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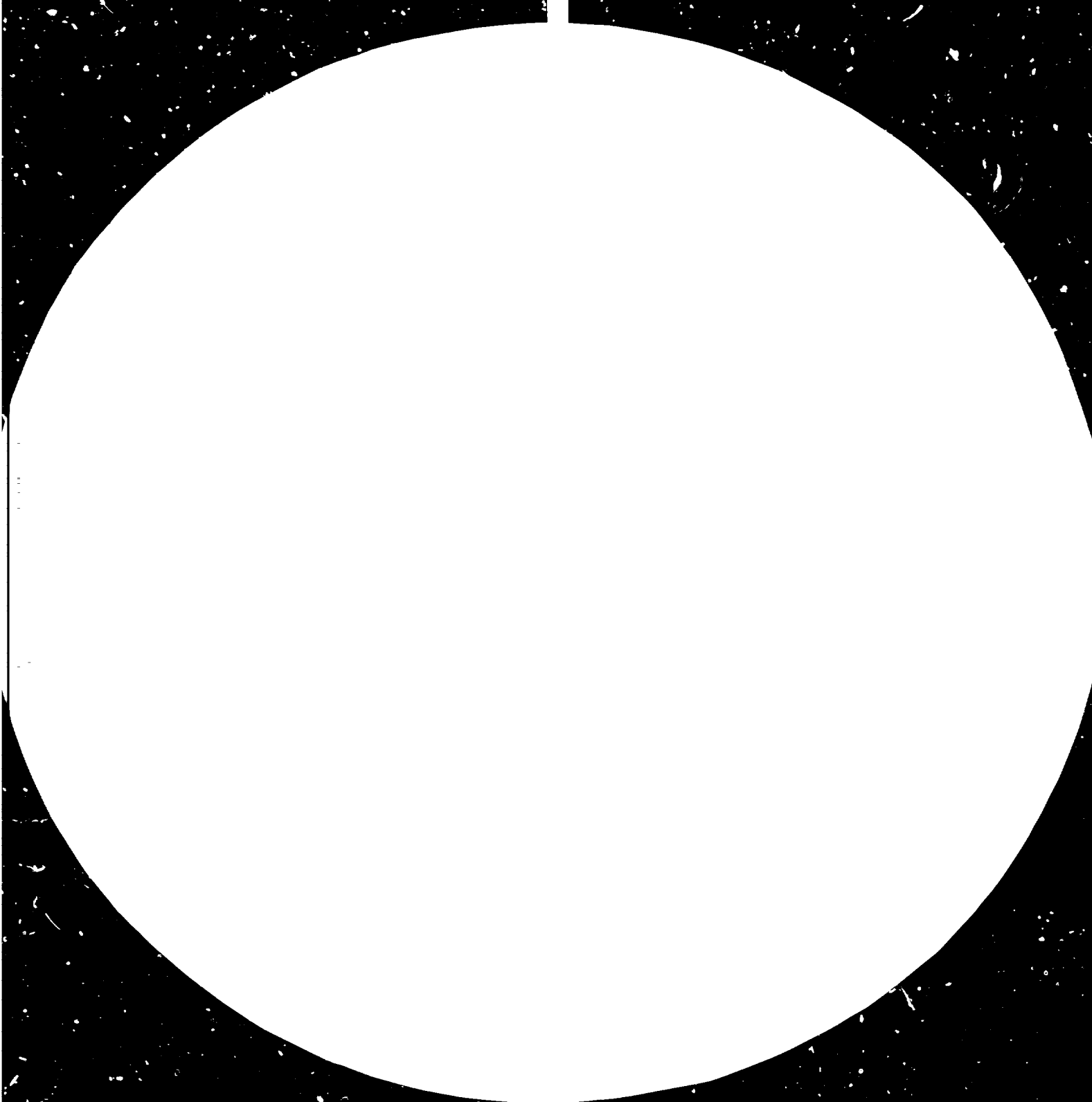

