COUNTRY REPORT ON AGRICULTURAL MECHANIZATION IN TURKEY

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ABSTRACT (COUNTRY REPORT OF TURKEY)

The population of Turkey is around 56 million and 50 % of which live in rural area. The topographical structure of Turkey is generally sloping, highlanded and mountanious. About 35 % of its surface area is suitable for various types of agriculture. At present, 27699003 ha of land is under cultivation. Agriculture is still an important sector of the Turkish economy, having the 50 % of the total active labor force and about 20 % of the GNP. There are about more than 3500000 farms, most of them are small farms having the acreage less than 50 ha. Marketing of agricultural products in domestic market and to abroad are still not well-developed and organized. Farmers require guidance in their equipment selection and operations to be economically succesful. Lending institutions also look for guidance in making equipment loans. Supplying the data to be used in choosing suitable tractor and agricultural machinery from the experimental studies made in the conditions of our country, in place of choosing from foreign literature is necessary in order to make a true agricultural planning. Thus, it will be much more useful to give a nationwide importance to "Determination of management values to agricultural equipment and machinery" carried on by the Agricultural Mechanization Branch of Rural Service Research Institutes and the farmers and planners should be provided with the obtained data in order to develop Turkey's agriculture.

COUNTRY REPORT OF TURKEY

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1. NATURAL CONDITIONS

1.1 AREA

Turkey is in the Northern hemisphere between 36°-42° north latitude and 26°-45° longitude and is located between Asia, Europa and Africa which are the old world continents. It acts as a natural bridge connecting these continents as well as the Black Sea and the Mediterranean Sea. It has a total surface area of 77797127 ha and is bounded by the Black Sea in the north, by the Aegean Sea in the west and by the Mediterranean Sea in the south. Its' coastal line, including the coastal line of Marmara Sea which is a semi-enclosed sea, is about 8272 km long.

There are seven geographical regions in Turkey; The Black Sea Region, The Marmara Region, The Aegean Region, The Central Anatolia Region, The Mediterranean Region, The East Anatolia Region and The Southeast Anatolia Region.

Because of its varying geographical conditions, Turkey shows the characteristics of the big continent within its ecolog-

ical structure. It includes different land groups present in the world because of the diversity in its geological structure, climate, plant cover and topography. About 35 percent of its surface area is suitable for various types of agriculture.

The topographical structure of Turkey is generally sloping, highlanded and mountainous. The slope of 62.5 percent of the land is greater than 15 percent.

1.2 CLIMATE

Turkey is generally located within the sub-tropical climatic line, winters being relatively mild and summers being long, warm and dry. The average annual temperature varies between 18-20 ^{o}C on the south coast, falls to 14-15 ^{o}C on the west coast, finally in the interior areas, fluctuates between 4-18 ^{o}C. The south coast of Turkey is usually warm during winter, the mean temperature varies between 8-12 ^{o}C. The winters are not very severe on the north and west coasts of Turkey, the mean January temperature varies between 5-7 ^{o}C. The East Anatolia and the interior parts of Turkey are subject to cold winters, because they are shielded from the moderating effect of the sea breezes by the coast line mountains. Average temperatures over this areas are between 0 and - 10 ^{o}C in winter.

Turkey is subject to both a continental type climate characterized by rainy weather throughout the year and to a subtropical climate distinguished by dry summers. Generally, in Turkey heavy rainfalls are observed on the slopes of mountains facing

the seas. But, moving towards the interior areas the rainfall gradually becomes less. Autumn marks the start of the rainy season which continues until late spring on the Marmara, Mediterranean and Aegean coasts. The Black Sea coast receives rain throughout the year. In the interior areas and Southeast Anatolia rainfall mostly occurs in spring. In the east of Turkey the winters are usually dry and rainfall occurs in spring and summer.

2. ECONOMIC AND SOCIAL CONDITIONS

The population of Turkey is around 56 million by 1990 census and 50 % of which live in rural area. The growth rate of the population is about 2.3 % per year.

