Master programme in Economic Growth, Innovation and Spatial Dynamics

The Role of Education in Agricultural Productivity:

The Case of Village Institutes in Turkey, 1940-1966

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Abstract: This study examines the relationship between education and agricultural productivity through the Turkish phenomenon of Village Institutes (VIs). Having emerged as the fourth step of the agrarian reform in 1937, the VIs provided a 5 year secondary education and 3 optional years of higher education to successful graduates of 5 year elementary village schools. Based on the principles of "learning by doing", the VIs' intensive work education curriculum was aimed at training village teachers who would then diffuse their knowledge to the rural in order to achieve a nation-wide growth in agricultural productivity. The results of the study show that a statistically significant positive relationship exists between the number of VI-graduate teachers and per area wheat output at province level. Furthermore, a positive and significant relationship is traced between the number of VI-graduate teachers and literacy rates. Nevertheless, a number of weaknesses pertaining to the analysis methods leave a variety of options to improve the results of this study.

Key words: Education, agricultural productivity, human capital, Village Institutes, Turkey

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1. INTRODUCTION

The role of human capital in productivity growth has been a topic of interest especially since the middle of the twentieth century. Direct and indirect impacts of education have been quantitatively analyzed through a number of studies ranging from area-specific to cross-country contexts. This thesis is expected to contribute to the collective effort of understanding the role of education by investigating a specific case from a phenomenon that is widely discussed politically, sociologically and economically in the Republic of Turkey: The extent to which rural revitalization and agricultural productivity growth have been facilitated by the Village Institutes (VIs), which were 5-year middle schools located in rural areas and which aimed to *"train teachers as well as other professionals who were strongly needed in rural life, including agricultural experts and midwives"* (Uygun, 2007 cited in Uygun 2008, p. 302).

Measuring the full extent of this role requires considering a number of factors through which economic growth can be amplified, demanding much more time and resources than what is available for the task at hand. Narrowing down the focus is essential to any research; therefore it will be this thesis' objective to focus on the contribution of the Village Institutes of Turkey to the nation's wheat productivity.

1.1. Purpose of the Study

As stated above, the purpose of this study is to investigate the interaction between agricultural productivity and the Village Institutes, regarding which further information will be provided in Chapter 5. This relationship will be investigated by explaining how output of wheat per area varies by the number of village school teachers who have graduated from a Village Institute, while controlling for remaining natural, technological and intellectual factors. The analysis will

be carried at province (city) level in order to account for the variations across different parts of the country.

The most important motive behind the choice of this topic lies in the never-ending discussions on the termination of the VIs. While the graduates and the left wing assert the benefits of the institutes, there is still powerful opposition against this system on the grounds that they have *"failed in every respect to fulfil their intended purposes"* (Yener, 1999). One of the common counterarguments to the benefits of the institutes has been that they forced the rural population to remain as peasants and labourers (Yener, 1999; Turan, 1979, p. 168). On the other hand, those who support this initiative[1] argue that *"feudal landlords"* and *"pro-imperialist intellectuals"* were behind the termination of the VIs as they considered an enlightened rural population a threat to their own wellbeing (Çezik, 2010; Tekeli, 1983, p. 666). With these arguments in mind, the study aims to see whether the institutes were indeed useless in terms of agricultural development (Yener, 1999).

The academic motive behind the topic, however, is to test whether it was possible to trace any interaction between the institutes and changes in agricultural productivity. As stated clearly by Karaömerlioğlu (1998a), one of the intended aims of the institutes was to increase productivity in agriculture (p. 47). However, Yener (1999) suggests that the institutes failed to achieve any of their aims, and Günaydın (2006) claims that they failed to achieve their agricultural aims in

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[1] Kemalist Thought Society [Atatürkçü Düşünce Derneği] and the New Generation of the People of Village Institutes Community [Yeni Kuşak Köy Enstitülüler Derneği] have strong arguments about the impact of imperialist authorities on the termination of the Village Institutes. One declaration made by the representatives of these communities at the press conference that was held on the 70th anniversary of the official promulgation of the institutes is particularly interesting. According to them, the American researchers John Dewey and Fay Kirby have been invited to Turkey as spies by pro-imperialism intellectuals in order to investigate the VI system. As their investigations revealed certain attributes of the system that could eventually increase resistance to foreign political influence and lay the foundation for a socialist system, the VI system was not appreciated by some politicians and intellectuals who stood to profit from promoting outside political interference. (Çezik, 2010)

particular (p. 13). Therefore this study aims to discuss the extent to which Yener and Günaydın's argument hold true in terms of the VIs' influence in agriculture, and reveals results significant enough to conclude that they achieved at least one of their aims: The quantitative analysis that is presented in this study concludes that the number of village teachers who hold a VI diploma interacts positively with the yield of wheat at the provincial level.

In a broader sense, the primary aim of this study is to offer one more set of empirical evidence to the anticipated positive relationship between investment in human capital and agricultural productivity. While setting the ground for the quantitative discussion of this interaction, a detailed narrative will in addition be presented on the description, emergence, development and termination of the Village Institutes allowing for a discussion on the efforts of the VIs to contribute to the modernization process.

1.2. Thesis Outline

The study report has been divided into 9 chapters including this introduction. Chapter 2 has been reserved for a literature review concerning the discussions on the dynamics in economic growth, agricultural productivity and agrarian transition in relation to human capital. Chapter 3 will present statistical snapshots from Turkey in terms of population, literacy and wheat productivity. In Chapter 4 the picture of the newborn Republic of Turkey will be drawn in terms of the reforms in the field of education and agriculture, prior to the emergence of the Village Institutes. Chapter 5 is dedicated to the history of the Village Institutes in terms of their description and evolution. Chapter 6 has been spared for a short discussion of the influence of the VIs in terms of community development and agricultural productivity. In Chapter 7, the data and method used for the investigation will be identified and described. Chapter 8 will follow to present and discuss the results of the statistical analysis along with the weaknesses of the analysis and, finally,

Chapter 9 will sum up the study through an evaluation of the results, theory implications, weaknesses and proposals for future research.

2. HUMAN CAPITAL AT THE ECONOMIC HORIZON

In this chapter, important works on the impact of education on economic growth and agricultural productivity will be summarized. It will, however, be assumed that the audience has prior knowledge on the basic theories of economic growth.

2.1. Education and Economic Growth

Education as an investment in human capital has been regarded as a growth factor as it was expected to increase labour productivity, and reduce income inequality and poverty (Amin & Awung, 2005, p.2). Arrow (1973) also reports that the productivity-adding human capital theory suggests: *"education adds to an individual's productivity and therefore increases the market value of his labour"* (p.193). Therefore much research has tested the impact of education on wages in an effort to discuss its contribution to economic growth. Nonetheless, the connection that is drawn between education, performance and wages is open for debate, as it is still a hot discussion topic how much the performance of the workers is reflected on their wages.

Building upon the basis that has earlier been provided by Friedman and Kuznets (1945), the important role of human capital in economic growth has been discussed in detail by the human capital model (Becker, 1963), the endogenous growth models (Lucas, 1988) and the application of the augmented Solow model (Mankiw, Romer, & Weil, 1992 – as reviewed in Griliches, 1997, p. S331). Making use of the 1940 and 1950 censuses to obtain detailed earnings-by-schooling data, Mincer's (1958) work is considered immensely valuable among the early works on human capital as well as the studies by Houthakker (1959) and Miller (1960) (as reviewed in Griliches, 1997, p. S331). Fabricant (1954), Abramovitz (1956), Kendrick (1956), and Solow (1957) point at the quality of labour force and capital measures as a potential factor in increasing

economic growth, since their previous observations on the economic growth were not fully explained by traditional labour and capital measures (Griliches, 1997, p. S331). These were then followed by Schultz (1960), who connected these discussions to the concept of the "residual" (Griliches, 1997, p. S331) .

Almost all models of economic growth have included some technological and knowledge based elements in their functions. Schumpeterian growth is characterized by radical innovations which lead to creative destruction at the turn of a growth cycle (Schumpeter, 1942), while the Solow model adds the change in TFP, total factor productivity, as a measure of technological advancement to the growth function (Solow, 1957). The modern economic growth argument however blends the performance of the technological advancement with the ability of individuals to absorb and expand it. Thus, the importance of education is stressed and referred to as an investment in the human capital. Unlike physical capital, the human capital is proposed to create increasing returns to scale, thus always having a beneficial side (Hansen & Knowles, 1998; Romer P. M., 1987).

Statistical analysis aside, common sense predicts that a strong and positive correlation must exist between education and growth. Nevertheless, the pool of literature on this hypothesis is rather frustrating as there are a number of studies which only produce evidence for a negative or insignificant relationship [One example being Islam (1995) as reviewed by Judson, 2002]. Mankiw et al (1992), Temple (1999), Kruger & Lindahl (2000), on the other hand, carry out a careful analysis of error terms and exclusion of outliers, and find evidence on a strong, positive and statistically significant relationship between education and growth (as reviewed in Judson, 2002, p. 211 and Ljungberg & Nilsson, 2009, p.73).

Huffman (1977) draws attention to the relationship between human capital and allocative efficiency. He suggests that surviving in a changing economic environment requires efficient reallocation of resources to adapt to the change. This is done by first realizing the change, then utilizing useful information, drawing suitable conclusions from the information and making prompt and key action plans. Allocative efficiency is considered a skill that is acquired at a cost and that yields benefits. Schooling is one way to acquire this skill, followed by research and experience from reallocating resources (Huffman, 1977, p. 60). Thus Huffman's (1977) study is based on the following assumption: *"If marginal returns to the allocative skill were to rise (fall), as they would if the rate of economic growth were to increase (decrease), then individuals would be induced to increase (decrease) their stock of allocative skill"* (p.61). His findings provide valuable evidence that investing in education increases the allocative performance of the U.S. Corn Belt farmers, whereas lack of evidence is reported on an increase in the production directly due to farmer education (Huffman, 1977, p. 77).

Ljungberg & Nilsson (2009) add valuable contributions to the human capital research by investigating the direction of causality between education and economic growth. They point out to the lack of agreement between Romer (1990), who suggests that economic growth reacts on the stock of human capital", and Lucas (1988), who suggests that it reacts on the increase of human capital (Ljungberg & Nilsson, 2009, p. 72). They report evidence from Benhabib and Spiegel (1994, 2002) who support Romer's (1990) stock view, while challenging this view with the findings of Vandenbussche, Aghion, & Meghir (2006), who show that tertiary education is important for growth in countries above a certain technological level which themselves are innovation producers whereas lower levels of education are important for countries which can only follow and imitate technological leaders (Ljungberg & Nilsson, 2009, p. 72). Through a set

of Granger causality tests, Ljungberg & Nilsson (2009) find that an increase in human capital caused economic growth, and not the other way around[2], up to the 1970s in Sweden, after which no evidence for a robust pattern could be observed (p.72, 92). They note that their study does not regard on-the-job-training, life-long learning forms or earlier forms of human capital like literacy (Ljungberg & Nilsson, 2009, p. 91), and they conclude:

> We do not suggest that more education could have prevented the structural crisis in the 1970s but probably it would have facilitated the transformation of the third industrial revolution and moderated the slow-down of growth in the 1980s (Ljungberg & Nilsson, 2009, p. 92).

In human capital research, identifying a proxy to depict human capital plays an important role. The most common three proxies that we see in important works are literacy rates, enrolment rates, and estimates of the average number of years of education attained by workers. However, it is important to assure collinearity between the chosen proxy and the country's whole human capital stock (Judson, 2002, p. 211). It is therefore not useful to have for example literacy rate as a human capital proxy for a dataset belonging to a developed country, because such countries usually have literacy rates close to hundred percent while the expansion continues on the higher education attainment. In short, Judson (2002) strongly argues that several errors exist in most of the studies which find a negative or insignificant correlation between education and growth (p.229). She suggests that better proxies should be identified for measuring human capital and draws the following conclusions in her study: (1) When human capital is measured as a combination of *"the available data on education spending, enrolments and education attainment of the labour force"*, there is a significant and positive correlation between human capital

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[2] Some examples of research which investigate the causality with a direction from economic growth to human capital are Barro (1991), Barro & Sala-i-Martin (1995), Barro (1997), and Diebolt & Monteils (2000), as reported by Ljungberg & Nilsson (2009, p.73).

accumulation and output growth; (2) At higher levels of output, the ratio of human capital to output is larger; (3) *"These observations match both the predictions of the endogenous growth model of Romer (1990) and the neoclassical model of Barro et al. (1995), but not the predictions of the models of Azariadis and Drazen (1990), Barro and Sala-i-Martin (1995) and others"* (Judson, 2002, p. 229).

This study focuses particularly on the relationship between the Village Institutes and agricultural productivity growth. Therefore the number of village teachers who own a VI diploma will be used as a proxy for VI-related education, and kilograms of wheat output per hectare of area sown for wheat will be the proxy for agricultural productivity. The former choice is built upon the idea that the VI-style education was spread only by those teachers who graduated from a VI and they were expected to change the approach to agriculture in villages while promoting the cultural enlightenment. The choice of per area wheat yield is justified with wheat being the main and most cultivated crop in Turkey, which produced only a small variety of crops at the time. Moreover, literacy rate will be used as a control variable which is expected to be among the factors that influence agricultural productivity.

2.2. Education and Agricultural Productivity

The economic benefits of education have been discussed by economists through the correlation between human capital investment and wages since Schultz (1961). However, this type of assessment is not robust in terms of the evaluation of education's role in productivity growth. First, it would be a rather dogmatic assumption to expect labour productivity to be fully reflected in wages. Second, the investigation becomes harder for sectors which are run in majority by the self employed. Investigations of the agricultural sector probably suffer from both of these inconveniences as the small farmers usually employ family members in their fields and thus do

not always pay them back in terms of wages, and corporate farmers may not define wages according to labour productivity as it can be the case in any sector. Therefore the economic benefits of education in the agricultural sector have been investigated through direct productivity measures in many studies, especially after 1980 (See Lockheed, Jamison, & Lau, 1980; Moock, 1981; Jamison & Moock, 1984; Appleton & Balihuta, 1996).