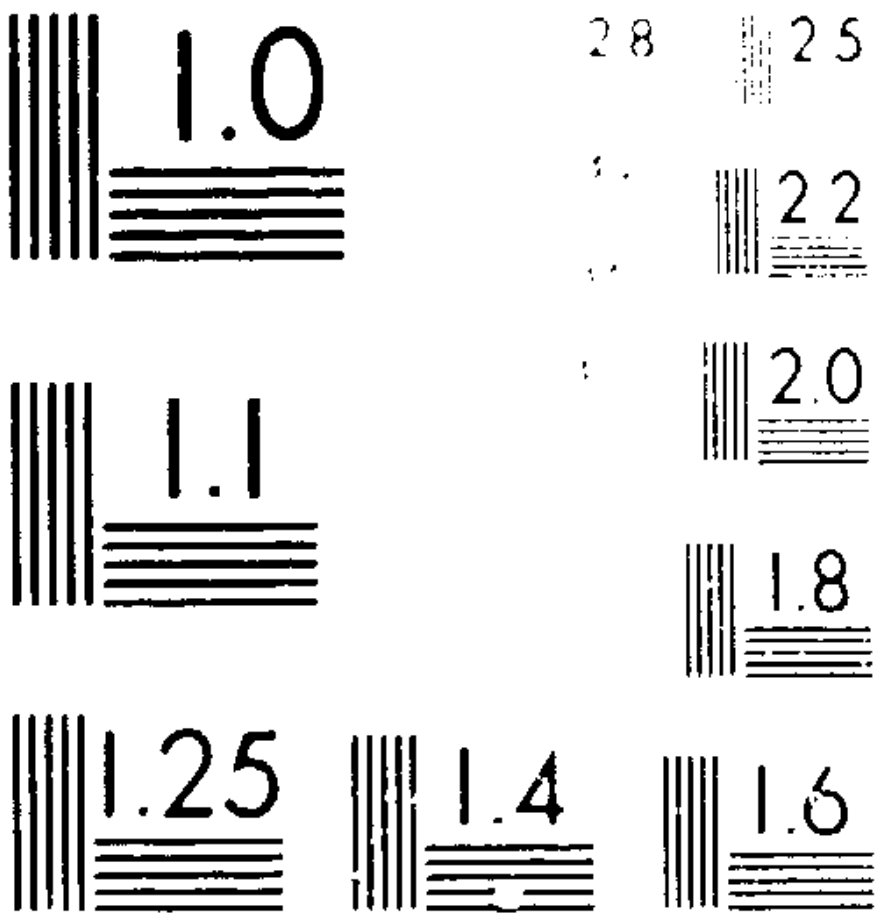
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Meeting on Exchange of Experiences and
Co-operation among Developing Countries in the
Development of Agricultural Machinery Industry

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COUNTRY PAPER - TURKEY*

by

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I. BACKGROUND INFORMATION

1. Introduction

Turkey, with 45 million people and 776.000 sq.km. of land, has got relatively large arable land which can sustain 80 million people. The breakdown of the arable land is as follows:

Sawn Area	Fallow Land	Vegetaibe Gardens	Vineyards	Fruit Gardens	Forestry
164	86	4.5	8.5	17.4	182.7

Breakdown of arable land (in 1000 sq.km). 139.400 sq.km. of the sawn area is used for grain production.

Table 1 gives figures which indicate the importance of agriculture in the country.

		1962	1967	1972	1977	1978
Population (Million)	Total	29.2	30.7	37.1	42.1	43.1
	Agriculture	19.5	21.0	22.4	24.0	23.4
	%	66.8	64.2	60.4	57.0	54.2
Employment (Million)	Total	12.0	12.7	13.5	14.8	14.8
	Agriculture	9.2	9.1	8.8	9.1	9.1
	%	77.1	71.3	65.0	61.5	61.5
G.N.P. (Factor Prices TL)	Total	68.7	94.1	134.1	185.0	192.5
	Agriculture	26.3	30.5	36.1	42.7	43.4
	%	38.3	32.4	26.9	23.1	22.4
Income Per Capita in TL	Total	2374	2874	3611	4396	4484
	Agriculture	1349	1452	1612	1779	1886
	%	56.8	50.5	44.6	40.5	42.2
Export (Million $)	Total	381.2	522.7	885.0	1753	2288
	Agriculture	295.1	420.7	607.4	1041	1543
	%	77.4	80.5	68.6	59.3	67.4

Table 1: The Place of Agriculture in Turkey

During the past thirty years, Turkey has enjoyed economic growth at relatively high level. Table 2 indicates some growth parameters between 1950-1979.

