madras 53

Products: Automobile tyres and tubes

53. EICHER TRACTORS INDIA LTD.
16A, Asaf Ali Road, New Delhi 1

Works New Industrial Town, Faridabad

Products: Agricultural tractors

54. ELGI EQUIPMENT PVT LTD.
India House, Trichy Road, Coimbatore 1

Products: Air compressors, high pressure car washing machines, hydraulic lifts and high pressure lubracating equipment

55. ELLORE ENGINEERING CO. LTD.
20, Second Beach Line, Madras 1

Works 42, Thiruvercmalai Road, Chromepet, Madras 44

Products: Steel forgings, track rod forgings and hub forgings

56. ETET ENGINEERS
P.B. No. 124, Amritsar

Works: Off Fathegarh Road, Amritsar

Products: Steering wheels

57. ENFIELD INDIA LTD.
Royal Enfield Bldg., P.B. No. 5284, Tiruvottiyur, Madras 19

Products: Motorcycles, scooters, three wheelersand engines for agricultural and industrial applications

58. ENGINE VALVES LTD.
354, M.K.N. Road, P.O. No. 1305, Madras 16

Products: Inlet and exhaust valves for internal combustion engines

59. ESCORTS LTD.
Block B., Connaught Circus, New Delhi

Works: i(Bahadurgarh, Patiala
ii(18/4, Mathura Road, Faridabad
iii(19/6 Mathura Road, Faridabad

Products: Pistons (aluminium), piston pins, shock absorbers, motorcycles, magnetos, wheel rimsand tractors

60. ESCORT TRANSMISSIONS LTD.
18/4, Mathura Road, Faridabad (Haryana)

Products: Complete automotive transmissions, all types of industrial and automotive gears and shafts (excluding bevel gears)

61. EX-CELL-O INDIA LTD.
78-B, Dr. Annie Besant Road, Worli, Bombay 18

Works: Off Pokhran Road, Thana

Products: Propeller shafts and components thereof, universal joint kits, steering gears and components thereof, steering arms, jacket tube assembly, steering brackets, front axle shafts and precision machine tools.

62. FENNER, COCKILL LTD.
Pandyan Building, P.B. No. 117, West Veli Street, Madurai 1

Works: Kochadai (Madurai Dist)

Products: Fan belts, metal-bonded-to-rubber components, 'O' rings, oil seals, rubber parts and 'V' belts

63. FIRESTONE TYRE & RUBBER CO OF INDIA PVT LTD.
Post Office Box No. 197, Bombay 1

Works: Hay Bunder Road, Bombay 33

Products: Automobile tyres and tubes

64. FIT TIGHT NUTS & BOLTS LTD.
Old Ashram, Andheri-Kurla Road, Bombay 69

Products: All types of high tensile fasteners including high tensile bolts, nuts and socket head cap screws

65. FLEXICONS LTD.
Advani Chambers, Sir P.M. Road, Bombay 1

Works: Udhna, Surat

Products: Self lubricating bearings and bushes

66. FRITZ & SINGH PVT LTD.
Fritz House, 227 N.S.C. Bose Road, Tollygunge, Calcutta 47

Products: Air, fuel and lube. oil filters/filter cartridges

67. FUEL INJECTIONS LTD.
43, Forbes Street, Fort, Bombay 1

Works: Chitalsar, Manpada, Ghodbunder Road, Thana

Products: Fuel injection equipment -- single cylinder pumps, nozzle holders, elements, delivery valves, nozzles and fuel filters

68. GABRIEL INDIA LTD.
S. 304, Bombay-Agra Road, Mulund, Bombay 80

Products: Shock absrobers for all automobiles, trucks, motorcycles, scooters, three wheelers and tanks

69. GASKETS & OIL SEALSPVT LTD.
P.B. No. 89, Padra Road, Baroda

Products: All types of gaskets, washers -- metallic, ferrous and non-ferrous and non-metallic, radiators for automobile and industrial engines, radiator cores, 'O' rings and oil coolers

70. GLASS & MINIATURE BULB INDUSTRIES
Bachari Niwas, Kanpur

Works: 84/22, Fazalganj, Kanpur

Products: Automobile bulbs

71. GLEITLAGER (INDIA) PVT LTD.
Manu Mansion, 16, Old Customs House Road, Bombay 1

Works: Off Pokhran Road No. 2, Majiwada, Thana

Products: Thickwalled bearings and bushes for tractors, diesel engines, etc.

