

**Agricultural Output and Productivity Growth  
in Turkey since 1880**

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## **Introduction**

Turkey is a large country with a large agricultural sector. In the year 2000, 35 percent of its labor force continued to be employed in and 13 percent of its GDP was generated in the agricultural sector.

A long-term, quantitative study of the role of agriculture in Turkey's economic development has not been undertaken to date. While estimates are available for the post-1960 period, long-term studies of output and productivity growth in Turkish agriculture are also not available. Equally importantly, long-term trends in Turkish agriculture have not been studied in a comparative perspective.

In a seminal contribution, Johnson and Mellor (1961) had identified five areas where agriculture may contribute to economic development: a) food for the growing population b) foreign exchange earnings through exports c) labor for the expanding non-agricultural sectors, especially manufacturing industry d) savings and capital for industry and e) market for the output of the industrial sector.

This paper will examine the contribution of agriculture to economic development in Turkey by focusing on each of these five areas. For this purpose, we will study long-term structural change (agriculture-non-agriculture linkages and the shift of resources from agriculture) as well as the increases in land and labor productivity in agriculture. In the last section, we will interpret the trends in land and labor productivity since 1880 in a European comparative perspective.

### **I- Basic Trends**

The first agricultural census for the area that comprises present-day Turkey was undertaken in 1907-8. Annual agricultural statistics began to be published regularly in the 1920s. It is thus possible to construct long-term series for total agricultural output, agricultural labor force, total land under cultivation from 1925. We then extended these aggregate series

back to 1880 (but not to 1870 because of wars and large population movements during that decade) on the basis of crop yields, agricultural tithe assessment and collection series.

### Long Term Trends in **Table 1 and Graph 1**

Growth in population, agricultural output, agricultural labor force, agricultural land since 1880 and in two sub-periods, 1880-1950 and 1950-2000

The population of the areas comprising present day Turkey increased from about 13 million in 1880 to 68 million in 2000, an increase of more than 4 times. Total agricultural output in constant prices increased by about 9 times and GDP per capita increased about 6 times during the same period.

It is thus clear that agricultural output has increased faster than population growth during the last 120 years. This long-term trend has ensured that agricultural could meet the increasing per capita demand for food even as per capita incomes increased more than 6 fold during the same period. Increases in agricultural output also contributed to the expansion of agricultural exports from 1880 until the 1980s.

Agricultural output and total population increased at a slow pace from 1880 to 1950, agricultural output at a little above 1 percent and population at less than 1 percent per year. Agricultural output and population began to grow at higher rates after the end of World War II. Increases in agricultural output continued to exceed population growth in recent decades, but not by a large margin. (Table 1 and Graph 1)

Agriculture in Turkey was characterized by relative availability of land and scarcity of labor and capital during the nineteenth century and the first half of the twentieth century. Availability of additional agricultural land and the expansion of area under cultivation was the most important cause of increases in agricultural output until the 1960s. For example, land under cultivation more than doubled during the decade after World War II. The shift from extensive to intensive agriculture began in the 1960s.

In part because of the relative availability of land and in part due to government policies dating back to the nineteenth century, small to medium sized enterprises have dominated agriculture since the nineteenth century.

Long term trends in agricultural output and inputs summarized in Table 1 and Graph 1 suggest substantial increases in labor and land productivity since 1880. We will examine land and labor productivity and also offer some estimates for total factor productivity growth since 1880 later in the paper.

## **II- Structural Change since 1880**

Massive structural changes accompanied these large increases in population and output. While land under cultivation increased more than 200 percent, numbers of people employed in the agricultural sector increased by about 70 percent since 1880. Most of the increases in land under cultivation occurred before the 1970s. Similarly, agricultural labor force continued to increase until the 1980s and began to decline in absolute terms in the 1990s. Share of agriculture in total employment has declined from about 80 percent in both 1880 and 1950 to 35 percent in 2000. In other words, virtually all of the shift of labor from agriculture occurred in the half century since 1950. Share of of agriculture in GDP has declined from about 65 percent in 1880 to 53 percent in 1950 to 13 percent in 2000. **(Table 2)**

Best to examine the 120 years since 1880 in two or three sub-periods.