Periods	Agriculture	Industry	Services	Gross Domestic Product
1950-1962	5.2	8.3	7.4	6.3
First Plan (1963-67)	3.2	11.1	7.0	6.4
Second Plan (1968-72)	3.3	8.3	8.3	6.7
Third Plan (1973-77)	3.3	9.8	8.0	7.2
1978	2.9	3.8	2.6	3.0
1979	1.9	-2.6	2.1	1.0

Table 2: The Growth Peformance of the Turkish Economy (in percent)

Table 3 gives Composition of Gross Domestic Product with 1968 prices.

	1950	1962	1967	1972	1977	1979
Agriculture	47.8	38.4	32.8	27.3	23.2	21.8
Industry	12.9	15.6	19.5	20.9	23.7	24.5
Services	39.3	46.0	47.7	51.3	53.1	53.7

Table 3: Percent Composition of Gross Domestic Products (with 1968 prices).

As it can be seen from this table the share of industry was only one-fourth of the share of agriculture in GDP in 1950. By 1979 we see that agriculture has 21.8% share in GDP which indicates a drop of 60% within 29 years.

During 1963-1977, agricultural output grew on the average 3.3 percent annually. During 1970's Turkey achieved self-sufficiency in staple food items. Wheat has shown an increase where surplus had to be exported for the last few years.

Table 4 presents composition of agricultural output by value.

	1962	1967	1972	1977	1979
Crops	59.4	61.0	62.4	57.7	57.7
Livestock	37.7	36.7	34.1	37.9	38.7
Forestry	2.3	2.7	2.9	3.6	3.0
Fishery	0.6	0.6	0.6	0.7	0.6

Table 4: Composition of Agricultural Output (%).

Exports of agricultural products grew 11.4 per cent annually for 1972-1977 period. In this period cereals and pulses increased on the average 27.2 per cent. These results were realized by greater use of modern equipment, fertilizer and agricultural techniques. Table 5 gives the main agricultural inputs which may indicate the level of agricultural sector.

Input	Unit	1962	1967	1972	1977
Fertilizer	1000 Tons	295	1535	3285	6577
Irrigated Land	1000 ha	1300	1540	2041	2587
Combines	units	6072	7840	9029	20286
Tractors	units	43747	74982	135726	325225

Table 5· Main Agricultural Inputs.

With these inputs, the following yields have been achieved:

Crops	1962	1967	Av. of 1973-1975
Wheat	975	1125	1327
Barley	1250	1394	1386
Corn	1199	1556	1898
Rice	3395	3888	4046
Potatoes	10876	11733	12810
Sugarbeets	21719	35722	32051
Sun Flower Seeds	733	1070	1106
Cotton (Raw)	989	1469	1949
Tobacco	601	637	728

Table 5: Production per hectar for some crops in kgs.

It is observed that yield has shown on the average 60-70% increase in the most areas.

Turkey with this agricultural output is self-sufficient in most of the areas. Imports has not exceeded 45 million $/year (mainly seed oil and some other industrial outputs), while her exports are well increasing in this field. Table 6 presents foreign exchange earnings from the agricultural products. The drop in the foreign exchange earnings for the year 1979 compared to 1978 is due to fuel oil and diesel oil shortage exercised in 1979. This year, it is expected that 2.3 million $ worth of Agricultural Products export will be realized.

Export Items	1977	1978	1979	1978/1979 Difference (%)
Agricultural Products	1041.1	1.542.8	1.491.0	- 3.3
Grains and Pulses	128.5	267.3	167.0	- 37.5
Fruits and vegetables	449.4	569.1	662.0	16.3
Hazel Nuts	251.1	330.9	353.1	6.7
Dried Sultanas	75.0	99.7	114.9	15.2
Citrus Fruits	42.1	43.8	53.5	23.5
Others	95.0	232.0	140.5	- 39.4
Industrial Inputs and Forest Products	414.8	604.6	431.0	- 28.7
Tobacco	175.9	225.3	177.0	- 21.4
Cotton	213.6	353.0	232.0	- 34.3
Others	25.3	26.3	22.0	- 15.4
Live Animal, Animal Products	48.4	102.2	83.7	- 18.1
Cow, Sheep and Goat	19.0	47.3	40.1	- 15.2
Mohair and wool	13.3	27.9	20.4	- 26.9
Others	16.1	27.0	23.2	- 14.1
Total	1504.3	2.249.6	2.005.7	- 10.8

Table 6: Agricultural Exports (Million $)

Table 7 presents average size and holdings in agriculture in the Private Sector. It will be observed that small holding (which has a negative effect towards mechanization) are approximately half of the arable land.