Nearly all studies on this issue regard education as a factor determining the likeliness to adopt innovation and they expect innovation to increase productivity, thus drawing a connection between education and productivity (Jamison & Moock, 1984, p. 68). This is how this study on the Village Institutes in Turkey will differ from the mentioned works. In this study, although the implicit assumption will be that one of the benefits of the institutes were to spread innovations, this individual effect will not be measured. Instead, the overall effect of the VI system on wheat productivity will be assessed.

The discussion of education's impact on agriculture has also sparked the discussion on whether the impact would be different in traditional compared to modernizing environments. Building upon the argument proposed by Schultz (1975) that education has larger impacts in changing technological and economic environments, Alene & Manyong (2007) present empirical results from northern Nigeria that education's productivity enhancing impact is positive only under improved technology (p. 157). Another important point to mention is the importance of sample selection, because education's effect on productivity is different on technology adopters than non-adopters (Alene & Manyong, 2007, p. 157).

Lockheed, Jamison & Lau (1980) find strong correlation between elementary school education and farm efficiency. However, the relationship is found to be more likely to be positive in

modernizing agricultural environments than in traditional ones (p.61) This finding is in parallel with the argument of Schultz (1964), who considers human capital to be the basis for productivity growth in modern, rather than traditional, agriculture (cited in Mineo, 2010, p. 17). Moock (1981) finds, however, a negative return to elementary schooling in a modernizing agricultural environment in Kenya (p. 739). Pointing out to this conflict between the two studies, Lipton (1985, p. 167) criticizes the study of Moock (1981) on the grounds that it provided results only at 10 percent significance level, which is apparently not enough for him; that too little has been written about the possible multicollinearity problem among the 14-18 explanatory variables; and that the relationships were assumed to be linear though there was not enough motivation given. Second, Lipton (1985) argues that the relationship is not necessarily causal and too much has been assumed in Moock's study regarding causality (p. 168). Third, he suggests that the way Moock constructed his variables would only yield results to show that *"dropping out from school leads to bad farming"*, and *"not that elementary schooling leads to bad farming"* (Lipton, 1985, p. 168), thus pointing out to a conceptual weakness in the construction of the hypotheses.

Jamison and Moock (1984) test the effect of schooling on agricultural productivity in Nepal, by using two parameters as a proxy for productivity (p. 83). They suggest that the choice of the type of fertilizer and adopting new types of wheat crop for cultivation are two innovative decisions that are expected to increase productivity, thus they measure the impact of education as well as other factors in the farmers' decision to adopt these innovations. Their results show that *"having attended school is related to the adoption of chemical fertilizer. [...]It seems, however, that there is no parallel effect of school attainment on the decision to grow wheat."* (Jamison & Moock, 1984, p. 83). The study also discusses the role of the government-run extension programme on

the adoption of fertilizer and decision to grow wheat. They observe that the programme serves as a *"catalyst for the diffusion process"* for fertilizer adoption (Jamison & Moock, 1984, p. 84). One very important finding is that *"a farmer is more likely to grow wheat or use chemical fertilizer the greater the proportion of other farmers who do so in this farmer's immediate area"* (Jamison & Moock, 1984, p. 84). This finding should be kept in mind while reading the results of this study on the dynamics between the number of Village Institute graduate teachers and wheat productivity. One of the ways in which the Village Institutes made villagers adopt new techniques and new products for growing in their farms and fields was that they adopted these innovations themselves first and proved that they worked well. In many cases, the villagers were reluctant to change but this resistance was overcome when they witnessed successful results achieved by either the institutes themselves, or the field cultivated by the village teacher who was graduated from a Village Institute (UCTEA Chamber of Agricultural Engineers Izmir Branch [TMMOB Ziraat Mühendisleri Odası İzmir Şubesi], 1995, pp. 21-22).

In his master's thesis submitted to Lund University Department of Economic History, Mineo (2010) investigates the relationship of education with production, earnings and off-farm mobility in the U.S. counties of the Heartland agricultural region with the time dimension covering specifically the years 1970, -80, -90, and 2000. The analysis of panel data in Mineo (2010) reveals results as follows: (1) university attainment correlates negatively whereas high school education correlates positively with corn output (p. 92), (2) no accurate relationship is observed between education and earnings (p. 93), and (3) farm proprietors in counties with higher secondary and tertiary school attainment were less likely to seek off-farm employment (p. 94).

Appleton & Balihuta (1996) mention the non-cognitive effects of education. They suggest that education changes people's attitudes and practices. The similarity between classroom discipline

and work-floor is emphasized, noting that education equips one with discipline, acceptance of hierarchy, punctuality and ability to work with a team (Appleton & Balihuta, 1996, p. 417). This argument is in parallel with what Arrow (1973) refers to by the *filtering* function of education (p.194). He discusses the function of education as a screening tool, in that it reports the abilities of different individuals to employers in a world of imperfect information. Arrow (1973) charges that the filter theory of higher education is not linked to the productivity-adding human capital theory, while not entirely challenging it either (p. 194). Nevertheless, the screening function of education can only be weakly discussed within the context of Turkish agricultural sector in the 1940-60s, as higher education was rarely required for farm labour, if at all. Especially in the middle of the twentieth century, which is the period of interest for this specific study about the Village Institutes, even primary school education was barely a requirement for farming and most of the population was illiterate anyway. However, this does not change the possibility that schooling would improve a person's habits in terms of being punctual and disciplined, which would very well be useful in agriculture as well as industry. The Village Institutes aimed to add on top of this and equip the villagers with the ability to develop scientific approach towards agriculture, which is expected to be a more effective factor in increasing productivity.

Appleton & Balihuta (1996) also touch upon the issue that schooling might cause off-farm mobility in developing countries, encouraging the students to try for a formal sector employment (p.417). They suggest that this might happen as schooling may encourage adopting modern practices and being open to new ideas (Appleton & Balihuta, 1996, p. 417). This phenomenon is discussed in two ways in the VI literature: The VIs both aimed to raise an open minded youth, and to suppress their aspiration to leave their village to seek other kinds of employment. A

positive relationship between VI education and agricultural productivity is expected as being open to new practices usually results in productivity solutions.

Appleton & Balihuta's (1996) study is interesting in the way that they summarize the findings of many other studies which measure the impact of education on agricultural productivity. They report that only a minority of the studies find a positive effect that is statistically significant, which is rather frustrating. However, they explain the insignificance by the use of small sample sizes, measurement errors related to agricultural productivity and the possibility of genuine variability in the impact of education where the sample is not controlled for traditional and modernizing environments (Appleton & Balihuta, 1996, p. 420).

3. STATISTICAL SNAPSHOTS FROM THE REPUBLIC OF TURKEY

In this chapter, information on the evolution of population, urbanization, literacy, share of agriculture in GNP and wheat productivity in the Republic of Turkey will be summarized in an effort to draw a simple yet useful picture of the country in the readers' mind. This will hopefully help the reader to understand the importance of agriculture, rural development and education for the Turkish population back in the first half of the twentieth century.

3.1. Population, Urbanization and Agriculture

The fast growing Republic of Turkey had about 76 percent of its population living in the rural in 1935, which did not drop below 70 percent until the 1960s. (See figures on Table 1 and the graphed version in Chart 1 on page 16.)

Table 1. Total population and urbanization level, Turkey, 1935-2000

Year	Total population (millions)	Urban	Rural
1935	16.2	24%	76%
1940	17.8	24%	76%
1945	18.8	25%	75%
1950	20.9	25%	75%
1955	24.1	29%	71%
1960	27.8	32%	68%
1965	31.4	34%	66%
1970	35.6	38%	62%
1975	40.3	42%	58%
1980	44.7	44%	56%
1985	50.7	53%	47%
1990	56.5	59%	41%
2000	67.8	65%	35%

Source: TurkStat (December 2008, p.16)

Agriculture has been one of the essential bases of Turkish economy with shares of approximately 47 percent of the GNP in 1930, 45 percent in 1940, 41 percent in 1950 and 38 percent in 1960 (TurkStat, December 2008, p. 682). (See Chart 2 on page 16).

With such a large portion of the citizens living in rural areas and contributing to the GNP with such high shares, the government could not ignore the need for developing the countryside in order to achieve a nationwide development back in the early years of the newborn Turkish Republic. A set of reforms were introduced and it was considered a national duty to spread them to every corner of the nation.

The relevant reforms among these will be reported further in Chapter 4. Yet it is reasonable to mention now that the emergence of the Village Institutes was intended to improve the rural population and serve for both the agricultural and educational reforms.

Chart 1. Total population and distribution of urban and rural population at national level, Turkey, 1927-2000
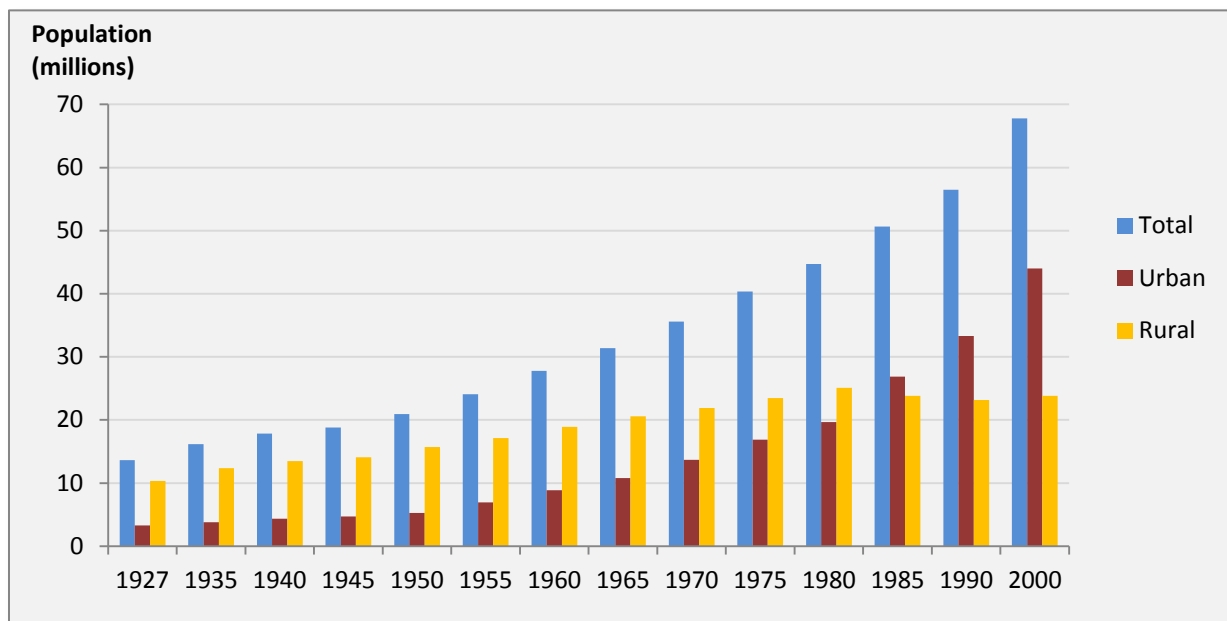
Source: Percentages calculated by using the data in Table 1.

Chart 2. Shares of sectors in Gross National Product, Turkey, 1923-2006
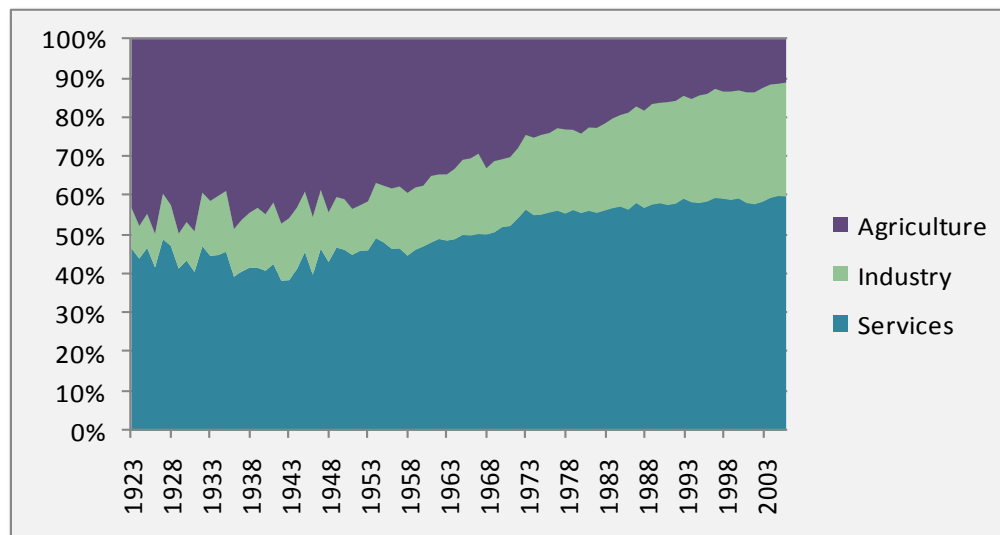
Source: TurkStat (December 2008, p. 68)

3.2. Literacy

As presented in Chart 3 below and Table 11 (on page 76), 19 percent of the total population was literate according to 1935 census. 29% of the males and 10% of the females were literate. Both the embarrassingly low overall literacy rate and the significant gap between the literacy rates of males and females dramatically signalled that more had to be done to spread education. Reacting to the overall literacy rate of below 9 percent as reported in the 1927 census, the government introduced a set of educational reforms, which will be presented in section 4.1. As of 2010, 90% of the population above the age of 6 is reported to be literate with the gap between genders reduced down to 4 percentage points (TurkStat, 2011)[3].