72. GLOBE AUTO ELECTRICALS LTD.
Agra Road, Mulund, Bombay 80

Products: Ignition coils, windshield wiper motors, ignition distributors, voltage regulators, ignition cum switch assy., A.C. generators (alternators), D.C. generators (dynamos) and starter motors

73. GLOBE MOTORS WORKSHOP LTD.
1/2 Jhandewala, New Delhi 1

Works: 14/1, Main Delhi-Mathura Road, Faridabad

Products: Bus and load bodies, tankers and trailers

74. GLOBE STEELS
1/2, Jhandewala, New Delhi 1

Works: Main Mathura Road, Ballabgarh

Products: Special and alloy steel in particular silico manganese spring and steel flats and malleable iron castings

75. GODREJ & BOYCE CO PVT LTD.
Lalbaug, Parel, Bombay

Works: i) Lalbaug, Parel, Bombay
ii) Agra Road, Vikhroli, Bombay 79

Products: Fork lift trucks

76. GOETZE (INDIA) LTD.
Block H, Connaught Circus, New Delhi

Works: Bahadurgarh, Patiala (Punjab)

Products: Piston rings and cylinder liners

77. GOODYEAR INDIA LTD.
225 C, Acharya Jagadish Bose Road, Calcutta 20

Works: Ballabgarh (Haryana)

Products: Auto, truck, tractor and earthmoving tyres and tubes, tread rubber and repair materials

78. GRANT JAMES PVT LTD.
11, Hungerford Street, Calcutta 16

Works: i) P.O. Joka, 24 Parganas
ii) 46, Moore Avenue, Calcutta 40

Products: Bus and truck bodies, bodies for pick-up vans, dumpers and miscellaneous vehicles

79. GUEST, KEEN, WILLIAMS LTD.
Jeevan Deep, 1, Middleton Street, P.B. No. 609,
Calcutta 16

Works: i) 97 Andul Road, P.O.Botanical Gardens, Howrah
ii) Currie Road, Howrah

Produces: All types of industrial fasteners including heat treated bolts, nuts and screws, self tapping screws, hot rolled forgings, quality alloy and special plain carbon steel billets and bars, alloy and spring steel rolled sections, bright drawn and turned steel sections, automobile and other steel forgings, brake shoe components, filter inserts, governor diaphragms and other pressed components for automobiles.

80. GURMUKH SINGH & SONS (REGD)
Gill Road, Miller Ganj, Ludhiana

Products: King pins, spring shackle pins, 'U' bolts, hub bolts, shcakle bolts and nuts, central bolts, shackle plates and gun metal bushes

81. HASHAN INDUSTRIES
6, Ideal Industrial Estate, 124, Delisle Road
Bombay 13

Products: Non-ferrous die castings, locks and switches for scooters, bakelite switches, ignition switches and plastic components

82. HAKIMARAI JAICHAND
United Bank of India Bldg., P.B. No. 1826
Sir P.M. Road, Fort, Bombay 1

Products: Steel forgings for automobiles

83. HEMANSHU TRADERS
Churiwadi, Aarey Road, Goregaon (East) Bombay 62

Products: Electric horns

84. HIMCO (INDIA) PVT LTD
Dhanodham, Andheri-Kurla Road, P.O. J.B. Nagar,
Bombay 59

Products: Lead storage batteries, battery plates, battery chargers, battery cables, battery terminals, battery cell testers, battery containers, electric horns, horn relays, horn switches, horn push buttons, contact points, dimmer switches, ignition cables and starter cables

85. HIND AUTO INDUSTRIES LTD
1, Madan Mohan Malaviya Marg, Lucknow

Products: Tie rod ends, universal joint couplings, water pump repair kits, king pins, spring shackle bolts and pins, crown wheels and pinions

86. HIND EQUIPMENT CORPORATION PVT LTD
Rajababadur Compound, 24-B, Hamam Street, Bombay 1

Products: Shock absorbers - hydraulic and friction, silent blocks and rubber-bonded-metal fittings

87. HINDUSTAN FERODO LTD
Ghatkopar, Bombay 77

Products: Brake linings, clutch facings, compressed fibre asbestos fibre jointings, asbestos yarns, asbestos plaited packings, asbestos cloth, etc.

88. HINDUSTAN MOTORS LTD.
4, India Exchange Place, Calcutta 1

Products: Cars and bus and truck chassis, earthmoving equipment and cranes

89. INDUSTAN TRACTORS LTD.
Viswamitri, Baroda

Products: Agricultural tractors, earthmoving equipment, etc.

90. H.J. LEACH & CO.
Asian Building, Nicol Road, Ballard Estate, Bombay 1

Products: Fuel, oil and air filters, filter elements and filter cartridges

91. HUBS & DRUMS PVT LTD.
Akashdeep, French Bridge, Bombay 7

Products: Hubs, brake drums, clutch housings, flywheel housings, water pump assy., water pump parts, brackets, shackle pins, king pins, king pin repair kits, bushes, and oil pump parts.