Size of Land (in 1000 sqm)	1963		1973	
	% Holdings	% Total Arable Land	% Holdings	% Total Arable Land
1-20	40.7	11.3	44.6	8.4
21-50	28.1	17.7	28.3	17.9
51-100	18.1	22.2	16.7	22.6
101-200	9.4	22.2	7.0	19.5
201-500	3.2	15.9	2.6	16.2
500 +	0.5	10.7	0.8	15.4
	100.0	100.0	100	100

Table 7: Average Size and holdings in agriculture.

The number of population engaged in agriculture is approximately nine millions (including 15 + Years old people). This presents 60.4% of the total working population of Turkey. The total land owned and operated by state enterprise "Devlet Üretme Çiftlikleri" is 2000 sqkm, which is only 0,9 % of the total. The land is mostly used for research and development for new seeds and cross-breed animals.

2. Availability of Agricultural Machinery

It is observed that wooden plows, (horse drawn) walking plows have been gradually decreasing while tractor drawn Mold board, swivel type, disc type, disc-harrow type of plows have been increasing. It is also observed that during the last ten years, use of about thirty implements of relatively important from statistical point of view have been started. It will be observed that about 50% of the population is 35-50 HP range. At present eight types of tractors with relatively high local content are being manufactured. Massey Ferguson and Fiat is the most known and widely used tractors. John-Deer Combines are also assembled Toda due to shortage of foreign exchange existing tractor manufacturing companies are working with the 35% of their capacities. Thus demand can not be met by local manufacture. The supply shortage is being met by imports under the loan agreements.

In case full capacity utilisation is secured (this will be practically impossible because side or auxiliary industry is not in the position of supplying locally manufactured parts) 120.000 tractors can be manufactured which is the double of the demand level at present. Table 8 gives manufacture of eight different tractors in the past few years. On the average for each tractor, two thousand US$ worth of parts are imported. From 1982 onwards the local content will increase from 80% to 95%, thus further foreign exchange will be saved and then higher production volume will be attained.

5. Private investments towards manufacturing agricultural implements and intermediate machinery are to be encouraged (by low interest rate loans and customs tax holidays for capital goods).

6. Public sector is to encourage the formation of cooperatives which may land agricultural equipment to the rural areas.

The private sector with low interest rate loans, partial income tax holidays, customs tax rebates is to be guided towards above mentioned goals. The public sector mainly (TZDK) has to take steps towards realizing these measures. At present there is no compulsory standards for the agricultural equipment. And there are large numbers of different designs in this area.

Seven tractor manufacturing companies operating under Western licenses have come to approximately 80% local content. BMC diesel engines now are being manufactured with 85% local content. Fiat and Ford engines are being assembled (the local content is to 50% approximately).

4. Locally Manufactured Equipment

Except medium and large tractors and combine harvesters all the agricultural machinery are completely manufactured with local inputs. Roller bearings are the only imported items in this sub-sector. Medium and large tractors have more than 80 per cent (except Steyr tractors) local content. Combine harvesters have approximately 60% local content. Today John-Deer equipment is being manufactured.

3. National Strategies or Programmes for the Development of Agricultural Machinery Industry

Since 1962 Five Year Development Plans are implemented in Turkey. The development plans are compulsory for the state enterprises while it is a guiding outline for the private enterprises. Turkish State Enterprise Türkiye Zirai Donatim Kurumu (TZDK) is the one of the large manufacturer of agricultural implements, intermediate, machinery, powered machinery and some specialized equipment. TZDK has 7 factories in the country of which one of them is manufacturing solely medium range tractors (70 HP) under STEYR Licence. The Fourth Five Year Development Plan foresees 19.9% annual growth as well as quality and performance increase of the locally manufactured agricultural equipment. During 1978 approximately 500.000 US$ worth of equipment is exported. It is expected that this figure will rise to 450 Million $ by the end of 1983.

The Fourth Five Year Development Plan has six measures to enforce and encourage the agricultural mechanization. These are

1. Agricultural schools curriculums are to be changed to give more weight to the importance of agricultural mechanization.

2. Mobile rural training teams are to be formed to teach the adults the use of equipment.

3. There will be no imports of tractors and the quality of the other locally manufactured agricultural equipment is to be developed.