Chart 3. Literacy rate by sex, Turkey, 1935-2000
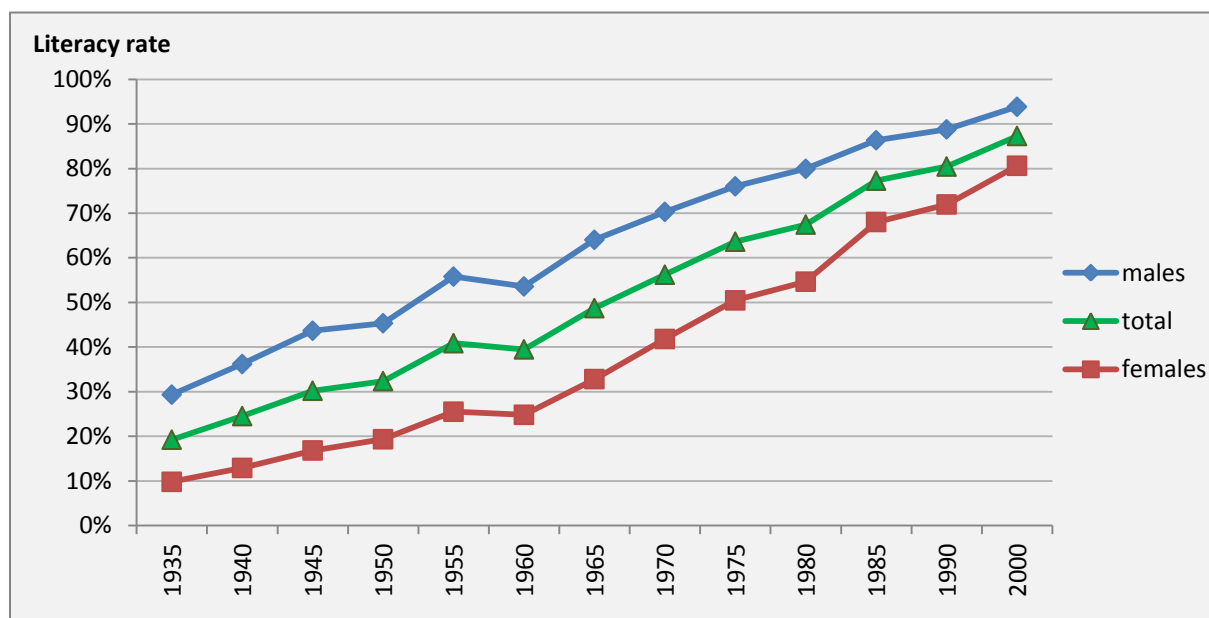
NOTE1: Literacy rates for 1940 belong to the average of those in 1935 and 1945.

NOTE2: Male literacy rate refers to number of literate males divided by male population above the age of 6, and likewise for females.

Source: The chart has been constructed by the use of data in TurkStat (December 2008, p. 18) Data is presented in APPENDIX A, Table 11 on page 76.

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[3] The percentage difference has been calculated with the nominal figures that were retrieved on 10th May 2011 from the online database of the Turkish Statistical Institute.

For a healthy discussion of convergence in the literacy rates at province level, coefficient of variation can be used as a measure. Chart 4 presents CV for the years 1927, 1935, -40, -45, -50, -55, -60 and -65.

Chart 4. Coefficient of variation in province level literacy rates.
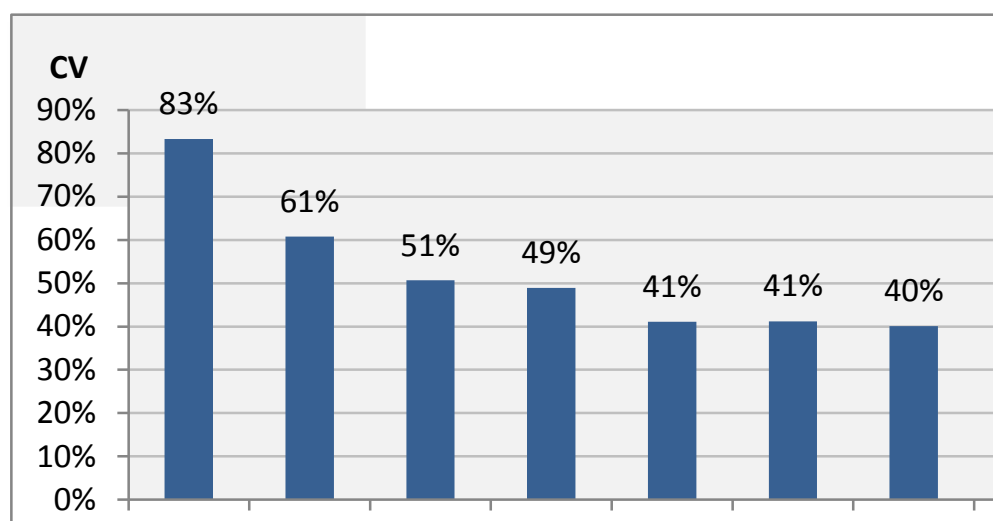
NOTE: Province level literacy rates for 1940 are derived as the average of those in 1935 and 1945, as they did not exist in the 1940 census.

Sources: State Institute of Statistics (1931, p. 42; 1950b, p. 190; 1961, p. 213) and General Statistical Office (1942, p. 82; 1950, p. 175; 1961, p. 138)

3.3. Wheat Productivity (Output per Area)

Chart 5 presents the evolution of per area wheat production between 1925 and 2007 at national level. The average annual growth rate in wheat productivity using a two-year approach, with 1925 as the starting point and 2007 as the ending point, is 8 percent.

Chart 6 presents the levels of variability across provinces in terms of per area wheat output for the years 1940, 1941, 1942, 1964, 1965 and 1966. The period 1940-42 displays an increasing trend in coefficient of variation (CV), implying divergence across provinces. 1964-66 on the other hand is marked with a slow decline in CV, implying convergence. The overall picture, needless to say, displays a significant fall in CV, implying convergence.

Chart 5. Output of wheat per hectare of area sown for wheat, Turkey, 1925-2007
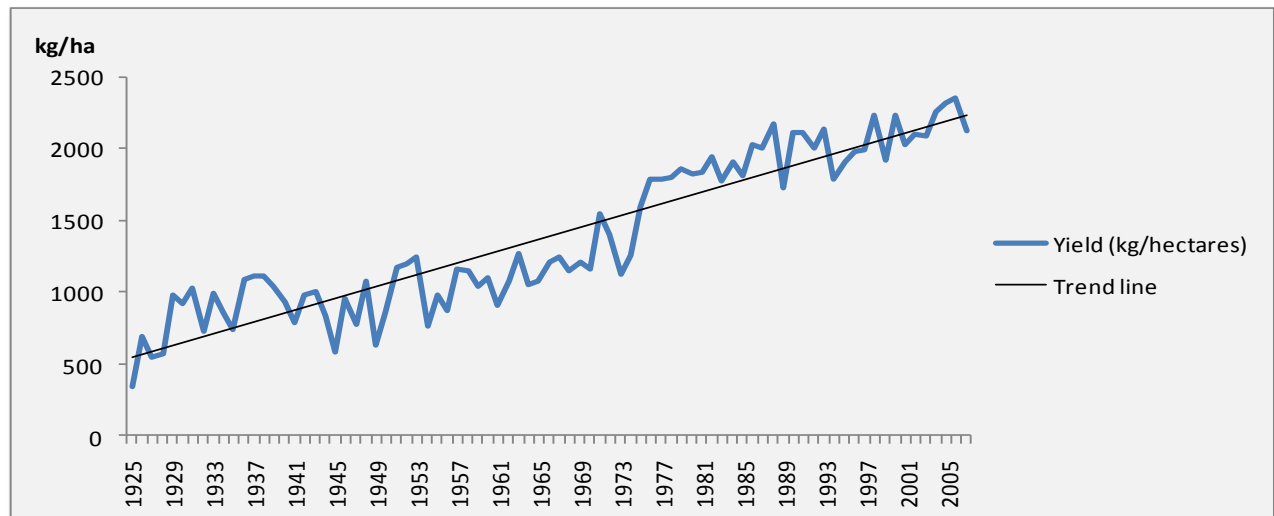
Source: Data retrieved from TurkStat (December 2008, pp. 196-197)

Chart 6. Coefficient of variation at province level for wheat
output per area, Turkey, 1940-1942 and 1964-1966
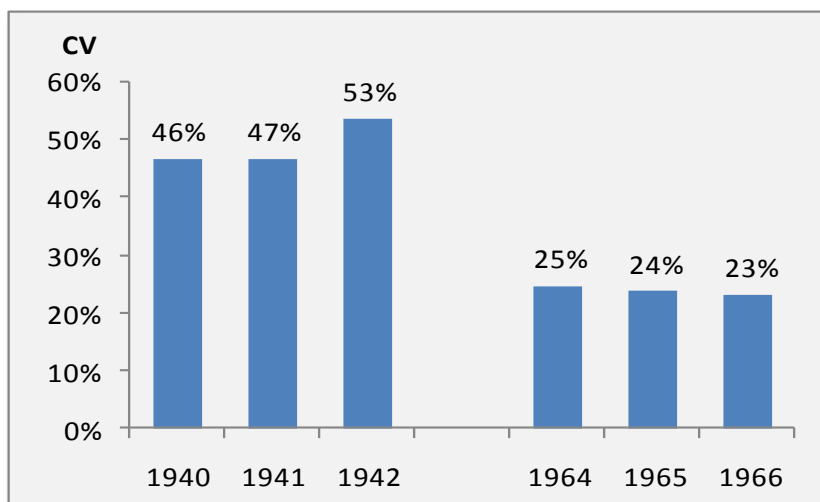
NOTE: CV calculated from nominal data on province level wheat output
and area sown for wheat.

Sources: State Institute of Statistics (1943, p. 8; 1968, p. 47)

4. EDUCATION AND AGRARIAN REFORMS IN THE REPUBLIC OF TURKEY

The history of the Turkish Republic starts on the 29th October 1923, three years after the establishment of the parliament on 23rd April 1920. Independence was gained through the war of independence led by Mustafa Kemal Atatürk, who is today considered the most important public figure and a national hero in Turkey. The first fifty years of republican history is narrated by a series of reforms that were expected to build an entirely new nation. Among all, the reforms in the field of education and agriculture are the two most essential ones as they make it easier to understand the role of the Village Institutes within the context of the modernization efforts and economic development

In section 4.1 the education reform will be summarized through three important implementations: (1) Unification of education, (2) alphabet reform, and (3) common-public education. Section 4.2 will follow to summarize the efforts to implement agricultural transformation, where (1) Land reform, (2) the Agricultural Credit and Sales Cooperatives, and (3) the Agricultural Factories and the State Agricultural Enterprise will be summarized. The emergence of the VIs will be introduced as a fourth step of the agrarian reform, yet will not be further explained in this chapter. The VI project must rather be considered to have served both the education and agrarian reforms. The grounds of this argument will become clearer with the narratives and discussions in chapters 5 and 6.

4.1. Education Reform

4.1.1. Unification of Education

On March 3rd 1924, only four months after the promulgation of the republic, the duality between regular schools and *madrasahs*[4] was abolished by the introduction of the act of Unification of Education[5] (Act no:430) (Tekeli, 1983, p. 660; Akyüz, 1999, p. 285). All institutions of education were now governed by the Ministry of Education which would accelerate the modernization process in education. In 1927, all courses related to religion were removed from the national curriculum. Only the elementary schools in villages would provide some courses with religious content, provided that the focus would be on modern principals of ethics and morals (Tekeli, 1983, p. 660). This act also solved the problem of training religious functionaries: The Faculty of Theology was first founded in İstanbul University, to provide higher education to the graduates of the twenty six İmam Hatip schools (secondary level schools that train imams) across the country (Tekeli, 1983, p. 660). The Faculty of Theology was terminated in 1934 as a part of university reforms, after the termination of Imam Hatip schools in 1930 and 1931 (Tekeli, 1983, p. 660; Sakaoğlu, 2003, p. 170).

4.1.2. Alphabet Reform

The Ottoman language was a mix of Turkish, Persian and Arabic, which used to be written in Arabic alphabet. The literacy rate in 1928 was less than 10 percent and Mustafa Kemal Atatürk, the first president of republic in Turkey, suggested that this low figure was partly caused by the extreme difficulty of learning the Arabic alphabet and its incompatibility with

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[4] Madrasah is an Arabic word that refers to schools which follow a rather religious and traditionalist curriculum and is widely common in Muslim countries (The Turkish Language Association, Online dictionary, search word: "medrese". Accessed on February 25th, 2011, via www.tdk.gov.tr).

[5] The act is called "Tevhid-i Tedrisat Kanunu" in Ottoman and "Eğitimde Birlik Kanunu" in Turkish.

the Turkish language (Akyüz, 1999, p. 298). To overcome the alphabet barrier, the new Turkish letters based on the Latin alphabet were introduced by a law dated 1st November, 1928 (Akyüz, 1999, p. 298). This reform was accompanied by the establishment of The Turkish Language Association, which immediately started working on finding Turkish expressions for foreign words, phrases and terminology (Akyüz, 1999, pp. 298-299). The literacy rate reached a level of approximately 19 percent in 1935 and 29 percent in 1945 (TurkStat, December 2008, p. 24; also see APPENDIX A, Table 11 on page 76), however, with the majority of the achievement in the cities and towns rather than the villages (Ahmad, 1993, p. 82).

4.1.3. Common-public Education

The introduction of the new alphabet required an exhaustive project to train adults and teenagers who were no longer studying. For this purpose, institutes by the name "Schools of the nation"[6] were founded primarily in order to teach the new alphabet. Thousands of men and women between 16 and 45 years of age were trained in these schools usually in the evenings, in periods of 4 months. There were two types of classes: Class A focused mainly on literacy whereas class B would provide courses also in simple mathematics, measurements, health and civics. More than 1.5 million adults received certificates from these schools between 1928 and 1950, but the greatest achievement was made during the first 5-10 years. The literacy rate of 10.7 percent in 1927 increased to 19.5 percent in 1935 and to 22.4 percent in 1940 (Akyüz, 1999, p. 351).