Turkish economy in the twentieth century has been characterized by large and persistent differences in average incomes/productivity between the agricultural and non-agricultural sectors. While we do not have sectoral output data for the nineteenth century, we can estimate that these intersectoral differences began to increase from 1880 with the beginning of industrialization and then began to decline towards the middle of the twentieth century: Rising and then declining Kuznets K since 1880; Inverted U but still high Kuznets' K **(Graph 2)**

### **Structural Change and Economic Growth since 1950:**

Since 1950 GDP per capita grew much faster than per capita productivity in both agriculture and the non-agricultural sector. In fact, our calculations based on **Graph 3** suggest that a large part (as much as 40 percent or more) of the growth in per capita income since 1950 can be attributed to the shift of labor from the low productivity agricultural sector to the higher productivity urban sector. (also Temin, 2002)

Share of agriculture in the labor force has declined from 80 percent to 35 percent during these 50 years. The shift of labor from agriculture to the urban sector will be slower but it clearly has some ways to go in the decades ahead.

### **III- Analysis of Productivity Increases in Agriculture**

Definition of Land and Labor Productivity: Output per worker and output per hectare, including crops and animal products, but net of seed and feed

Problems in measuring labor productivity in agriculture

Analysis of labor productivity, in three sub-periods: 1880-1950, 1950-1980, 1980-2000 ... large shock during World War I ... **Graph 4 and Table 3**

Decomposition of labor productivity increases:

- increases in land per worker
- increases in land productivity

The growth of agricultural output until 1950 at an annual rate slightly above 1 percent per annum was mostly due to the expansion of inputs, land and labor. These long term rates also reflect the fact that World War I (1914-1922) led to a very large decline in the population of Turkey, by more than 20 percent. Agricultural output declined by as much as 50 percent during the same period but recovered along with population during the interwar years. (Graph 1) There were modest increases in land and labor productivity (both at less than 0,5 percent

per year) during this period. It is worth noting that the increases in land productivity until the 1960s were achieved at a time when large amounts of new lands were being brought under cultivation.

In the period since 1950, annual rate of growth of agricultural output has been close to 3 percent. This higher rate of growth has been supported by rapid increases in land under cultivation until the 1960s and the shift to more intensive agriculture after the frontier is reached. Yields and land productivity began to increase more rapidly as the use of new inputs, irrigation, agricultural machinery and equipment, fertilizers and high yielding varieties of seeds increased in the 1960s. The large and expensive irrigation project on the Euphrates Valley in Southeastern Anatolia fits well into this context. Shift in the output mix towards crops with higher value per unit of land has also raised land productivity during the last half century.

Output and land productivity growth has slowed down to 2 percent per annum since 1980 but labor productivity growth has accelerated due to the acceleration of labor movement away from agriculture. (Table 3)

Contribution / impact of markets, government policy and relative (intersectoral) prices

Markets-prices important until 1914 .. intersectoral terms of trade sharply lower until 1950 ... prices and government policy more favorable after World war II until 1980 and less favorable since.

#### **- Estimates for Total Factor Productivity Growth since 1880 (Table 4)**

Problems with data and estimation .. However, middle-of-the-road estimates in line with the picture provided earlier

Total factor productivity growth in agriculture was small until 1950 (about 0,3 percent per year) but appears to be significant since 1950 (1,7 percent per year).

#### **IV- Productivity Growth since 1880 in Comparative Perspective (Table 5)**

Levels of land productivity in Turkey have been growing since 1880 due to rising yields and changing output mix. The gap in land productivity between Turkey and Western European countries has stayed roughly unchanged during this period at about 1 : 3 (increasing slightly before 1950 and declining slightly since) Levels of land productivity in Turkey has been comparable to those in countries of eastern and southeastern Europe during most of this period. Land productivity in Turkey has been growing at a higher pace during recent decades in comparison to this latter group of countries.