92. HYDERABAD ALLWYN METAL WORKS LTD.
Sanatnagar, Hyderabad 18

Products: Bus and truck bodies, kits for bus and truck bodies, trailers and semi-trailers, hydraulic hoists and tipping gears, tipper body kits and power tillers

93. HYDRAULICS LTD.
29, Mount Road, P.B. No. 331, Madras 2

Products: Hydraulic telescopic shock absorbers

94. IDEAL JAWA (INDIA) PVT LTD.
Industrial Estate, Mysore 2

Products: "Jawa" motorcycles and scooters

95. IMANES PVT LTD.
94, S.V. Road, Erla, Bombay 56

Products: Coil springs, flat springs and wire forms

96. INDEQUIP ENGINEERING LTD.
Reid Road, Ahmedabad 2
Products: Oil lubricating rotor pumps

97. INDIA BODY BUILDERS
Eastern Woollen Mills Compound, 62, Bhawani Shanker Road, Bombay 28

Products: Bus and coach bodies, bodies for station wagons, delivery vans, ambulances, tankers, autorickshaws and steel cab with load bodies

98. INDIA FORGE & DROP STAMPINGS LTD.
150-A, Mount Road, Madras 2

Products: Steel forgings for automotive industries

99. INDIA LEAF SPRING MANUFACTURING CO PVT LTD
62, Mahatma Gandhi Road, Secunderabad (A.P.)

Products: Lead springs

100. INDIAN BATTERY MANUFACTURING CO. PVT. LTD.
1A, Acharya Jagadish Bose Road, Calcutta 20

Products: Automobile batteries

101. INDIAN CABLE INDUSTRIES
Bombay-Poona Road, Pimpri, Roona

Products: Automobile cables

102. INDIAN STANDARD METAL CO. LTD.
Chinchpokli Cross Lane, Bombay 27

Products: Non-ferrous alloy ingots, sand castings, shell moulded castings in bronze, gun metal and other non-ferrous alloys, pressure and gravity die-castings in aluminium and zinc base alloys, clutch housings, water pump body, hub caps, oil filter bodies, accelerator pedals, cylinder head for three wheelers, oil pump for diesel engines and S.G. Iron castings both machined and unmachined.

103. INDIA PISTON REPCO LTD.
Huzur Gardens, Sembiam, Madras 11

Products: Flywheel starter ring gears

104. INDIA PISTONS LTD.
Huzur Gardens, Sembiam, Madras 11

Products: Pistons, piston rings, gudgeon pins, cylinder lines, circlips, ferrous and non-ferrous castings

105. INDIA RADIATORS LTD.
99, Armenian Street, P.B. No. 113, Madras 1

Products: Radiators including heavy duty radiators

106. INEX ENGINE VALVES PVT LTD.
1, Narendra Place, New Delhi

Products: Inlet and exhaust valves for internal combustion engines

107. INJECTO PVT. LTD.
Injecto House, Tilak Marg, Jaipur

Products: Carburettors and fuel pumps (petrol) and their repair kits, water pumps and parts, high pressure hydraulic hoses and flexible tubes.

108. INSPI AUTO INDUSTRIES PVT. LTD.
2A/3, Asaf Ali Road, New Delhi 1

Products: Carburettors and fuel pumps (petrol) and their repair kits

109. INTERNATIONAL INSTRUMENTS PVT LTD.
140, Hosur Road, Adugodi Post, Bangalore 30

Products: Tachographs, speedometers, double pressure gauges, single pressure guages, temperature gauges, oil pressure gauges, fuel gauges, ampere meters, flexible shaft cables for tachographs and speedometer cables.

110. INTERNATIONAL TRACTORS CO. OF INDIA LTD.
Akurli Road, Kandivli (East), Bombay 67

Products: Agricultural tractors, implements and equipments

111. JAMNA AUTO INDUSTRIES
Auto Industries Road, Yamunanagar (Punjab)

Products: Laminated automobile springs and leaves

112. JAYANAND KHIRA & CO PVT. LTD.
Khira Bhavan, Sandhurst Bridge, Bombay 7

Products: Bus and truck bodies and body kits, bodies for ambulances, delivery vans, milk vans, tankers and trailers

113. J.M.A. INDUSTRIES LTD.
8 Padmini Enclave, Hauz Khas, New Delhi 29

Products: Electric horns, combination tail and side flasher lights, switches, head lights, flasher units, wiper arms and blades.

114. JOHN FOWLER (INDIA) LTD.
136A, Rash Behari Avenue, Calcutta 29

Products: Fuel, oil and air filters and elements

115. JONAS WOODHEAD & SONS (INDIA) LTD.
41, Thiruneermalai Road, Madras 44

Products: Laminated leaf springs for road and rail vehicles.

116. JOSTS ENGINEERING CO. LTD.
Great Social Bldgs., Sir P.M. Road, Bombay 1

Products: 'Jumbo' battery, petrol and diesel driven industrial platform trucks; 'Pigmy' hand operated hydraulic pallet trucks; and 'Jostak' manually operated, battery operated and main operated stackers

117. KALINA METAL & ENGINEERING WORKS
109, Sheth Motishah Lane, Mazagaon, Bombay 10

Products: Front parking indicator lights, rear parking and number plate lights, side indicator lights, dome lights and switches, bulb holders for head lights, light reflectors, door opening weather strips, flexible channels, door handles (with or without locks), rear view mirros, decorative parts for cars, buses and trucks.