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[6] "Millet Mektepleri" in Turkish.

4.2. Agrarian Reform

According to the agricultural census which included 1 million families in 1913, 5 percent of the total number of farm families controlled 65 percent of the total land available for cultivation whereas another 8 percent of farm families (approximately 80 thousand families) were landless peasants (Günaydın, 2006, p.13; Dinler, 1996 as reviewed in Yavuz, 2005, p.7). This leaves a block of 87 percent controlling only 35 percent of the land, drawing a picture of unequal land ownership in the final years of the Ottoman Empire. In addition to the inequality of capital in terms of land ownership, the country was short on work animals and tools: In 1927, 22 percent of the rural citizens did not own any work animals and the average number of wooden ploughs per farm family was less than one (Günaydın, 2006, p. 13).

The 1930s are thus important in the Turkish history of agriculture as they are marked as the period when an agrarian transformation process was initiated. The aim was to design a structure which would enable the rural families to own land and attain agricultural production techniques, while encouraging them to actively participate in the Republic's enlightenment project (Günaydın, 2006, p. 13).

This project was designed into four steps: It would be initiated with the land reform, and would be followed by the establishments of the agricultural credit and sales cooperatives in 1935, the Administration of Agricultural Factories and the State Agricultural Enterprise in 1937. Finally, the Village Institutes would be the final step towards setting up a web of institutions to provide the farmers with knowledge and support. These institutions would teach the farmers modern agricultural techniques (Günaydın, 2006, p. 13).

4.2.1. Land Reform

The first modern agricultural policy was introduced in the beginning of the 19th century by Kavalalı Mehmet Ali Pasha in Egypt, which at that time belonged to the Ottoman Empire. The arable part of land that belonged to some organizations and institutions were distributed among farmers, who would be free to choose which products to grow (Yavuz, 2005, p. 46). Nevertheless, this policy was unique to the region and some 40 percent of the land in the rest of the empire belonged largely to the emperor, followed by a few other leaders in the hierarchy from the viziers down until the cavalries (Gürbüz 1989 as reviewed in Yavuz & Çağlayan, 2005, p.3; Parvin & Hiç, 1990, p.212). Farmers were the hereditary and perpetual tenants of these lands and their right to cultivate these areas was subject to tax (Dinler, 1996 cited in Yavuz & Çağlayan, 2005, p.3). This was called the *miri* system. *Vakıf* (religious foundation) and *mülk* (private) were the next two land categories that existed in the Ottoman Empire (Parvin & Hiç, 1990, p. 212).

The villagers, who did not hold the legal right to sell land, became poorer and poorer in time with the dramatic increases in tax levels (Tokgöz, 1995, cited in Yavuz & Çağlayan, 2005, p.5). Later, in 1858, the Land Code made it legal for the holders of *miri* land to transfer or sell their rights to others, thus taking a step towards privatization (Parvin & Hiç, 1990, p. 212).

After the Republic of Turkey was founded (1923), the *miri* system was dismantled and over 40 percent of the state land was distributed to the landless peasants of Anatolia and immigrants from the Balkans, encouraging private land ownership. Since then, however, despite three attempts to redistribute land to small farmers, a complete land reform programme has failed to develop (Morvaridi, 1990, p. 304; Parvin & Hiç, 1990, p. 208).

In 1945, Law no. 6062 was passed by the İnönü government, the only party that existed, to distribute land to farmers based on the principles of land reform (Parvin & Hiç, 1990, p. 214). Unfortunately, the law could be implemented to a very low extent. When it was first introduced the law allowed owning a maximum of 50 acres of land per person. After the emergence of a second party in the democratic system of Turkey, İsmet İnönü's government increased the maximum limit to 5000 acres in an effort to soothe the opposition, which consisted largely of landowners (Parvin & Hiç, 1990, p. 214).

4.2.2. Agricultural Credit and Sales Cooperatives

Agricultural Credit Cooperatives[7] (ACCs) were introduced in 1935 by Law no. 2836 in order to give loans to provide capital for the agricultural sector. In 1969, the number of ACCs reached to 1991 with 49 percent of the 11,293,811 members being farm families (CIHEAM, 1971, p. 104).

The same year, Agricultural Sales Cooperatives[8] (ASCs) were introduced by Law no. 2834 in order to improve the conditions for the domestic and international sales of plant and animal products produced by the farmers (CIHEAM, 1971, p. 104). By 1969, the number of ASCs reached 556, serving 214,870 members in total (CIHEAM, 1971, p. 104).

4.2.3. Administration of Agricultural Factories and the State Agricultural Enterprise

The Administration of Agricultural Factories[9] (AAFs) were established on 12th February 1937 by Law no. 3130 in order to help farmers cultivate fallow land by lending them agricultural machinery and tools (Republic of Turkey Ministry of Agriculture and Rural

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[7] "Tarım Kredi Kooperatifleri" in Turkish.

[8] "Tarım Satış Kooperatifleri" in Turkish.

[9] "Zirai (Tarımsal) Kombinalar İdaresi" in Turkish.

Affairs, May 2004, p. 55). They implemented projects to increase cereal production between the years 1937 and 1940. In 1943, they established State Farms[10] on fallow land owned by the state in order to increase production and meet the domestic demand for foodstuffs (Republic of Turkey Ministry of Agriculture and Rural Affairs, May 2004, p. 55).

State Agricultural Enterprises[11] were founded in 1937 when Mustafa Kemal Atatürk, donated to the state all the farms he owned (Ulus, 1938, p. 84). Once owned and managed by Atatürk himself, these lands would now be used by the government with the purpose of setting a good example for the villagers by demonstrating modern agricultural techniques (Ulus, 1938, p. 84). The organization was responsible for managing pieces of land whose ownership would be transferred to them, while demonstrating the necessary agricultural methods and techniques themselves at the new agricultural enterprises, factories and workshops that they would establish and run in every region in order to guide the farmers in the area (Ulus, 1938, p. 84).

4.2.4. Village Institutes

The Village Institute project emerged in 1937 as a result of an effort to educate the rural population in order to increase their competence in various fields, with special emphasis on agriculture. Following the "learning by doing" principle, the VIs were 5- year boarding schools which would train elementary school graduates of the rural population to become village school teachers while equipping them with the necessary knowledge that the rural conditions required. Training teachers was not the only aim of the VIs; they also trained agricultural experts, health technicians, midwives, carpenters and other specialists that were

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[10] "Devlet Üretme Çiftlikleri" in Turkish.

[11] "Devlet Ziraat İşletmeleri Kurumu" in Turkish.

necessary for the rural population. Moreover, they did not only aim to train the VI students but also the public. A detailed story of the institutes will be presented in Chapter 5.

5. HISTORY OF THE VILLAGE INSTITUTES AND RELATED ACADEMIC LITERATURE

Understanding the expectations regarding the Village Institute (VI) project requires a thorough knowledge of the emergence, evolution principles and the working mechanism of the VI system. This chapter will begin with a short time line of the story of the VIs and will be followed by a narrative on the principles and ideology behind the system. Next, further details about the system will be given, after which their curriculum will be explained. The final sub-section in this chapter will shortly summarize the decision elements for VIs choice of location and where in reality they ended up being established. After presenting further attributes of the VIs, another sub-section will describe the Village Institute of Higher Education. Finally, the chapter will be closed with a review of VI literature, presenting both the supporting and dissenting arguments on the achievements of the institutes.

5.1. Time Line

First established for testing in 1937, Village Institutes were promulgated in 1940, their curricula were modified after 1946, and finally they were terminated in 1954 (Uygun, 2008, p. 32; Altunya, 2000, p. 47; Türkmen, 2007, p. 334; Akyüz, 1999, p. 339).

The first two institutes were established in 1937 as pilot schools in Eskişehir and in İzmir under law no.3803 (Uygun, 2008, p. 32), fourteen years after the republic was founded, thirteen years after the Law of Unification in Education passed and nine years after the alphabet reform.

During the 3-year testing period, another VI was established in 1938 and one more in 1939. Finally, VIs were officially promulgated on April 17th, 1940 (Uygun, 2008, p. 32). In 1940, ten more VIs were established, followed by three more in 1941, one in 1942, two in 1944 and one in

1948, totalling up to 21 institutes in the end. In the academic year of 1945-46, there were 20 VIs employing 119 female and 403 male teachers; teaching 1727 female and 13806 male students (Altunya, 2000, p. 47)(See the rest of the figures in Table 12 in APPENDIX A).

With the introduction of the institutes, the number of village school teachers increased significantly in a period of 11 years. VIs had their first group of graduates in 1942. In 1946, 45 percent of the village school teachers across the country were graduates of VIs, which increased to 72 percent in 1950 (Şimşek, 2006). The figures display valuable evidence that most of the increase in the number of village school teachers could be attributed to the VIs. (See Table 13 in APPENDIX A for nominal figures.)

The Institutes remained active and operative until the early 1950s, but the original phase of the Village Institutes ended in 1946, soon after the withdrawal of Hasan Ali Yücel from the Ministry of Education and Ismail Hakkı Tonguç from the administration of the Elementary Education (Kirby, 1962, cited in Uygun, 2008, p.302; Tekeli, 1983, p.666). After the Second World War, the VIs were attacked by the conservatives on the grounds that the students here were being brainwashed with the undesired ideologies of the time like socialism and communism, and being induced class conflict. The implicit reason behind these reactions is believed to be the fear of *"awakening the peasants by teaching them to read and write, teaching them about health care and efficient agriculture, in short giving them a new sense of self reliance and confidence"* (Ahmad, 1993, p. 83). Other criticisms about the VIs will be reported further in Section 5.9 on page 46.

Consequently, the curricula of the VIs were altered in 1946 and coeducational training was abolished. The practical courses were replaced by theoretical lectures, the girls were registered to

two separate institutes, and the notion of "learning by doing" left its place to mere "learning" (Ahmad, 1993, p. 83). In 1953, the curricula of VIs were merged with those of the regular primary teacher training schools. However, in 1954 with a number of reasons one of which was that *"a person could not do all the training and teaching jobs at the same time in a village"*, the VI system was terminated for good, leaving their place to regular teacher training schools (Türkmen, 2007, p. 334). (Also see Sakaoğlu, 2003, p.247)

5.2. Principles and Ideology behind the Village Institute System

Although the adoption of the Latin alphabet in 1928 led to a dramatic increase in the literacy levels by making it easier for people to learn to read and write, the countryside was unable to catch up with the literacy rates of the urban citizens (Ahmad, 1993, p. 82). In order to help the countryside gain speed, Mustafa Kemal Atatürk, appointed a commission to find a solution. They realized that the youths from the villages should be trained not in the cities but again in villages to avoid corruption[12] (Ahmad, 1993, p. 83). Also, a practical curriculum was essential as the rural understanding of education was more about "doing" rather than just "knowing" (Ahmad, 1993, p. 83).

After being appointed General Director of Primary Education, İsmail Hakkı Tonguç began to work on his rural revitalization plan, aiming to achieve this through education. Despite being an intellectual, he was distinguished by his thorough understanding of the rural needs and conditions, which were the main reasons why he wanted to direct educational efforts to the rural (Kirby, 1962, p. 78). With the approval of Hasan Ali Yücel, the Education Minister of the time, he began the implementation of the Village Institutes projects in 1937.

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[12] "Corruption" here refers to the change in a young person's feeling of belonging to the village, developing willingness to move to the city.

"The pioneer of the movement, Tonguç, focused on the implementation of a synthesis of work school and production school in the Village Institutes in an attempt to create a more production-oriented rural population" (Uygun, 2008, p. 303). In the light of this ambition, some of the aims of the institutes were: (1) to modernize social relations, (2) to end poverty and ignorance among the peasants, (3) to create peasant intellectuals, (4) to increase agricultural productivity and (5) to help spread the Kemalist Revolution in the countryside (Karaömerlioğlu, 1999, p. 112). Within the scope of this thesis, the focus will be on the fourth aim, while the others will be discussed briefly with the purpose of making the picture of the institutes clearer in the readers' mind.

5.3. The Village Institute System

The VIs were 5-year middle schools following the first 5 years of elementary education[13]. Third article of the Law of Village Institutes required that the healthy students with high academic performance who complete a 5-year primary education in the villages located in the neighbouring provinces would be accepted to these boarding schools (Sakaoğlu, 2003, p. 237; Vexliard & Aytaç, 1964; Gedikoğlu, 1971 cited in Şeren, 2008, p. 214), which were located on vast tracts of land in rural areas. Previous experience of training primary school teachers had shown that teachers with urban origins were unable to understand the needs and conditions of the villages, thus decreasing their ability to connect well with the students in village schools as well as the rest of the inhabitants. This time, it was decided that the village students should become village teachers (Aydın, 2007, p. 81; Sakaoğlu, 2003, p. 236; Şeren, 2008, p. 212). The VIs were planned to develop a system that would best fit the rural conditions and equip the villagers with

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[13] Back in the time, primary education covered the grades prior to high school. Most commonly, children had a 5 year elementary school followed by 3 years of middle school, which were both managed by the Primary Education unit of the Ministry of Education. The VIs were middle schools which offered a 5-year education instead of 3 and gave the graduates the right to continue, if willing to, with the Village Institute of Higher Education upon graduation.

the kind of knowledge that they could actually utilize in practice (Türkmen, 2007, p. 334; Sakaoğlu, 2003, p. 236). The students would come from the rural and go back to their villages to serve as village school teachers, village trainers, health technicians[14], mechanics or carpenters for twenty years (Şeren, 2008) after graduation. *"Also, instead of regular salary like urban elementary school teachers, they had to use designated agricultural fields by the government in a village to make living. Only a small amount of salary and some agricultural equipment were given to these village school teachers."* (Dilaver, 1994, p.73 cited in Türkmen, 2007, p.334; also see Sakaoğlu, 2003, p.238 and Keleş, 2007, p.8-9)

The perspective on knowledge in the rural was highly pragmatic. However, their approach to practical, useful knowledge worked in both ways: (1) They were more willing to digest the kind of knowledge that they could utilize in their lives, and (2) they were able to digest certain kinds of knowledge better through practice. Thus, the VIs highly emphasized the principle of *"learning by doing"* (Karaömerlioğlu, 1999, p. 120). The next main principle was *"creating from nothing"* (Kirby, 1962), though this one emerged naturally by itself as the government was dealing with difficult economic conditions. The students and teachers worked in building not only their institutes but also helping other institutes' construction. Once they were erected, the students would go on building farms, gardens, forests, aqueducts, wells, workshops, energy sources, libraries and similar improvements in the coming years as part of their work-education (Evren, 1998, p. 35). *"During the first five years the Institutes had built more than 300 buildings such as dormitories, refectories, kitchens, workshops, warehouses, garages, class-rooms, etc. They had installed electricity in sixteen of their twenty-one centers."* (Vexliard & Aytaç, 1964, p. 44)

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[14] A health technician was a person who was responsible from diagnosing and curing common and basic health problems. These people were either graduates of vocational health schools or village institutes with a major in health. These schools are not qualified as medical schools but provide their graduates with the necessary knowledge and skills to cure basic problems which do not need to be taken to a specialist doctor.