Shares of sectors in Gross National Product in 1990 as follows; Services 52.6 %, Industry 29.3 %, Agriculture 18.1 % and average rate of economical growth annual is 6 %. This rate is one of the highest values in the world.

Turkey has a suitable communication and transportation network for export and import as well as tourism. The highway and maritime transportation network of Turkey provides good connections with the Middle-East, North Africa and Europa. Moreover, the telephone, telegram and telex systems are also highly developed.

There are 11 million students in primary and secondary school and 1 million students in university. Turkey has 28 universities (322 faculties and higher educational institutions).

Our economic policies is free trade with liberal market and privatization of productin. We have confidience that the agricultural sector will continue to feed the country, to create enough surplus a significant growth in agricultural export and provide raw material for agro-processing.

3. AGRICULTURAL USE OF LAND IN TURKEY

Besides land which had previously been cultivated, grassland and forests also began to be cleared for farming as a result of the population growth and the mechanization in agriculture. At present, 27699003 hectares of land (35.6 percent of total) is under cultivation in Turkey. Form of land use in Turkey is shown in the Table 1.

Table 1. Land Use in Turkey

	Area (Hectares)
Dry farming	22607334
Wet farming	2990880
Vineyards and Gardens	1058637
Special Crops	1042152
Agricultural Land	27699003

4. WATER RESOURCES

As shown in Table 2., Turkey has 665000 ha of inland waters, excluding rivers and small streams. There are 200 natural lakes with a total area of 500000 ha and 775 dam lake and ponds with a total surface area of 165000 ha, their proportion in the total surface area of the country being about 0.85 percent.

Turkish rivers and streams have a total length of 175715 km, 11000 km. The total yearly discharge of all inland water resources is estimated as 183.2 billion m^3.

Table 2. Water Resources of Turkey

Resource	Number	Surface area, length, volume
Natural lakes	200	500000 ha
Dam lakes	75	150000 ha
Ponds	700	15000 ha
Total		665000 ha
Rivers and streams	33	175715 km
Underground waters		$94*10^9$ m^3
Average rainfall		652.5 mm

The 16 largest lakes of the country have a total surface area of 9200 km^2 and a coastal length of 26748 km (including dam lakes).

Average annual rainfall in Turkey is estimated as 652.5 mm or 509.0 billion m^3 and 36 percent of this amount which corresponds to 183.24 m^3, is assumed to reach the surface waters. Although the annual potential water resource of the country is as large as 183.2 billion m^3, the total water withdrawal by major uses such as public water supply, irrigation, industry and electrical cooling is only 19400 million m^3. A percentage of 72.7 of the total withdrawal is supplied from surface waters and the rest from groundwater supplies.

5. POLICY OF AGRICULTURAL MECHANIZATION

After the World-War II, development economics became an important topic for developing countries such as Turkey to strengten their independence and improve welfare of their nations. At the beginning of sixties, a comprehensive planning period was started in Turkey. In the planning period, in spite of the considerable development in industry at the expense of agriculture, agriculture is still an important sector of the Turkish Economy, having the 50 % of the total active labor force and about 20 % of the GNP.

It is possible to observe a sound progress in Turkish Agriculture from a labor-intensive farming to a modern one. But, there are still rather serious problem releted to agriculture. At

the national level, inequalities in the income distribution between different sectors are valid againist agriculture. Marketing of agricultural products in domestic market and to abroad are still not well-developed and organized.

According to official statistics, there are about more than 3500000 farms in Turkey . Most of them are small farms having the acreage less than 50 ha. Turkey have a lot of socio-economic problems such as lack of capital and managerial skills, weakness in bargainning power, underemployment, less education level etc.

Solving these problems, of course, depend on analysing and evaluation of the present situation and to put out some tools and instrument to cope with them. Some valuable studies have been done in the past at different levels, but Turkish agriculture needs new specific and comprehensive studies dealing with this phenomenons.

However to make such a specific and comprehensive study requires data and informations. In Turkey, there are realy good statistical data about agriculture, collected and published by State Institute of Statistics with the collaboration of Ministry of Agriculture and Rural Affairs (Table 3.). But, most of them are at the national, regional and provincial level, and there is not a data base at the farm level. Then Turkish agriculture needs immediately a data base system at the farm level.