118. KAMANI METAL & ALLOYS LTD.
Agra Road, Kurla North, Bombay 70

Products: Brass, copper and phosphor bronze and nickel silver sheets, strips and coils

119. KANTI ENGINEERING WORKS
4, Annesley Road, Off Lamington Road, Bombay 7

Products: Air, oil and fuel filters and elements, air filter cartridges and sheet metal stampings

120. K.G. KHOSLA & CO. PVT. LTD.
1, Desabhandu Gupta Road, New Delhi 1

Products: Jacks, Air Compressors and Service Station equipment

121. KIRLOSKAR OIL ENGINES LTD.
13, Elphinstone Road, Kirkee, Poona 3

Products: Thinwalled bearings and bushes

122. KORULA RUBBER CO. PVT. LTD.
249-B, Worli, Bombay 18

Products: Automobile rubber components and bus body profiles

123. KOTHARI AUTO PARTS MANUFACTURERS PVT. LTD.
431, Lamington Road, Bombay 4

Products: Rear axle shafts, tie rod ends, universal joint cross assy., shackle bolts, king pins, shackle pins and sealed beams

124. K.S. DIESELS PVT. LTD.
19-21, Hamam Street, Bombay 1

Products: Fuel Injection equipments -- single cylinder pumps, nozzles, nozzle holders, elements and delivery valves.

125. K.T. STEEL INDUSTRIES PVT. LTD.
Broach Street, Bombay 9

Products: Trailers (3 and 5 tonnes capacity)

126. LEONG MOTOR COACH WORKS
43, Hazra Road, Calcutta 19

Products: Bodies for buses, trucks, ambulances, delivery vans, tankers, etc. and all steel and welded station wagons, body fittings such as R.C. Locks, window regulators and door handles

127. L.G. BALAKRISHNAN & BROS PVT LTD.
India House, 254, Trichy Road, P.B. No. 254, Coimbatore 1

Products: Timing chains for automobiles and motor cycles, industrial chains and bodies for buses and trucks

128. LUCAS-TVS LTD.
Padi, Madras 50

Products: Starter motors, dynamos, voltage regulators, distributors, electric horns, horn relays, windscreen wipers, flasher units, solenoids, head, side and tail lamps.

129. LUK AUTO ANCILLARY (INDIA) LTD.
Jeevan Vihar Building, 1st floor, Parliament Street, New Delhi

Products: Automobile clutches and clutch plates

130. LUMINA ELECTRICAL INDUSTRIES
Prakash Bhavan, Bhavani Shanker Cross Road, Bombay 28

Products: Automobile bulbs

131. MACO PVT LTD.
6692/1, Khari Baoli, Delhi 6

Products: Gudgeon pins for all kinds of engines -- vehicular and stationary -- king pins, pivot pins, pinion pins, shackle pins, water pump shafts, brake pedal pins, brake pedal tubes and bell crank pins

132. MADRAS RUBBER FACTORY LTD.
Dhun Building, 175/1, Mount Road, Madras 2

Products: Automobile tyres and tubes, tread rubber and repair materials

133. MAHINDRA & MAHINDRA LTD.
Gateway Building, Apollo Bunder, Bombay 1

Products: CJ - 3B Jeep universal and FC - 150 Jeep trucks

134. MAHINDRA OWEN PVT. LTD.
Gateway Building, Apollo Bunder, Bombay 1

Products: A complete range of light and heavy agricultural, industrial and municipal trailers from 10 cwt. to 40 tonnes pay load

135. MAHINDRA SINTERED PRODUCTS LTD.
Gateway Building, Apollo Bunder, Bombay 1

Products: Sintered bronze/iron self lubricating bearings and bushings and parts

136. MALLEABLE IRON & STEEL CASTINGS CO PVT LTD.
Mathuradas Mills Compound, Tulsipipe Road, Lower Parel, Bombay 13

Products: Chassis components -- hubs, hub caps, differential caps, brake drums, flywheels, steering knuckles, steering housings and malleable iron automotive castings

137. METALCRAFT CORPORATION
32, Cossipore Road, Calcutta 2

Products: Pressed and machined components for cars, commercial vehicles, motor cycles and scooters

138. METROPOLITAN SPRINGS PVT LTD.
Salt Pan Road, Antop Hill, Wadala, Bombay 31

Products: Leaf springs, coil springs, rear axle shafts, king pins, high tensile bolts, torsion bars and upset forgings

139. M.G. AUTOMOBILES
Patelnagar, Bellary 2

Products: Bus, lorry and van bodies and pressed steel sections for automobile bodies

140. MINIATURE BULB INDUSTRIES OF INDIA
131, Kanwali Road, Dehra Dun (U.P.)

Products: All types of automobile bulbs

141. MODAK RUBBER PRODUCTS PVT LTD.
Kondivatta Road, Andheri (East) Bombay 59

Products: Rubber parts for automobiles - engine mountings, rubber bushings, gear covers, sponge and other channels and other allied products in all types of natural and synthetic rubbers

142. MOPEDS INDIA LTD.
1, V. Palaniswamy Naidu Street, Avanashi Road, Coimbatore 18

Products: 'Suvega' mopeds (Scooterettes)