According to law no. 3803, the VIs were supposed to be built at the outskirts of big cities, to have enough land to simulate village conditions while being close to main roads. They were supposed to have access to water resources. The aim was to locate the VIs at points which had the potential to become regional centres. The location must allow easy transportation of health personnel, technicians, doctors and others to and between the villages. This was more or less manageable in regions where there was enough land that belonged to the Treasury. However, in other regions land was bought from villagers. As can be predicted, these pieces of land were usually of the kind those villagers themselves were not able to achieve high yields on (Evren, 1998, p. 30).

According to the founder of the institutes, Tonguç, work education could be described as the education provided through work within the work. This meant that the students did not exercise on samples. They were responsible for all stages and details of the work in hand (Tonguç, 1998). However, over time, the village institutes deviated from the work education approach (Uygun & Kıncal, 2006).

Once erected, the VIs did not rely extensively on the government budget for running expenses, excluding the small salaries paid to the teachers. (Stone, 1974, p. 422) The harvest from farms, milk and other products from the dairy, furniture from the workshops, clothes from the weaving workshop, honey from the hives and any other goods that they produced were consumed in the institutes themselves, with the surplus being sold at nearby markets. This way, the VIs were both able to finance themselves internally and let students experience the importance of being productive. The better products they made, the better conditions they lived under (Kirby, 1962).

5.4. Village Institute Curriculum

In the beginning, the VI principals had more autonomy on the curriculum that they'd like to follow. In 1943, a common curriculum for the VIs was centrally administered by the Ministry of Education. However, each institute was allowed to modify their program according to the needs and conditions of their region. Some institutes emphasized cereal production while others concentrated on fishing, apiculture (beekeeping) or livestock etc (Türkoğlu, 1997).

A graduate of a village institute would have completed 114 weeks' worth of cultural courses, 58 weeks' worth of agricultural courses, 58 weeks' worth of technical studies[15] and would have had 30 weeks of vacation (Türkoğlu, 1997). The vacations would involve the students continuing studying, though. They were taken in shifts among students. During these vacations, the students would go back home and prepare "village files" that contained detailed information about the conditions in their own villages (Evren, 1998, p. 35).

The cultural courses varied from Turkish language and literature to mathematics, from history to natural sciences, from foreign languages to geography. Among interesting cultural courses was music, military training, housekeeping & child-care, and agricultural business economics. The agricultural studies ranged from basic agriculture, horticulture and zootechnics to apiculture, sericulture and fishing. The technical courses offered to males and females were different. While males could choose between ironworking, woodworking or construction, the females could specialize in needlework, weaving & textile, or extra agricultural studies (Altunya, 2000, pp. 43-44; Şimşek, 2006, p. 7). The full list of courses and their hourly distributions per week can be found in Table 14 in APPENDIX A.

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[15] The technical studies included courses such as concreting, carpentery, iron working, home building, weaving etc. (Türkoğlu, 2005)

5.5. Locations of the Institutes

The VIs were located 5-10km away from urbanized areas in order to target villagers, but as close to a train station as possible (Binbaşıoğlu, 1997, p.35; Gedikoğlu, 1971 cited in Şeren, 2008, p.11). They were responsible for providing 5-year secondary education to the rural population of three to six provinces located around them (Binbaşıoğlu, 1997).

The initial plan mandated that the VIs were to be located on land that (1) was arable and state-owned, (2) had fertile soil which is easy to cultivate and has existing garden plots in and around, and (3) was located approximately at the centre of two or three surrounding provinces with water and air conditions allowing for good sanitary conditions (Kirby, 1962 cited in Şeren, 2008, p. 213). Nevertheless, it has been observed that these conditions were not applicable for all the institutes although it is still a fact that they were located on areas which reflected most of the common properties of the rest of the land in the region (Kirby, 1962 cited Şeren, 2008, p. 213). Partly due to budget problems and partly to availability, not all land provided to the institutes was highly fertile and had a good location; the first students of the institutes usually had to work on making the land arable themselves (Vexliard & Aytaç, 1964, p. 44). In many locations, VIs did not even have any water resources nearby; they had to build infrastructure to bring water from distant rivers or construct wells (See UCTEA Chamber of Agricultural Engineers Izmir Branch [TMMOB Ziraat Mühendisleri Odası İzmir Şubesi], 1995 and Kirby, 1962).

Table 3 on page 37 displays the population characteristics of the villages that the VIs were located in, in terms of the population of the province (city), the district, sub-district and village that each VI belongs to. To interpret Table 3, follow this example: Çifteler Village Institute was established in 1937 in a village of 1625 inhabitants which belonged to a sub-district which in 1940 had 16 villages with an average of 630 inhabitants living in each. This sub-district belonged

to a district that had 151 villages with 405 inhabitants each on average, and it was located in a province where 31 percent of the population was urban. The province's population was 1.13 percent of the total national population and it owned 356 villages in total.

To compare the numbers in Table 3 to total national measures, keep in mind Table 2:

Table 2. Total population, urbanization level and number of provinces in Turkey in 1940 and 1945.

Year	1940	1945
National population	17,820,950	18,790,174
Level of urbanization	24.39 %	25.08 %
Number of provinces	63	63

Source: General Statistical Office (1950)

Table 3 at a glance, with no deeper analysis, would provide evidence that the level of urbanization was not a decision factor for the location of the VIs. The highest urbanization is observed in Istanbul with 82 percent in 1940, with İzmir as the closest follower with 51 percent. The minimum urbanization level belonged to Bingöl with 5.7 percent; and 54 cities (i.e. provinces) out of 63 had an urban population between 10 and 30 percent. The distribution of the cities in Table 3 in terms of urbanization level displays a similar spread to the national one; therefore it is hard to see a pattern for choice of location for VIs in regards to urbanization levels.

Table 3. Population information on the locations of all 21 Village Institutes.

| 1 | 2 | PROVINCE | | | DISTRICT | | SUB-DISTRICT | | VILLAGE |
| | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
Year established	Name of Village Institute	Ratio to national population	Level of urbanization	Number of villages	Number of villages	Average population per village	Number of villages	Average population per village	Population
1937	Çifteler	1.13%	31%	356	151	405	16	630	1625
1937	Kızılçullu	3.35%	51%	642	62	935	5	1235	.
1938	Kepirtepe [a]	0.97%	40%	190	34	866	22	809	.
1939	Gölköy	2.03%	11%	1129	218	231	119	222	358
1940	Düziçi	2.11%	32%	702	40	467	25	454	433
1940	Aksu	1.44%	19%	572	68	384	14	462	.
1940	Savaştepe	2.71%	22%	915	337	399	23	440	2007
1940	Gönen	0.96%	25%	214	54	1826	19	635	2070
1940	Cılavuz	2.00%	20%	777	98	393	34	460	1269
1940	Pazarören	1.92%	23%	489	169	322	31	294	703
1940	Akçadağ	2.30%	19%	773	89	484	32	417	615
1940	Arifiye [b]	2.11%	21%	676	175	424	26	389	898
1940	Akpınar-Ladik [c]	2.04%	20%	733	53	286	42	296	.
1940	Beşikdüzü	2.19%	11%	579	133	481	27	502	1031
1941	Hasanoğlan	3.38%	31%	1126	40	546	12	876	1286
1941	İvriz	3.48%	21%	885	67	420	19	406	617
1941	Pamukpınar	2.63%	17%	1221	145	332	18	327	.
1942	Pulur	2.08%	17%	1012	124	347	40	380	457
1944	Ortaklar	1.65%	21%	455	165	497	28	691	1927
1944	Dicle	1.40%	25%	292	68	282	58	288	.
1948	Erciş [d]	0.77%	24%	521	18	1103	.	.	.

[a] The VI was located 4.5km away from the district centre on an abandoned piece of land.

[b] Arifiye was located in Sakarya, which was named Adapazarı at the time and was a district in Kocaeli province.

[c] The VI was located 3km away from Akpınar train station, name of village not specified.

[d] Data for Erciş Village Institute belongs to 1945 census, and all the others to 1940.

Sources: Evren, 1998, p.33; State Statistical Institute, 1935a; State Statistical Institute, 1935b; State Statistical Institute, 1940; State Statistical Institute, 1950a; State Statistical Institute, 1950b

On the other hand, the comparison between the seventh and tenth columns in Table 3 might hint that village population could have been a factor of choice: All VIs were located in villages which had a population above the average village population of the district they belonged to. Though this could be coincidental, as the villages close to train stations tend to be larger in population anyway.

Figure 1. Locations and names of the Village Institutes

Source: Köy Enstitüleri [Village Institutes] (2010)

Figure 1 illustrates the locations of the institutes on the map of Turkey. What this picture indicates is that the aim could have been to locate them evenly across the country so that every neighbouring city could have more or less equal distance to the institute. In other words, the geographical distribution of VIs across the country displayed a *"map of equal opportunity"* (Türkoğlu, 1997, p. 185).

5.6. Other Attributes of the Village Institutes

5.6.1. Organization Structure

The Village Institutes demonstrated a unique system in terms of organization structure compared to many other entities at the time. All the students were allowed and encouraged to take part in the management along with the teachers, aiming to avoid the hegemony of the principal and their assistants while letting the students internalize the fundamentals of democracy in practice (Öztürk, 1961 cited in Şeren, 2008, p. 218).

The job descriptions within the organization of the institutes are summarized below:

Managers:

The principal was responsible from providing the instructors, teachers, advisors and the inspectors with the necessary resources, tools and information while closely following their progress.[16] S/he in the beginning used to work together with a head of education and an assistant. In addition, s/he used to receive assistance from the head of arts, head of workshops, head of agriculture, head of music and head of health. The head of education was responsible from all activities regarding the education of the students (Binbaşıoğlu, 1997, pp. 35-36).

Board of teachers:

The board of teachers would organize meetings regularly to discuss problems and take decisions (Binbaşıoğlu, 1997, p. 36).

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[16] Köy Okulları ve Enstitüleri Teşkilat Kanunu [Village Schools and Institutes Organization Law], Article:38

<u>Group leader ["küme başı"]:</u>

In every classroom was a teacher who would help the students on a wide variety of matters including private issues. These teachers, who were called "group leaders" in the beginning, were later named "classroom teachers" (Binbaşıoğlu, 1997, p. 36).

<u>Expert students:</u>

There were also a few students who had expertise in a specific area such as ironworking, carpentry or weaving, and would have similar responsibilities to that of the teachers (Binbaşıoğlu, 1997, p. 36).

5.6.2. *Students' Active Participation in Management and Upkeep*

Each grade in VIs elected a representative group who would be responsible from managing the activities and solving problems. At the end of each week there would be an assembly where the representatives of the week would present a detailed report of what they had done the whole week and the audience would challenge them with a critical discussion (Binbaşıoğlu, 1997, p. 37). In these sessions, the students were also allowed to evaluate the decisions of the management and could freely object to the principal's or the teachers' actions. This was not only expected to equip the students with problem solving and management skills, but also a better understanding of democracy through practice, which was still a new term for the Turkish nation.

The VIs did not employ any caretakers or janitors. There were only one cook, one scullion and a person to do the laundry. The students worked in shifts to clean, organize and manage the classrooms, bathrooms, restrooms, dorms, workshops and any other facility located in the campus (Binbaşıoğlu, 1997, p. 37).

5.6.3. Extra-curricular Activities

The students usually started the day very early with playing national games or performing a short session of folk dancing together in the school yard for morning exercise, after which they would spend another hour before breakfast reading newspapers and books (Binbaşıoğlu, 1997, p. 37).

Saturday evenings were occasionally reserved for entertainment. The students usually organized concerts or wrote dramas themselves and performed them for the neighbouring residents to watch, including the governors of the area (Binbaşıoğlu, 1997, p. 37). Considering that cities and districts remote from the biggest few cities did not have much opportunity to watch a concert or a theatre play at the time, these activities became good ways at letting the rural population experience the wonders of art.

5.7. Village Institutes of Higher Education

According to the Village Institute Law the VIs could only employ teachers who graduated from teacher training schools, vocational high schools or universities. However, the graduates of these schools usually came from an urban culture, which sometimes made it hard for them to adapt to village conditions and communicate well with the villagers. This led to the idea of establishing a higher institute as an extension of the original VIs. Students who successfully completed their five year education at a secondary level VI would be allowed to apply to the higher institute and would be employed in VIs after graduation (Aydın, 2007, p. 99).

Hasanoğlan Institute of Higher Education was established in the same campus as its secondary level counterpart, located 32 kilometers from Ankara (the capital city) at the skirts of the mountain Elmadağ. The students were selected according to the results of an examination that they would take after application. The first group of students that started their higher education

here in 1942 was from Kızılçullu and Çifteler, which were the oldest two institutes (Aydın, 2007, p. 100). In the coming years, the origins of the new students were more evenly distributed to allow similar opportunities to the graduates of all VIs (Aydın, 2007, p. 101).