The gap in labor productivity between Turkey and countries of western and southern Europe has been larger than the gap in land productivity. This gap has widened substantially during the last half century as Turkish agriculture was slow in releasing labor to the urban sector. In recent decades labor productivity in Turkish agriculture appears to be lagging behind countries of eastern and southeastern Europe as well, with the possible exception of Poland. How soon and how quickly the gap will begin to close will depend, above all, on the rate at which labor will leave agriculture in Turkey.

#### **V- Conclusion:**

To summarize, agricultural output in Turkey grew at an annual rate slightly above 1 percent from 1880 until 1950, mostly due to the expansion of land and labor. Land and labor productivity increased at a modest rate (both at less than 0,5 percent per year) during this period.

In the period since 1950, annual rate of growth of agricultural output has been close to 3 percent. This higher rate of growth has been supported by rapid increases in land under cultivation until the 1960s when the frontier was reached and the shift to more intensive agriculture thereafter. Output and land productivity growth has slowed down to 2 percent per annum since 1980 but labor productivity growth has accelerated due to the more rapid movement of labor away from agriculture.

Turkish economy in the twentieth century has been characterized by large and persistent differences in average incomes/productivity between the agricultural and non-agricultural sectors. The pace with which these differences will diminish will depend on the rate at which labor will leave agriculture in the decades ahead.

We now return to the five contributions of agriculture to economic development outlined at the beginning of the paper:

- Agriculture in Turkey has provided sufficient amounts **food** for a growing population with rising incomes since 1880.
- Agriculture accounted for more than half of exports and **foreign exchange earnings** until 1980. Exports of manufacturing industry have dominated exports and share of agriculture has declined rapidly since.
- After stopping in 1914, shift of **labor** from agriculture to industry and services accelerated after World War II. Because of the large differences in sectoral productivity between agriculture and non-agriculture, this labor shift has been responsible for more than one-third of the increase in per capita GDP since 1950.
- The most significant contribution of agriculture to savings and **capital** formation in industry occurred during the interwar period, thanks in large part to the sharp shift of the terms of trade in favor of the urban sector. The contribution of agriculture to capital formation in the urban sector has been minimal since 1950 because of the various crop purchase programs and subsidies offered to agriculture. These government support programs have been motivated by the political weight of a still large rural population.
- The growth of productivity and incomes in agriculture has also ensured that agriculture provide some **demand** for the products of the industrial sector including, in the more recent period, inputs to agriculture. Government manipulation of the intersectoral terms of trade in favor of agricultural producers has accelerated the incorporation of the agricultural population into the national market. At the same time, however, the large and persistent differences in sectoral productivity and income has limited the demand from agriculture. The decline in the agricultural share of the total population and labor force means that the relative importance of this demand has been and will continue to decline in the decades ahead.

Agriculture in Turkey has been slow to release labor to the rest of the economy and continues to retain about 35 percent of the labor force today. Most of this labor is employed as unpaid workers in more than 3 million small and medium sized family farms. In view of the large intersectoral productivity and income differences between agriculture and the rest of the economy, it is clear that most of the poorest people in the country earn their living in the agricultural sector today.

All this is not due to the performance of the agricultural sector alone, however. If the urban sector had been able to grow at a more rapid pace, more labor would have left the countryside during the last half century. Equally importantly, the national educational system has been able to offer limited amounts of schooling to large segments of the rural population in the past. As a result, a large part of the current agricultural labor force consists of undereducated men and women for whom the urban sector offers limited opportunities.

For the gap in land and labor productivity between Turkey and most of the European Union countries to close and GDP per capita levels in Turkey to converge towards European Union averages in the decades ahead, it is essential that a large part the labor force currently employed in agriculture move to more productive employment in the secondary and tertiary sectors. For this outcome, however, agricultural sector needs to undergo significant institutional changes and attract greater amounts of capital.

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