143. MOTOR INDUSTRIES CO. LTD.
P.B. No. 93, Bangalore 1

Products: Spark plugs, heater plugs, (glow plug) with resisters and indicators for diesel engines, diesel fuel injection equipments - fuel injection pumps, nozzles, nozzle holders, delivery valves, elements, filters and filter inserts

144. MULJI V. NARSI
Udhyognagar, Sion, Bombay 22

Products: Heavy deep drawing and intricated sheet metal parts for automobile and scooters and precision weighing machines

145. MURARKA ENGINEERING WORKS
28/37, Najafgarh Road, New Delhi 15

Products: Laminated leaf springs, steel forgings and industrial chains

146. MUTUAL STEEL INDUSTRIES
47, Kandivli Industrial Estate, Bombay 67

Products: Steering wheels and elastic block for leaf springs

147. NAPCO BEVEL GEAR OF INDIA LTD.
3, Friends Colony, New Delhi 14

Products: Complete range of gears for automobiles, aircrafts, earthmoving equipments, etc. axles and universal joints

148. NATIONAL ENGINEERING INDUSTRIES LTD.
Jaipur

Products: Ball and roller bearings, tapper roller bearings, steel balls and axle boxes

149. NATIONAL FASTENERS PVT LTD.
102-B, Mount Road, Nandanam, Madras 35

Products: Hot stamped brass automotive components

150. NATIONAL RUBBER MANUFACTURERS LTD.
"Leslie House", 19, Chowringhee Street, Calcutta 13

Products: Auto rubber components

151. NATIONAL STEEL & GENERAL MILLS
878A, East Park Road, Karol Bagh, New Delhi

Products: Steel forgings for automobile industry

152. NEW INDIA MOTORS PVT LTD.
Scindia House, P.B. No. 296, New Delhi 1

Products: Bus and truck bodies, trailers and mobile cranes

153. OIL SEALS MANUFACTURING CO. INDIA LTD.
Elphinstone Bldg., 10, Veer Nariman Road, Bombay 1

Products: Oil seals and 'O' rings, chevron packings, hydraulic packings, 'U' seals, carbon seals and other moulded rubber components

154. OLDHAM & SONS (INDIA) LTD.
21/22, Alandur Road, Madras 32

Products: Automobile batteries

155. ORIENT GENERAL INDUSTRIES LTD.
111/1, Barrackpore Trunk Road, Calcutta 35

Products: Dynamos, starter motors, voltage regulators, fuse units, electric horns, horn relays and horn rings

156. PAYEN-TALBROS PVT. LTD.
71/3, Najafgarh Industrial Area, New Delhi 15

Products: Gaskets of all kinds -- metalic and non-metalic

157. PEARL SCOOTERS
425, Industrial Area, Ludhiana 3

Products: Scooters

158. PERFECT ENGINEERING PRODUCTS PVT LTD
24 Raja Mansilal Bldg., 11, Bruce Street, Bombay 1

Products: Valve guides, valve seats inserts, valve tappets and push rods

159. PIONEER SPRING & STEEL CONCERN PVT LTD.
20, British India Street, Calcutta 1

Products: Coil springs, circlips, snap rings and retainer rings, (wire range upto 8.71 mm) plate springs, spring and lock washers (flat section upto 9.525 mm x 11.112 mm and square section upto 10 mm) for automotive industry.

160. POPULAR AUTOMOBILE INDUSTRIES
33B, Kennedy Bridge, Bombay 4

Products: Sealed beams, head lights, tail, side, roof and fog lights for all types of automobile vehicles

161. PRADIP LAMP WORKS
P.O. Bogumpur, Patna 9

Products: Automobile bulbs

162. PRECISION BEARINGS (INDIA) LTD.
Wavell House, Graham Road, Ballard Estate, Bombay 1

Products: Ball and roller bearings

163. PRECISION COMPONENTS PVT. LTD.
Andheri-Kurla Road, Marol Naka, Bombay 59

Products: Hydraulic grease nipples and fittings and other turned components

184. PREMIER AUTOMOBILES LTD.
Construction House, Ballard Estate, Bombay 1

Products: Cars, bus and truck chasis, delivery vans, industrial and marine engines and air conditioners

165. PREMIER TYRES LTD.
Maneckjee Wadia Bldg., M.G. Road, Bombay 1

Products: Tyres and tubes for automotive vehicles

166. PRESTOLITE OF INDIA LTD.
2/A3 Asaf Ali Road, New Delhi 1

Products: Voltage regulators, condensors, contact sets, ignition coils, electric horns, horn relays, govenors, distributor caps and rotors, solenoid switches, oil pressure switches, stop light switches, windscreen wiper motor assy., head lamps and battery cables

167. PUROHIT RUBBER WORKS
13-D Kurla Industrial Estate, Off Agra Road, Bombay 77

Products: Automobile rubber components, viz., engine mountings, radiator hoses, silent block bushings, oil seals, sponge rubber glass channels, spring bushes, vibration dampers, flexible couplings, mats and carpets, pedal pads, rubber mouldings and rubber tubings