In the higher institutes which provided a 3-year education, at the end of every academic year the students needed to work as interns in secondary level VIs for two months. Towards the end of their final year, they had to prepare a research project about villages and village education. These projects were usually published afterwards for the benefit of the other VIs (Aydın, 2007, p. 101).

This higher VI developed into a form of folk university that would seek solutions for the problems of villages and the VIs (Arayıcı, 1999b, p. 248). However, Hasanoğlan Village Institute of Higher Education became the focal point of discussions during the transition from one-party regime to a multiple-party parliament (Başaran, 2003, pp. 100-101), and was finally terminated on 27th November, 1947 (Aydın, 2007, p. 103). The students who were close to graduation at the time were taken for military service but they were recruited as sergeants although their level of education would allow them to be reserve officers. They ended up having a lower rank in the military as the new Minister of Education tagged them as potential left-wing anarchists (Aydın, 2007, p. 103).

5.8. Academic Literature on the Village Institutes

Most studies discuss the VIs from a sociological, political and educational perspective. Yet little has been investigated through economic lenses. Fay Kirby's PhD work which she submitted to Columbia University Teachers College in 1962 is probably the most detailed narrative on the story of the Village Institutes, though from an educational perspective. Despite including a sub-section with an economic approach, the publicly available copy of her work does not present any

quantitative analysis, and nothing could be confirmed as to whether the original dissertation[17] included such analysis. Kirby's (1962) discussion on the economic impacts of the VIs will be reported in section 6.1 on page 49.

Vexliard & Aytaç (1964) report the story and the attributes of the VIs as a well-organized summary while presenting short interpretations of their roles from an educational perspective. Another PhD dissertation[18] was submitted by M. Asım Karaömerlioğlu to the Ohio State University Department of History in 1999. This work aimed to *"challenge many mainstream historiographical views which have been the cornerstones of history writing in Republican Turkey"* (p. 295), thus did not provide any quantitative approach to the economic impacts of the institutes. Keseroğlu (2005) discusses the story of Village Institutes in terms of spreading libraries and encouraging reading in Turkey. Arayıcı (1999a) presents an education perspective on the institutes as well, though very briefly commenting on the possible effects on the socio-economic development of the nation, however, with no quantitative inquiry and evidence. Şeren (2008) presents an educational approach to the phenomenon, discussing the role and success of the VIs as teacher-training institutions. Uygun (2008) spares a section for the story of the VIs in order to pursue the main aim of discussing the impact of John Dewey, an American philosopher and educator, on the teacher education system in Turkey. Finally, despite not being published in a journal, Baran & Şahin (n.d.) too discuss the educational role of the institutes and the extent to which they reflect John Dewey's philosophy. There are a number of other publications which either focus entirely on the Village Institutes or spare a section for it in the broader context of

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[17] The original dissertation is named "The Village Institute Movement of Turkey: An Educational Mobilization for Social Change".

[18] The title of Karaömerlioğlu's (1999) dissertation was "The cult of the peasant: Ideology and practice, Turkey, 1930-1946".

education and social development, yet they are not entirely relevant to the purpose of this study which approaches the issue from an economic perspective.

As far as an economic focus is concerned, Şimşek[19] (2006) is therefore the only work that was possible to retrieve, which attempted to explain the impact of the VIs on agricultural productivity through an econometric analysis. In the first part of the investigation, Şimşek (2006) utilizes an analysis of panel data of 51 provinces covering the period 1949-52 in an effort to explain the variations in total cereal output with the variations in total area sown, value of machinery, annual rainfall, a set of VI factors[20] and a dummy to control for unspecified factors (pp. 14-15). The results of the analysis unfortunately show no statistically significant evidence for a positive relationship between the VI-related factors and cereal output (Şimşek, 2006, p. 15). On the other hand, the second part of the analysis provides evidence that the VIs contributed highly to raising the human capital in Turkey by spreading education and increasing the literacy rates (Şimşek, 2006, p. 15). To interpret the findings of his analyses, Şimşek (2006) suggests:

> The Village Institutes were successful in spreading education but they probably did not have a significant effect in raising the short term agricultural productivity of villages. The difficulties of teachers in conducting the dual farmer-teacher role, the low quality of the land assigned to them, and adverse relations between the teachers and the rest of the village (Stirling, 1965, pp. 276-277) might explain the apparent lack of the short term economic impact. Nevertheless, the Village Institutes might have had a positive long term impact on Turkish economy since they increased the human capital by spreading elementary education and raising literacy rates. (p. 15)

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[19] Being a PhD student at the time, Alp Şimşek's study was a term paper for the Economic History course in the Massachusetts Institute of Technology in 2006 with the title "An Economic Look at the Village Institutes".

[20] The three VI-related factors were: (1) the number of village teachers who own a VI diploma, (2) yearly average number of VI graduate teachers in the province in the past three years, and (3) yearly average number of VI graduate teachers in the province in the past five years (Şimşek, 2006, pp. 14-15)

Nevertheless, the author himself has reported that the econometric approach he used for the analysis needed improving, yet he did not expect the signs of the coefficients to change if so done[21]. In the original paper, Şimşek (2006) starts the analysis with the following Cobb-Douglas function:

(a)
$$Q = AK^{\beta}T^{\alpha}R^{\sigma}e^{\gamma R}e^{\Sigma_i \delta^i E^i + \Sigma_i \lambda^i S^i}$$

Where

Q = Total cereal output
K = Total area sown
T = Number of tractors and ploughs
R = Annual rainfall
E^i = Village Institute factors
S^i = Other factors such as soil type, other agricultural inputs, or labor.

Next, he derives the first difference logarithms to formulate the change in output, thus:

(b) $\log(Q_{t+1}) - \log(Q_t) = \beta[\log(K_{t+1}) - \log(K_t)] + \alpha[\log(T_{t+1}) - \log(T_t)] +$

$\sigma[\log(R_{t+1} - R_t) -] + \gamma(R_{t+1} - R_t) + [\log(E^i_{t+1}) -$

$\log(E^i_t)] + \Sigma_i \delta^i(E^i_{t+1} - E^i_t) + \Sigma_i \lambda^i(S^i_{t+1} - S^i_t)$

(Şimşek, 2006, p. 14)

Assuming that the change in S will be zero over time, this factor is disregarded, making the data for this variable unnecessary to be collected (Şimşek, 2006, pp. 13-14).

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[21] This information has been retrieved directly from the author himself through contacting by e-mail on December 4th, 2010. In his e-mail response, he also proposed that a fixed effects estimator would probably reveal more reliable results than the first difference estimator that was used in the paper.

At this point, it is important to mention that Şimşek's choice of first differences limits the analysis to modeling the annual changes in a relatively shorter period (1949-52), whereas the model that will be used in this thesis allows investigating the impact of various factors on wheat productivity over a longer period of time (1940-66). The details of the model chosen for this thesis will be explained further in section 7.

5.9. Counter-arguments on the Village Institutes

The reasons behind the official decision to terminate the Village Institutes could be traced back to political as well as pedagogical perspectives (Stone, 1974, p. 423). The Village Institutes have attracted much criticism, most of which focused on (1) their efforts to raise revolutionary mentality among the students (Vexliard & Aytaç, 1964, p. 45) and (2) labour intensive workload which did not let the students improve themselves in the cultural field (Yener, 1999; Turan, 1979, p. 168). Moreover, the villagers accused the teachers of not "*showing a good example from the religious standpoint*" (Vexliard & Aytaç, 1964, p. 45).

One of the core aims of the VIs was to train teachers who would best fit the rural conditions and customs. However, Dr. Mümtaz Turhan[22] – Professor of Experimental Psychology at Istanbul University back then – suggested that "*the graduates of the VIs were simply disaffected and alienated from rural customs*" (Stone, 1974, p. 424). He defended that the VI students were too young and inexperienced to overcome the resistance from the inhabitants of the villages they have been sent to (Stone, 1974, p. 424). At this point, one must keep in mind that the graduates were assigned such excruciating responsibility: They were obliged to teach the villagers new techniques in agriculture which they have never heard of before, make them start cultivating

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[22] "One of the most prestigious opponents of the Village Institutes was Dr. Mümtaz Turhan, then Professor of Experimental Psychology at Istanbul University. His attacks on the Village Institutes were all the more influential because he was of eastern Anatolian stock and had kept in touch with village conditions." (Stone, 1974, p. 423)

crops they have never grown before or adopt a completely new approach to agriculture. While doing so, they had to abolish the dogmas and the old customs that the villagers had established centuries ago. Besides, the teachers were already despised by some of the villagers for their superiority, which is not at all surprising. Leaving the village as an 11 year old child, the graduate of the VI comes back to his village as a 16 year old young teacher who is obliged by law to make the villagers adopt the new techniques in agriculture as well as broaden or even change their perspectives in more abstract fields like literature, drama, philosophy, religion and politics. As the most knowledgeable and educated person in the village, the 16 year old village teacher was most certainly exposed to some level of jealousy and resistance, one of the reasons being that the age hierarchy is a core element of Turkish culture.

Another argument presented by Dr. Turhan is that the VI graduate teachers did not train the children to enable their admission to institutions of secondary and higher education (Turhan, 1967 as reviewed in Stone, 1974 p.424). Therefore it can be suggested that Dr. Mümtaz Turhan's criticisms regarded the contribution of the VIs to formal education rather than agricultural productivity and thus will not be further discussed in this paper.

A further criticism was charged by Nureddin Ergin, who directed his focus on the living conditions at the institutes. He suggested, through his observations at the VI in Adapazarı at the North West region of Turkey, that the students' health was destroyed by the harsh schedule, primitive living conditions, heavy physical labor and inadequate diet (Stone, 1974 p.424). Moreover, he commented on the lack of democracy and science at the institutes, which was completely against the principles of the VI system (Stone, 1974 p.425).

The Village Institutes received intensive negative opinions in terms of their distance to religion. Among these stands out the writings of Nurettin Topçu, an academic in history, who holds a doctorate from the Sorbonne in France (Stone, 1974, p.426). He claimed that the efforts to Europeanize the Turkish youth were inappropriate and a distinctively Islamic renaissance should instead be encouraged (Stone, 1974, p.427). This advice appealed to many Turkish Muslims and they considered the advocators of the VIs "godless communists". Having been considered a *"religious reactionary"* by intellectuals, Topçu's *"arguments have been ignored by the makers of Turkish educational policy in the Ministry of Education."* (Stone, 1974, p. 427).

In addition to the above, there were other reasons behind the VIs termination which were less pronounced yet more effective. Parvin & Hiç (1990) suggest that a good number of seats in the parliament supporting the Republican government were occupied by large land owners at the time (p.212). The efforts to establish the land reform was the first action from the government which put their authority and well-being at risk, and now the VIs were training highly skilled and well educated teachers who had the duty of raising awakened peasants (Ahmad, 1993, p. 83). On the other hand, *"the landlords were loath to see literate and politicized peasants who understood their rights and were capable of articulating their grievances"* (Ahmad, 1993, p. 82). Feeling threatened by the VIs efforts to awaken the peasants (Karaömerlioğlu, 1998a, p. 62), the aghas and big landowners joined forces under the roof the new and expanding Democratic Party (DP) in 1946, ending the single-party regime (Parvin & Hiç, 1990, p. 212). They denounced étatism and encouraged liberal economy, while rejecting land reform and supporting agricultural reform instead (Parvin & Hiç, 1990, p. 212).

6. THE INFLUENCE OF THE VILLAGE INSTITUTES

In this chapter, the impacts of VIs on the economy, agriculture and community development will be discussed. As the previous literature regarding this field lacks useful quantitative analysis, the discussion on the VIs' influence will have to remain highly hypothetical. Some examples from the story of the VIs will be presented in order to create an understanding of why one must expect positive influences from the institutes, yet the individual effects of these examples will not be quantified.

6.1. On the Economy

Kirby (1962) posits that the VIs had valuable contributions to the economic lives of the villages that were located nearby and quotes the following observations about how the economy was revived by the Village Institute that was located in the Hasanoğlan Village in Ankara:

> By becoming a market for the neighbouring villages, Hasanoğlan village slowly adopted features of township. The inhabitants of Hasanoğlan village applied to the related institutions to obtain a permit for setting a bazaar once every week. There were also some who attempted to construct a hotel in the village. The shops increased their supply and the variety of products, bringing economic competition to the village. (Yasa, 1955, p. 238-9 cited in Kirby 1962, p. 296, translated by Ayşegül Girgin)

Kirby (1962) also discusses the indirect impacts of the VIs on the economy of their neighbourhood. For example, a section for goods trains was constructed at the train station near Hasanoğlan VI in order to deliver supplies to the institute, which in time was also utilized by the other economic entities in the area and along the route (Kirby, 1962, p. 298). Similarly, a bridge was constructed for Düziçi VI in Adana, which eventually connected the villages and district centres with the urban city centre (Kirby, 1962, p. 298). Gönen VI in Isparta was located in an

area which was potentially wealthy yet was isolated from the market due to insufficient availability of transportation. Therefore this region was among the first to be part of the new road construction project after the Second World War, thanks to the formal endeavours of Gönen VI (Kirby, 1962, p. 298). Pazaören VI in Kayseri constituted a major reason for the regular maintenance and improvement of a 50 km stretch of road which was immensely important for the interaction of the villages with the urban centres (Kirby, 1962, p. 298).