Table 3. Number of Agricultural Equipment and Machinery

Machine and Equipment	Number
Wooden plow	524 899
Walking plow	576 523
Moldboard type tractor plow	622 468
Half turn type tractor plow	22 833
Trench plow	30 324
Disc type tractor plow	69 077
Oneway	21 058
Stubble plow	12 827
Rotary cultivator	11 585
Cultivator	273 451
Land roller	38 099
Disc and other harrows	148 404
Spike tooth harrow	352 302
Harrow	16 124
Hay rake	76 640
Tractor drawn hoe	79 621
Cereal seeder (drill)	65 540
Combine seeder	90 580
Potato planter	1 417
Manure spreader	952
Fertilizer distributor	164 668
Reaper	34 325
Binder	3 705
Baler	7 010
Thresher	135 086
Combine harvester	11 551
Potato harvester	4 757
Beet harvester	3 561
Knapsack sprayer	399 260
PTO driven sprayer	107 961
Engine driven sprayer	56 408
Duster	42 257
Centrifugal pump	77 774
Trailer	627 572
Tractor	672 845

6. AGRICULTURAL RESEARCH IN TURKEY

Soil and water management research is primarily conducted in 11 research institutes and their substations under the General Directorate of Rural Services (GDRS) of the Ministry of Agriculture and Rural Affairs (MARA). The Soil and Fertilizer Research Institute and the Ankara Rural Service Research Institute are located on the outskirts of Ankara. The other nine regional rural service research institutes are located at Menemen, Tarsus, Eskisehir, Konya, Tokat, Samsun, Sanliurfa, Erzurum and Kirklareli Ataturk. Their main purpose is to backstop the rural infrastructure development side of GDRS which involve activities of rural road construction, water supplies, land reclamation, land consolidation, small irrigation dams and schemes, irrigation and drainage, on farm development including canals and land levelling and agricultural planning. The 10 Regional Rural Services Research Institutes accordingly work in seven broad areas of soil and water research. These include; 1. hydrology and meteorology, 2. soil and water conservation, 3. irrigation and water consumption, 4. drainage and land reclamation, 5. soil fertility, 6. mechanization and 7. economics of production costs.

GDRS has a monopoly on mechanization research in MARA. The regional program has close connections to the work side of the directorate and to extension. There is considerable demand for the operation norms and lists of the most efficient sets of equipment identified by this relatively small research unit, particularly in the eastern part of the country where use mecha

nized equipment is increasing.

Farmers require guidance in their equipment selection and operations to be economically successful. Lending institutions also look for guidance in making equipment loans. The climate of southeastern and eastern Turkey create special demands on equipment and research must account for these factors both economically and in its design activities. Accordingly research projects would include as follows;

1. time study and fuel consumption of machines used for agriculture and,

2. determination of optimal machinery park for farm development activities.

7. PROBLEMS AND ITS COUNTER-MEASURES

1. It is certain that the service stations which are planned to be established in intense agricultural regions will lesson the repairment and service expences and will solve the problems concerning spare parts by performing the necessary technical and advisory services for enabling them to make the most effective use of their tractors and other agricultural machinery.

2. In our country, today, if we take into account the fact that our farmers can not profit enough from service and training services after they buy tractor and agricultural machines. It is necessary that there must be a collaborative relationship between farmers and official institutes.

3. Supplying the data to be used in choosing suitable tractor and agricultural machinery from the experimental studies made in the conditions of our country, in place of choosing from foreign literature is necessary in order to make a true agricultural planning. Thus, it will be much more useful to give a nationwide importance to "Determination of management values to agricultural equipment and machinery" carried on by the Agricultural Mechanization Branch of Rural Service Research Institutes and the farmers and planners should be provided with the obtained data in order to develop Turkey's agriculture.

4. Tractors and agricultural machines which are out of use for different use can be utilized for Turkey's agriculture with a rehabilitation programme.

8. REFERENCES

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ORGANIZATION CHART OF RURAL SERVICE RESEARCH INSTITUTES