4. The investments of TUMOSAN integrated tractor-engine Project is to be accelerated.

Although the import component of such equipment is low, there were difficulties in providing certain parts and approximately 30% of the established capacity have been used during 1978 and 1979. With the completion of FIAT and FORD engine manufacturing vertical integration investments, foreign exchange requirement will be minimized. Two small tractors, Başak and Fidan are being manufactured with hundred percent local content.

5. Types of Equipment Locally Manufactured

About sixty different items (worth of statistical data) are locally manufactured. At present the helicopters and most of the sprayer and duster aircrafts are imported. The rest of the listed (except tractors and combine harvesters) items are being hundred percent locally manufactured. The designs are either local designs or foreign design adaptation.

6. Present Production

Present production is in the level of meeting the demand and even export to certain countries. The foreign exchange shortage causes low level of manufacturing of tractors which can not satisfy the full demand. If enough foreign exchange is made available, tractors supply will become more than the demand and export may be realized. Due to recession in this year demand is under the level of supply and hence export of FIAT and Leyland tractors to various countries has been realized.

7. Demand for agricultural equipment

The demand to agricultural equipment is mostly seasonal, thus large companies have not been formed. The annual increase in the demand has been foreseen at 19.9% level by the Fourth Plan. This is 85% more than the increase in the general machinery manufacturing sector. There is some opportunity for foreign co-operation in the manufacturing of olives, tobacco, cotton harvesting equipment. Since the harvesting of such items are highly labor intensive, it is the time for Turkey to seek foreign collaboration in this area. This could be achieved on the private sector to private sector basis quite easily.

	Index	Manufactured Units	%	Imports Units	%	Total Units	%
1973	100	32816	86.9	4922	13.1	37738	100
1974	78	25616	85.2	4426	14.8	30042	100
1975	99	32691	62.6	19468	37.4	52159	100
1976	114	37453	47.9	40724	52.1	78177	100
1977	94	30814	43.3	40279	56.7	71094	100
1978	55	18202	56.6	13942	43.4	32144	100
1979	45	14857	95.5	700	4.5	15557	100

Table 8: Manufacturing and Import of Tractors.

II. EXPERIENCE

Turkey being self sufficient in the manufacture of agricultural equipment has to develop their quality which will yield lower relative costs. The manufacturing of costliest equipment such as medium and large tractors have to be independent from the availability of foreign exchange. After the big oil price increases, negative balance of the foreign exchange hampered greatly the level of manufacture.

At present a tractor 70 HP say Steyr 548 cost 11875 US$ (950.000TL) which is 1890 Kg. This gives a specific cost of 503 TL/Kg which is high when compared with the purchasing power of the average peasant. Simple tractor Basak which is a Turkish design has a specific cost of 640 TL/Kg. This high cost arises from the low level of production and high level of investment and expensive technology. Low level of manufacturing also arises from the existing too many (8 plants) companies in this field.

A cultivator weighing 325 Kg costs 39 500 TL, this gives a specific cost of 1.5 $/Kg, a trailer has a specific cost of 1.9 $/Kg.

Excluding tractors and combine harvesters agricultural machinery are relatively cheap. Maximum specific cost are around 2 5 $/Kg. Table 9 gives some specific cost of such machinery.

It can be observed that low investment and workshop type manufacturing units are able to supply low cost machinery. Of course small workshops do not have design or quality control units which are very important for the longer life of so much equipment.

Make	Thresher	Cultivators	Trailer	Combine Seed Drill	Ploughs Pl	Rake and Cylinder
TZDK	1.9	1.3	2.1	3.0	1.5	1.4
YILDIRIM	2.2	1.5	1.9	3.4	1.6	1.6
KALYONCU	2.1	1.4	1.8	2.8	1.4	1.6

Table 9: Some Specific Costs of Agricultural Machinery (in $/Kg).

To go further down in the specific cost needs engineering and finance. Engineering will lead to less weight and finance will enable the companies to work all the year round.

III. RECOMMENDATIONS

Turkish private sector is willing to go into a co-operation in the manufacturing of agricultural equipment. Technical assistance in the field of olives, tobacco and cotton harvesting machines from any country is welcomed. At present both tractor manufacturing companies and some of the intermediate equipment manufacturers are in the position of supplying technical assistance to any developing country at relatively inexpensive way. A joint venture is also possible in this field.