The direct economic impacts of the institutes have been discussed by Kirby (1962) through the initiatives they have started due to lack of opportunities. For example, the infertility of the land provided to Arifiye VI in Adapazarı made them focus on fishing in the nearby lake Sapanca, which the inhabitants had not until then thought of doing at a commercial level. The institute also planted fruit gardens in the area, a practice which was not widely spread before. Soon, the area became an important supplier of fish and fruits, whose market extended even to Istanbul (Kirby, 1962, p. 299). Another VI which focused on fishing due to land infertility was Beşikdüzü VI in Trabzon. Due to the tough conditions for fishing in the Black Sea, Beşikdüzü VI found a way to compete in the fish market by starting a tinning industry, producing canned fish (Kirby, 1962, p. 300). Kepirtepe VI in Kırklareli, a city located in the European region of Turkey, brought an important benefit to its neighbourhood by constructing the first artesian well, providing sanitised drinking water to the village. The news spread quickly and a number of other wells were constructed by other farmers throughout the European side. Previously low-yield fields became the main source of fruits and vegetables for large cities like Edirne and İstanbul. Soon land reclamations began and land prices increased in the area (Kirby, 1962, p. 300).

Nevertheless, Kirby (1962) argues that one must not expect to observe the true economic impacts of the institutes as their initial system survived for only 6 years before they reduced emphasis on

work education (p.302). Kirby's study does not present any statistical analysis on the economic impacts as it was a dissertation for her PhD in the field of education, not economics. In this study, the contribution, if any, of the VIs to agricultural productivity growth will be analysed as far as the data in hand allows.

6.2. On Agriculture

The VIs did not work in a closed system. They were always in interaction with the public. Article no.6 in the Law of Village Institutes obliged the VI graduates to serve as village teachers back in their home villages with the parallel duty of teaching the villagers agricultural techniques and how to approach agriculture in a scientific way by applying these methods on the fields, gardens and workshops provided to them by the government (Şeren, 2008). First of all, the villagers could easily see what the students were doing on the field. There is a convincingly large number of written accounts in which VI teachers and graduates tell of villagers visiting their fields and challenging their agricultural method. In time, as they saw that the students were making many things possible on those fields which the villagers once thought were impossible, they themselves started to adopt those techniques or retrieve the same materials to use in their own fields. The excerpt from the memoirs of a VI graduate on page 52 is interesting in the way that it pictures the agricultural knowledge spillover process that initiated once he started teaching at his home village.

FROM LOW-INCOME CEREAL FARMING TO CASH-BEARING APPLE GARDENS...

TMMOB Ziraat Mühendisleri Odası İzmir Şubesi (1995) presents a few interviews that were done with some former VI teachers. Süleyman Aydemir states that his village (in southwest Turkey) had no more than three trees in total when he first arrived there to start teaching at the elementary school. Together with two other teachers and one health technician who had graduated together with him from Gönen VI in Isparta, they decided to plant a garden. Aydemir tells his experience with the following words:

> We distributed some of the good vegetable seedlings to the villagers one month before the time they used to plant them in the previous years. This enabled harvesting the vegetables one month earlier, extending the vegetable farming period by one month. […] I, teacher Hüseyin Avni Topçu, teacher Esat Ercan and health technician Halil Durmaz were at our village's service as the four VI graduates. In school, we spread the secular and revolutionary ideologies brought by the reforms of Atatürk to found the Republic of Turkey. Outside, we had planted fruit gardens. 'The Turks have their brains in their eyes' says an old proverb. We did it, and showed them. In 1954 all four of us planted apple trees – on an area of $1000m^2$ each. The saplings belonged to two different kinds of apples and we retrieved them from the nearby agricultural office and the VI that we graduated from. In addition, I planted another apple garden on an area of $4000m^2$, where I grew two more kinds of apples. The villagers were just watching. I had planted the trees with 8m distance to each other. They criticized me for wasting too much space. They did not have any technical knowledge. They thought the harvest would be larger in scale if more trees were planted with shorter distance. […]We did not have water for irrigation. We carried barrels of water by a horse carriage from a 2km distance. […]Two years later I tried to drill a wellbore, but I failed to find water. So I built a simple dug-well, which also failed to collect enough water. I was able to irrigate only 9 trees a day. (TMMOB Ziraat Mühendisleri Odası İzmir Şubesi, 1995, pp. 21-22)

With his trees reaching maturity in 1968, Aydemir states that he harvested apples so big that two of them could weigh more than a kilogram. He says he also was competent in apiculture, and he won an agricultural competition with his honey, which rewarded him with 50 liras of money and some hand-tools.

However, the villagers did not respond to his success until he managed to make the first sale from his village to İstanbul and received 13,750 Turkish Liras, which was a rather high amount at the time. His colleague Hüseyin Avni Topçu sent his apples to İstanbul too. The villagers compared this revenue from apples to their revenue from cereals. Even farmers who harvested a land of $100.000m^2$ were not able to earn this much from cereals. In 1970, the rest of the villagers started planting apple trees, with Aydemir and his colleagues there to help them at every stage.

> Today, the apple gardens in my village occupy $7 km^2$. The village earns 30 billion Turkish Liras a year from apples, which is a very large amount. The increase in income enabled villagers to buy tractors. They started to build brick-houses and are no longer living under roofs made of clay. They have electricity, water and television at their homes. Most even have automobiles. The village is alive and ambitious now, it's producing and consuming in a civilized way, which is making us happy. (TMMOB Ziraat Mühendisleri Odası İzmir Şubesi, 1995, p. 23)

Excerpt 1. Memoirs of a Village Institute graduate. (Quotes translated by Ayşegül Girgin)

The example presented in Excerpt 1 on page 52 is unique in its details, yet highly similar to numerous other success stories told by many other VI teachers and graduates (Aydın, 2007; TMMOB Ziraat Mühendisleri Odası İzmir Şubesi, 1995; Şimşek, 2006). This kind of spillover is essential as it usually results in a better product and/or increased productivity or at least increased variety, which consequently increases the farmers' income.

The effects of VI graduates, however, were not only about unintentional knowledge spillovers. They had direct effects in agricultural productivity, as they themselves spent valuable efforts to help the villagers directly in various ways from suggesting new techniques to giving them new and healthy saplings and seedlings (TMMOB Ziraat Mühendisleri Odası İzmir Şubesi, 1995). In many occasions, the emergence of a VI in a village brought many developments in the infrastructure, such as drainage of swamps, building aqueducts and bridges, drilling wells and planting gardens and forests, while teaching the villagers why they were necessary and how they could be constructed and maintained (Stone, 1974; TMMOB Ziraat Mühendisleri Odası İzmir Şubesi, 1995).

The institutes aimed to equip the students in a way that would enable them to approach agriculture in a scientific way. They would learn how to analyze the products and the soil to improve their products. In addition to this, they would know the scientific facts that explained how certain methods worked to increase productivity in agriculture. They were expected to use this background to choose or develop the best combination for matters related to irrigation, fertilizer, planting schedule and choice of seeds that would survive best in the climate and soil conditions of the field they were farming on. All these efforts were to increase the productivity as well as increasing the quality of the harvest. The same approach applied to the other branches

of agriculture such as horticulture, sericulture, apiculture and fishing (Altunya, 2000; Evren, 1998; Binbaşıoğlu, 1997; Kirby, 1962; Uygun & Kıncal, 2006; Karaömerlioğlu, 1998b).

6.3. On Community Development

Knowledge spillover did not exist only in agriculture, but also in arts and ideologies. Besides unintentional natural spillovers, the VIs intended to spread knowledge intentionally through the events they arranged for public.

Firstly, as previously mentioned, the Saturday night events were a great way for the neighbourhood to socialize while enriching their ideological world through the plays they watched or widening their musical perspectives by attending the concerts given by VI students (Aydın, 2007). This way, the rural population, most of whom were illiterate, was now able to at least grab a small piece from the cake of enlightenment. In addition to this, one would expect that the graduates of VIs were making an effort to integrate their own students into performing various types of arts once they become teachers in their home-villages, expanding the influence.

Secondly, the political ideologies were spreading from the VIs. The students were raised by Kemalist teachers and living in a highly democratic environment which made them strong defenders of terms like secularism, nationalism, populism, republicanism and democracy (Keleş, 2007). In this case, one might say it would not be wrong to expect such thoughts to be reflected on the dramas that they wrote and played for public, if not already spreading through their daily conversations. Moreover, once they became teachers themselves, it would not be absurd to predict that the graduates of VIs were probably raising their own students in the light of their ideologies.

7.   METHODOLOGY, DATA AND MEASURES

In this chapter, once the choice of statistical model for the analysis of data is introduced, the dimensions of the data will be explained. These will be followed by the descriptions of the sources of data, the definitions of the variables and finally the explanation of the regression model that will be used in order to investigate the interactions between the Village Institutes (VIs) and wheat productivity.

7.1.   Choice of dimension

As mentioned before, the main focus of this study is quantifying the extent to which the variations in wheat output per area (denoted by WY) can be explained by the variations in the number of village school teachers who own a Village Institute diploma (denoted by VIGT), in the Republic of Turkey, controlling for the variations in rainfall, elevation of the area from sea level, use of tractors and literacy rates. To answer this question, a set of data will be analyzed through pooled OLS regression of panel data, which is described as a set of data with both longitudinal and cross-sectional dimension.

The cross-section of Turkey with 63 cities will enable controlling for the geographical differences, whereas the longitudinal dimension will account for the changes through time. Moreover, panel data provides more observations, and is less vulnerable to multicollinearity problems (Gujarati, 2004, p. 637) compared to a set with one dimension, being cross-sectional or longitudinal.

Time span

The scale of this study's data set was highly dependent of the accessibility of data. After thorough exploration of various statistical records such as censuses and yearbooks that were

published both comprehensively and individually from 1927 to 2010, it was observed that the format and the content of a series of statistics could vary through different years of publishing. For example, the number of tractors and wheat yield are listed in the yearbook at province level one year, but only at national level another year. Similarly, the rainfall data is listed nominally in one year and as an average of the past several years in the yearbook of another year. Such non-uniformity in the availability of data required cropping the span of the data set down to a range that covers specifically the years 1940, 1941, 1942, 1964, 1965 and 1966.

Spatial dimension

The Republic of Turkey currently consists of 81 provinces. However, back in the 1927 there were 58 provinces, increasing to 67 in 1955. This was not because the borders of the Republic expanded, but because some provinces grew to such a great extent in population that they needed to assign province status to distant regions with enough population to achieve administrative efficiency. Therefore, for each year, 46 to 66 cities are used in the analysis, depending on which cities (i.e. provinces) have the data for all the variables in the model. This is achieved by carrying the analysis with SPSS (statistical analysis software) and choosing the option to omit the data points which lack a variable or more.

7.2. Data Sources

The data collected for this thesis were retrieved from two government institutions: (1) Turkish Statistical Institute[23] (TurkStat), which is run by the Prime Ministry of Republic of Turkey, and (2) Turkish State Meteorological Service[24] (TSMS), which is run by the Ministry of Environment

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[23] Official title of the organization in Turkish is "T.C.Başbakanlık Türkiye İstatistik Kurumu" (TÜİK). Official website: www.tuik.gov.tr.

[24] The official title of the organization in Turkish is "T.C.Çevre ve Orman Bakanlığı Devlet Meteoroloji İşleri Genel Müdürlüğü" (DMİ). Official website: www.dmi.gov.tr.

and Forestry of the Republic of Turkey. During the life of the republic, TurkStat changed its name a few times, and therefore appears as State Institute of Statistics[25] or General Statistical Office[26] as well as TurkStat in the citations made in this study.

Problems Related to Data

The data retrieved from TurkStat were in the form of scanned images which were difficult to transfer into the statistical analysis software. As the original hard copies of some of these documents have been damaged in the archives it has made the transfer process even more complex. This unfortunately brings together the suspicion that some of the numbers that are used in the analysis may be slightly different from reality due to readability problems.

The data on rainfall, retrieved from TSMS, has been obtained directly in spreadsheet format. However, it must be noted that the data belonging to the period before 1975 has not gone through quality control tests at TSMS, for which reason it is not certain that the data is entirely correct.

7.3. Variable Descriptions

Wheat Yield (WY)

Wheat yield is described as the kilograms of output per hectares of area sown for wheat. The output and area sown are usually given separately in the original sources, making is possible to calculate the yield by dividing the former by the latter.

The plausible problem with the variable is that the records were kept according to the forms collected from individual farm owners. With the average literacy rate of approximately 20

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[25] The Turkish name of the institution is "Devlet İstatistik Enstitüsü".

[26] The Turkish name of the institution was "İstatistik Umum Müdürlüğü" in the early years of the republic which was later replaced by "İstatistik Genel Müdürlüğü".

percent in the 1940s and 28 percent in the 1960s, one unfortunately cannot expect the farmers to be adequately precise in their book keeping.

Village Institute Graduate Teachers (VIGT)

This term refers to the number of elementary village school teachers in a province who have a Village Institute diploma. The numbers have been transferred from the archives of TurkStat that belong to the category of National Education Statistics and Statistics of Ministry of Education[27]. If the analysis could be carried out to cover the years 1942-1952, then it would have been possible to use the individual VIGT values that were observed each year. Unfortunately, the output of wheat per area is not available for these years. Therefore the value of VIGT will be zero for those years of analysis in the 1940s because the first batch of students graduated in 1942, whereas the value of VIGT in 1952 will be assumed to be constant through the years 1964-1966. This brings the limitation of accounting for the changes in the number of VI graduate teachers through time, due to various reasons such as immigration, death or change of career. However, the spatial variation for this variable, i.e. the variation across provinces, is still likely to have remained more or less the same.

Literacy Rate (LR)

Literacy rate refers to the number of people above the age of 7 (or 5 or 6 according to the year of census) who can at least read but not necessarily write in comparison to the total population. The values are in percentages and the numbers used for calculation have been transferred from the census records.

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[27] The terms are called "milli eğitim istatistikleri" and "maarif istatistikleri" in Turkish, respectively.

Since census data was collected in 5 year periods, there is no individual literacy rate information for every year. Therefore, the value of LR in 1935 will be used as a literacy proxy for the observations in 1940-1942, and that in 1960 will be used as a proxy for the observations in 1964-1966. This makes sense not only because literacy data does not exist for every year, but also because literacy is expected to have medium and long term effect, thus making a 5 to7 year lag legitimate for analysis.