168. RACKMAN KOSHATKINN (REGD)
53, Industrial Area, Najafgarh Road, New Delhi 15

Products: Automobile leaf springs and spring leaves, sealed beams, head lamps, inspection lamps, tail lamps, side mirrors, oil seals and sheet metal parts

169. RANE BRAKE LININGS LTD.
Plot No. 30, Industrial Estate, Ambattur, Madras 58

Products: Moulded brake linings and clutch facings

170. RANE (MADRAS) LTD
Ganapathy Bldg., 47, Velachery Road, Madras 32

Products: Tie rod ends, steering linkages, suspension joints and clutch discs

171. R.C. EDWARDS & CO. PVT. LTD.
16, Arthur Bunder Road, Colaba, Bombay 5

Products: Taxi meters

172. RUBY COACH BUILDERS PVT LTD.
75, Dr. Annie Besant Road, Worli, Bombay 18

Products: Bus, coach and truck bodies, body kits, bodies for delivery vans, ambulances, refrigerator vans, trolley buses and double decker buses and tipping bodies

173. SAHNEY STEEL & PRESSWORKS PVT LTD.
27, Kirol, Vidya Vihar, Bombay 77

Products: Armatures, piston pins, king pin sets and field coils

174. SANKEY WHEELSLTD.
Freeder Road, Durgapur 1

Products: Pressed steel wheels for cars, commercial vehicles, tractors, trailers, slow moving vehicles and scooters

175. SAUND ZWEIRAD UNION (INDIA) PVT LTD.
18/A, Kailas Colony, New Delhi 14

Products: 'Vicky' mopeds and spare parts and accessories thereof

176. SCHRADER SCOVILL DUNCAN LTD.
Udyog Bhavan, Wittet Road, Ballard Estate, Bombay 1

Products: Automobile tyre tube valves for all automotive vechicles including aircrafts and other general purpose applications and accessories such as valve caps, valve cores, hex nuts, rim nuts, ring washers and bridge washers

177. SERVICE STATION EQUIPMENT CO PVT LTD.
'Krupanidhi', Wittet Road, Ballard Estate, Bombay 1

Products: Automotive and industrial lubrication equipment, 'Globe' automotive hoists, and 'Hercules' service station equipments

178. SHAMA ENGINE VALVES LTD.
14-F, Connaught Place (Central Circle), New Delhi 1

Products: Inlet and Exhaust valves

179. SHAMA PISTONS & RINGS LTD.
14-F, Connaught Place, New Delhi 1

Products: Pistons, piston rings and piston pins

180. SHARCO INDUSTRIES PVT LTD
P.B. No. 1467, Sharan Kutir, Kashmere Gate, Delhi 6

Products: Electric horns (6, 12 and 24 volts vibrator and windtone type) -- singles and duals, hydraulic and mechanical jacks, scissor and bumper jacks, side lift jacks (1 to 12 tons), head lamp rims for Ambassador cars (pressure die casted) and double blade hacksaw frames

181. SHARDLOW INDIA LTD.
Huzur Gardens, Sembiam, Madras 11

Products: Steel forgings for automotive industry

182. SHAR-LEE FILTORITES PVT LTD.
P.B. No. 1226, Kashmere Gate, Delhi 6

Products: Fuel, oil and air filters and elements

183. SHRIRAM BEARINGS LTD.
49/1, Gariahat Road, Calcutta 19

Products: Ball and roller bearings

184. SIMETALLS PVT LTD.
61, Government Gate Road, Parel, Bombay 12

Products: Sintered (self lubricating) bearings of bronze and iron, carbon (metal graphite) bushes for automobile starters, sintered bronze filters, small machine parts manufactured by powder metallurgy process

185. SIMMONDS MARSHALL LTD.
Savoy Chambers, 5, Wallace Street, Bombay 1

Products: Nyloc self locking fasteners, wheel nuts and special nuts

186. SIMPSON & CO. LTD.
202/203, Mount Road, Madras 2

Products: Perkins automotive, industrial and tractor type diesel engines and related parts, garage equipments, tanks, trailers, general body building works such as bus and lorry bodies and bodies for ambulances, vans, etc.

187. SION GARAGE PVT LTD.
29, Amba Bhuvan, Sion Circle, Bombay 22

Products: Bus and truck bodies, air-conditioned coaches, bodies for refrigerated vans, aircraft refuellers, explosive vans, ambulances, dumpers, tankers, trailers and station wagons

188. SOUTHERN INDUSTRIAL CORPN LTD.
99, Armenian Street, P.B. No. 113, Madras 1

Products: Automobile control cables and speedometer cables

189. SHREE ENGINEERING PRODUCTS LTD.
Sreenivas House, Waudby Road, Bombay 1

Products: Steering knuckles, rear axle housings, clutch and brake pedals, pedal pivots, cross shaft levers, handbrakes, mounting brackets, bumper brackets, universal couplings, spring hangers, differential carrier caps, differential cages and brake drums

190. SRI RAMADAS MOTOR TRANSPORT PVT LTD.
Subhas Road, Kakinada (A.P.)

Products: King pin units, king pin thrust washers and bearings, water pump shafts and shaft pump drives, oil pump gears, engine bedding bolts, shackle pins and bolts, clutch and brake pedal shafts, vibration damper pins, brake shoe anchor pins and shoe pins, handbrake pulls, tie rod balls, oil seals, valve guides, push rods, axle stud dust caps, bus, lorry and station wagon bodies

191. STANDARD AUTO PARTS PVT LTD.
Chopasni Road, Jodhpur

Products: King pin units, piston pin sets and shafts for water pumps and counter gears

192. STANDARD BATTERIES LTD.
Vakola, Santacruz, Bombay 55

Products: All kinds of lead-acid storage batteries for automotive industries

193. STANDARD MOTOR PRODUCTS OF INDIA LTD.
29, Mount Road, Madras 2

Products: Cars and drive away chassis and one ton truck chassis

194. STANDARD RADIATORS PVT LTD.
Industrial Estate, Baroda 3

Products: Radiators and radiator cores, radiator shell covers and caps, oil coolers, metal pressings and sheet metal stampings

195. STEELSWORTH PVT LTD.
Steelnagar, Tinsukia, Assam

Products: Jeep trailers and general purpose trailers

196. STUMPP SCHUELE & SOMAPPA PVT LTD.
P.B. No. 78, Bangalore 1

Products: Coil springs, flat springs, wire forms, spring washers and star washers

197. SUDSONS PVT LTD.
3, Esplanade East, Calcutta 1

Products: Steel forgings for automobiles

198. SUNDARAM-CLAYTON LTD.
Z Padi, Madras 50
Products: Air assisted and full air brake equipments composing of air compressors, air servos, governors and non-return valves, air pressure reservoirs and fittings, brake chambers, brake valves, slack adjusters and safety valves, stop light switches and air filters

199. SUNDARAM INDUSTRIES PVT LTD.
TVS Building, West Veli Street, Madurai 1

Products: Bus and truck bodies, body kits and bodies for all types of vehicles, rubber bushes and tyre retreading

200. SUPER SEALS INDIA PVT LTD.
21-A, Nizamuddin West, New Delhi 13

Products: Synthetic rubber oil seals, hydraulic brake parts and brake hoses

201. SURAT INDUSTRIAL ENGINEERING CO PVT LTD.
Mangalwadi, Varachha Road, Surat

Products: King pins, water pump repair kits, spring pins, bushes, clutch and transmission shafts, wheel bolts, mechanical jacks (upto 10 tonnes), brass, bronze and aluminium castings

202. SWASTIK RUBBER PRODUCTS LTD.
Swastik House, Behind Kirkee Rly Station, Poona 3

Products: All types of moulded extruded, metal bonded auto components, oil seals and hoses

203. TATA ENGINEERING AND LOCOMOTIVE CO. LTD.
Bombay House, 24, Bruce Street, Bombay 1

Products: Bus and truck chassis and bodies and excavators

204. TECALEMIT (HIND) LTD.
8, Chittaranjan Avenue, Calcutta 13

Products: Complete range of servicing equipments, pumps and fittings, grease nipples, filters and filter elements (paper & felt)

205. TEKSONS PVT LTD.
Modi Chambers, French Bridge, Bombay 4

Products: Complete range of heat exchangers, viz. radiators, oil coolers, intercoolers, aftercoolers and convectors; low pressure flexible hoses for fuel, oil and vacuum, high pressure hydraulic hoses and brake hoses

206. T.I. DIAMOND CHAIN LTD.
11/12, North Beach Road, Madras 1

Products: Timing chains

207. TRACTORS & FARM EQUIPMENT LTD.
11, Kothari Road, P.B. No. 3302, Madras 34

Products: Agricultural tractors -- Massey -- Ferguson 1035 and the related range of implements

208. TURNER MORRE & CO LTD.
Gateway Bldg., Apollo Bunder, Bombay 1

Products: Complete clutch assembly, clutch pressure plates and clutch driven plates

209. UNICORN PVT LTD.
29, Mount Road, P.B. No. 2708, Madras 2

Products: Sheet metal components, grey iron castings and automobile bodies, particularly from fibreglass re-inforced plastic materials

210. UNION CO (ACCESSORIES) PVT LTD.
29, Mount Road, Madras 2

Products: Radiators, radiator cores, electric horns, horn relays, hand pumps, screw jacks, hydraulic trolley jacks, pedal assy. petrol filter caps, radiator filler caps, hub caps and dynamo fan pulleys

211. UNIVERSAL RADIATORS
Mettupalayam Road, Coimbatore 11

Products: Radiators, radiator cores, radiator caps, oil coolers and intercoolers, aftercoolers for automotive engines

212. UPPER INDIA BEARINGS PVT LTD.
1/18, Mount Road, Madras 2
Products: Thinwalled engine bearings, composite metal and non-ferrous bushes

213. USHA AUTOMOBILE & ENGINEERING PVT LTD.
14, Princep Street, Calcutta 13

Products: Silencers, mufflers with exhaust pipes, spring cushions, vacuum air containers for air brakes, tail lamps, accelerator pedals, window regulator mechanisms, door locks and remote control locking devices, window channels and weather strips and ignition switches

214. USHA TELEHOIST LTD.
14, Princept Street, Calcutta 13

Products: Hydraulic & mechanical tipping gears for automobiles

215. VICTOR GASKETS INDIA LTD.
S. 305, Agra Road, Mulund, Bombay 80

Products: Gaskets

216. WESTERN THOMSON (INDIA) PVT. LTD.
99, Armenian Street, Madras 1

Products: Water thermostats

217. WHEELS INDIA LTD.
37, Mount Road, Madras 6

Products: Wheels for commercial vehicles, passenger cars, tanks and tractors

218. WYMAN-GORDON INDIA LTD.
P.B. No. 41, Off Pokhran Road, Majiwada, Thana

Products: Steel forgings for all industries

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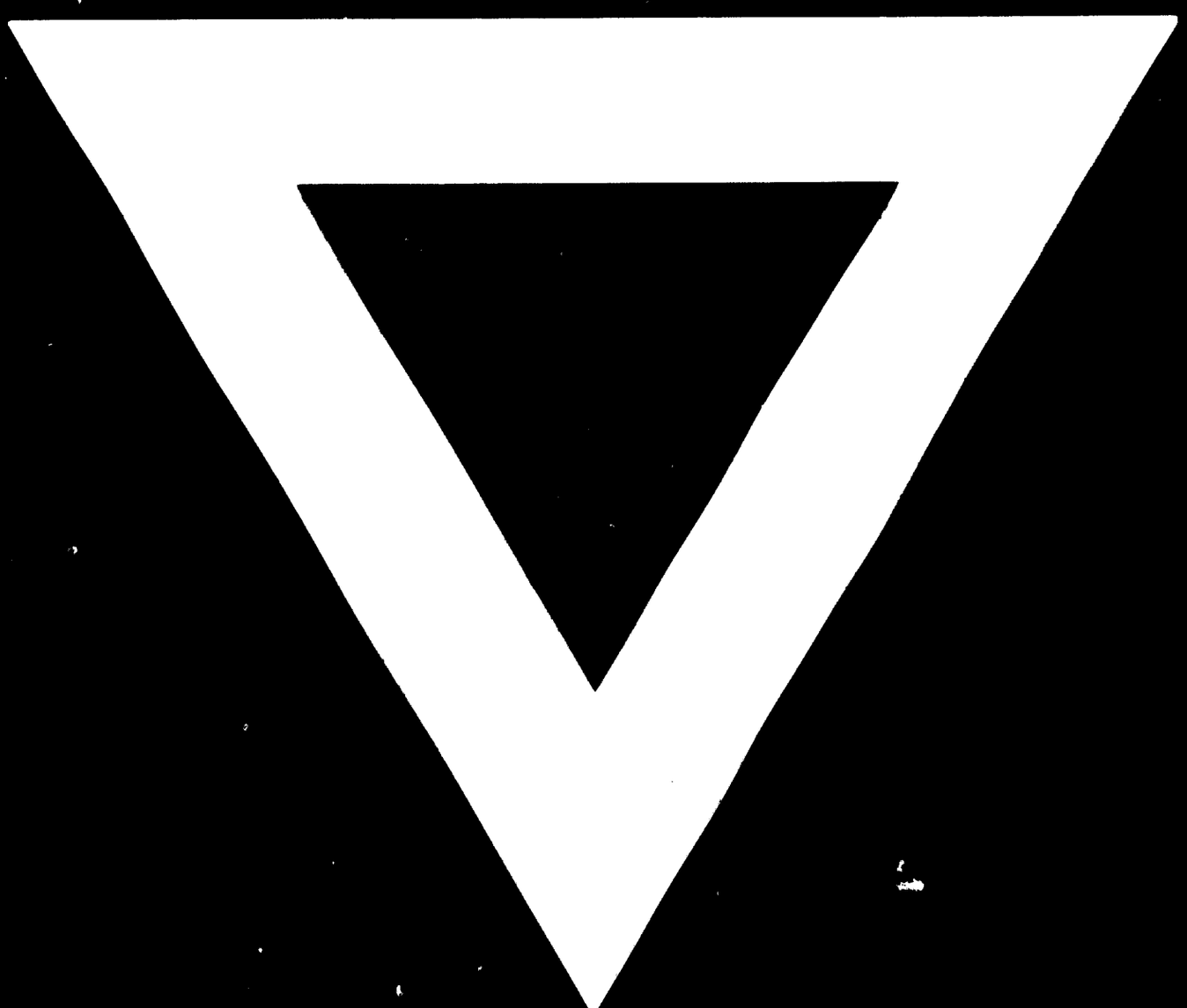

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