Rainfall in Spring (SR)

SR refers to the total rainfall observed during the spring season, i.e. in March, April and May. The rainfall observed in the spring is vital as several sources refer to the importance of rain during this period (Smiley, Backhouse, Lucas, & Paulitz, 2009, p. 131; Ünal, Retrieved 15.02.2011).

Elevation (E)

Elevation refers to the location, in terms of the vertical distance from the sea level in meters, of the meteorology station at which the rainfall data was recorded.

Tractors (T)

The abbreviation T refers to the number of tractors in each province. Although it does not seem totally unreasonable to normalize this variable by area sown, the nominal figure is still useful as a proxy for technology. The majority of provinces are of similar size anyway, with the exception of the four large cities: İstanbul, Ankara, Adana and İzmir.

7.4. Model Specification

The main objective tested the extent to which the variations in output of wheat per area sown (kg/ha) could be explained by the variations in the rain that fell during the spring season, literacy rate of the province, the use of tractors and the number of village school teachers that hold a Village Institute diploma.

The model, which represents a pooled panel linear regression, follows:

$$(1) \qquad WY_{it} = \alpha + \beta_1 VIGT_{it} + \beta_2 SR_{it} + \beta_3 E_{it} + \beta_4 T_{it} + \beta_5 LR_{it} + \varepsilon_{it}$$

where i denotes the province and t denotes the year

and

WY = Kilograms of output of wheat per hectares of area sown for wheat
VIGT = Number of village school teachers who have a Village Institute degree
SR = Rainfall in kilograms per square meters observed in March, April and May
E = Elevation of the meteorology station from the sea level (in meters)
T = Number of tractors
LR = Percentage of population that is literate

Please note:

The value of $VIGT_i$ is zero for 1940-42, and equal to $VIGT_{i,1952}$ for 1964-66. Similarly, LR_i is equal to $LR_{i,1935}$ for 1940-42, and to $LR_{i,1955}$ for 1964-66 (Reasons explained in sub-section 7.3 on page 57).

8. DATA ANALYSIS AND RESULTS

This chapter is set aside for the results of the regression analyses which aim to investigate the relationship between the number of village teachers who own a VI diploma (VIGT) and per area wheat output (WY). Firstly, the adjustments made on the dataset and the treatment of the missing values will be explained in section 8.1. In section 8.2, the results of the first group of regression analyses will be presented. A positive coefficient with high statistical significance will be found for the variable VIGT where WY is the dependent variable. A test for heteroscedasticity will also be provided. In section 8.3, a reference will be made to Şimşek's (2006) findings that the VI-related factors interacted positively with literacy and parallel results will be obtained.

8.1. Modifying the Dataset

Certain adjustments have been made to the data in order to prepare it for analysis. The list of modifications is as follows:

Treating the missing values:

1. The data sources retrieved from the Turkish Statistical Institute had total number of tractors for the years of interest (i.e. 1940, -41,-42, -64,-65 and -66) at national level. The province based distribution of these tractors was not available for the years 1940,-41,-42. Therefore these values have been estimated by assuming that the growth rate in the total number applies to the growth rate in individual provinces. The calculations are explained in APPENDIX C.

2. Province level literacy rates for 1940 were not available in the 1940 census. These values have been estimated as the arithmetic average of the related values in 1935 and 1945.

Combining and eliminating data

The political map of Turkey has changed a number of times since the founding of the republic. Some districts gained the status of a province, and some provinces went down to district status

by connecting to a neighbouring province as their populations and economies changed. To attain equivalence throughout the dataset used for this study, the values relating to two different provinces in 1960s which used to be one in the 1940 were added up and represented as one province throughout the whole dataset. The list of provinces pertaining to this kind of adjustment is given in APPENDIX C.

8.2. OLS Regression with per area wheat output (WY)

OLS regression results for Equation (1) are represented below in

Table 4, where the dependent variable is WY (wheat output per area). Results of this first OLS analysis reveal an insignificant coefficient for E (elevation) as the p-value is 0.407. In this model, the coefficients of VIGT (VI-graduate teachers) and LR (literacy rate) as well as the constant are significant at 99.9% confidence level (i.e. $\alpha = 0.001$) and those of SR (spring rain) and T (tractors) are significant at 90% confidence level (i.e. $\alpha = 0.1$).

Table 4. Linear regression results for Equation (1).

	Coefficient	Sig.	df	F-sig.	Adjusted R^2	Durbin Watson
Constant	588.986	.000				
VIGT	.565	.001				
SR	.444	.033	323	.000	.275	1.694
E	.029	.407				
T	.037	.075				
LR	7.617	.000				

Dependent variable: WY

The above results imply that a model that excludes the variable E could be useful. Thus the new model to be tested is presented below:

(2) $$WY_{it} = \alpha + \beta_1 VIGT_{it} + \beta_2 SR_{it} + \beta_4 T_{it} + \beta_5 LR_{it} + \varepsilon_{it}$$

Table 5. Linear regression results for Equation (2).

	Coefficient	Sig.	df	F-sig.	Adjusted R^2	Durbin Watson
Constant	623.756	.000				
VIGT	.609	.000				
SR	.429	.038	323	.000	.276	1.688
LR	6.806	.000				
T	.035	.090				

Dependent variable: WY

As illustrated in Table 5 all measures are significant at 90% confidence level (i.e. $\alpha = 0.1$), with VIGT and LR being more significant with p-values even below 0.001. The adjusted R square of Equation (2) is 0.1 percentage points higher than that of Equation (1), meaning that the model which excludes the variable E explains only 0.1 percent more of the variations in output of wheat per area (WY). The F significance is satisfying for both models, meaning that the F statistic for both models was good enough to reject the null hypothesis that all coefficients are zero.

According to the final results of the model, one more VI-graduate teacher in a province is expected to increase its wheat productivity by 609 grams per hectare. The coefficient for literacy rate (LR) is implies a large increase in wheat productivity (by 6.806 kilograms per hectare) for each person per 100 inhabitants that become literate.[28] The coefficient for literacy rate is statistically significant at 0.05 alpha level and insignificant at 0.01 level, thus the model is acceptable only if the precision is not essential for estimating the marginal changes in wheat productivity. The p-value for the coefficient of number of tractors (T) is debatable as well: It is

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[28] For example, in a province with 50 percent literacy rate, the wheat output per hectares is expected to increase by 6.806 kilograms when the literacy rate increases to 51 percent.

only significant at 0.1 alpha level, which means that there is 9 percent chance that the actual value of the coefficient is not different from 0. Therefore it might be useful to run the model again without the machinery variable if precision is essential. Thus the following equation:

(3) $$WY_{it} = \alpha + \beta_1 VIGT_{it} + \beta_2 SR_{it} + \beta_4 LR_{it} + \varepsilon_{it}$$

Table 6. Linear regression results for Equation (3).

	Coefficient	Sig.	df	F-sig.	Adjusted R^2	Durbin Watson
Constant	620.589	.000				
VIGT	.704	.000	323	.000	.272	1.695
SR	.389	.059				
LR	7.454	.000				

Dependent variable: WY

As seen in Table 6, omitting the variable T from the equation results in an increase in values of all the coefficients, an increase in SR's p-value and a drastic decrease in LR's p-value, whereas the adjusted R^2 is reduced by only 0.6 percentage points.

8.2.1. Testing for Heteroscedasticity

Heteroscedasticity[29] refers to a non-uniform spread of the variance of the error term across observations, which is a simple violation of the assumptions of the classical linear regression methods (Feinstein & Thomas, 2002, p. 309). When it occurs, the size of the error term across observations displays a *"clear, systematic pattern of distortion"* whereas the classical linear regression methods assume random differences in the size of the error term (Feinstein & Thomas, 2002, p. 309). Heteroscedasticity does not affect the regression coefficients, but the statistical significance of the independent variables. For example, in

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[29] Also spelled as "heteroskedasticity" in some sources.

extreme cases of heteroscedasticity, a variable might in reality be irrelevant for the model yet it might appear statistically significant according to regression results (Feinstein & Thomas, 2002, p. 311).

Formal tests such as the Goldfeld-Quandt, Breusch-Pagan and White tests are commonly used to diagnose heteroscedasticity (Feinstein & Thomas, 2002, p. 311; Gupta, 1999, p. 7[12]; Goldfeld & Quandt, 1965). For convenience reasons, White test will be employed on model (2) presented in section 8.2.

As instructed in the publication titled "SPSS for Beginners" by Gupta (1999), steps to carry out a formal White's test (pp. 7[21-24]) have been performed. As instructed, four new variables were constructed by taking the squares of each variable. These were labelled: sq_vigt, sq_sr, sq_lr and sq_t. Next, six other variables were constructed by multiplying every two variables with each other. These were labelled: Vigt_SR, Vigt_T, Vigt_LR, SR_T, SR_LR, and T_LR. Finally another new variable was constructed by taking the square of the residual of every observation[30] and given the name sq_res. After this, all the original and new variables are processed in a linear regression model with sq_res as the dependent variable. The regression results of the White's test for heteroscedasticity are presented in Table 15 in APPENDIX B, and the model summary is presented in Table 7 below.

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[30] All these new variables were constructed by the TRANSFORM / COMPUTE function in SPSS 17.0.

Table 7. Model summary for White's test on Equation (2).

R	R Square	Adjusted R Square	Std. Error of the Estimate
.202	.041	-.003	1.81202E5

Predictors: (Constant), T_LR, SR, sq_vigt, sq_lr, SR_T, sq_t, Vigt_SR, sq_sr, SR_LR, VIGT, Vigt_T, Vigt_LR, LR, T

Dependent Variable: sq_res

As instructed in Gupta (1999), the final step is to multiply the number of observations (n) with R square and compare the resulting value with the Chi-Square (χ^2) for the same number of observations (p. 7[24]). Thus:

$$n \times R^2 = 323 \times 0.041 = 13.24$$

and

$$\chi^2(323) = 365.91 \quad \text{for } \alpha = 0.05$$

As $n \times R^2 < \chi^2$, heteroscedasticity cannot be confirmed

8.3. Simple Regression on Literacy Rate

Şimşek (2006) suggest that the VIs achieved their educational goals (p. 10). However, his argumentation remains weak as he only provides simple quantitative evidence like the overall increase in the number of teachers, number of students and literacy rate. He unfortunately does not quantify the extent to which this increase can be attributed to the VI-related factors.

In this section, the contribution of the VIs to the increase in literacy rate will be investigated through a regression model where the number of village teachers who own a VI diploma (VIGT) in 1952 will be the independent variable and the literacy rate in 1960 will be the dependent

variable. This is expected to answer the question of how much the VI-graduate teachers can influence the literacy rates in 8 years.

Please note that the analysis is carried at province level and a time lag of 8 years is assumed. The following model is used to explain the relationship:

$$(4) \qquad LR_{i,1960} = \alpha + \beta_1 VIGT_{i,1952} + \varepsilon_{i,1960}$$

The results for the above regression model have been presented in Table 8, which imply that 18.7 percent of the variations in the literacy rate can be explained by the changes in the number of VI graduate teachers. According to the results, 100 more VI grad teachers is expected to increase literacy rate by 4.2 percent in 8 years.

Table 8. Regression results for Equation (4).

	Coefficient	Sig.	df	F-sig.	Adjusted R^2
Constant	17.602	.000	62	.000	.187
VIGT	.042	.000			

Dependent variable: LR_{1960}

In order to increase the degree of freedom, the same analysis can be made with a time dimension in addition to the cross-section. In this case, the data available allows analyzing a pool of data that pairs up LR_{1960} with $VIGT_{1952}$, and LR_{1935} with $VIGT_{1927}$. Nevertheless the value of VIGT is zero for all cities prior to 1942 rendering the cross-sectional dimension meaningless for half of the pool. However, the longitudinal dimension will gain meaning in this case. The model is presented as follows:

(5) $$LR_{it} = \alpha + \beta_1 VIGT_{i,t-8} + \varepsilon_{it}$$

The results for the above model, which are represented in Table 9, suggest that 43.1 percent of the variations in LR are explained by the changes in VIGT. According to the quantitative results, 100 more teachers who own VI diplomas are expected to increase the literacy rate by 5.3 percentage points in 8 years.

Table 9. Simple regression results for Equation (5).

	Coefficient	Sig.	df	F-sig.	Adjusted R^2
Constant	14.132	.000	119	.000	.431
VIGT	.053	.000			

Dependent variable. LR

9. CONCLUSION AND EVALUATION

In this concluding chapter, the results of the analyses will be summarized. A discussion on the weaknesses and certain errors pertaining to the database and the analysis method will be presented in section 9.3. Finally, the study will be completed with a section on ideas for further research on the Village Institutes experience of Turkey within the context of their influences on agricultural productivity.

9.1. Summary of Results

The aim of the study was to investigate the interaction between human capital and agricultural productivity through the case of the Village Institutes (VI) project of the Republic of Turkey in the middle of the twentieth century. The results of the quantitative methods employed in this study showed that a statistically significant positive relationship exists between the VI-graduate teachers (VIGT) and wheat output per area (WY). A set of pooled panel data with the spatial dimension covering all 66 provinces in Turkey and the time dimension covering the years 1940, -41, -42, -64, -65 and -66 has been employed.

Among the control variables, the amount of rain that falls in the spring season and the literacy rate were found to have the highest statistical significance, both with positive coefficients. Number of tractors, on the other hand, had debatable statistical significance whereas that of elevation from sea level was unquestionably low.

The second part of the analysis involved quantifying the relationship between the VI-graduate teachers (VIGT) and literacy rate (LR) assuming an 8-year time lag. The coefficient for VIGT was positive and statistically significant. However, the R^2 was only 0.187, which alleviates concerns about a potential multicollinearity between VIGT and LR, when they were used as

independent variables in the same model when explaining the variations in per area wheat output in the previous section.

To sum up, the analysis provides evidence that there is a great chance that the VIs contributed positively to agricultural productivity growth, which was just one of the intended aims of the VIs. The extent to which the institutes were able to achieve their social, political and intellectual aims has not been quantitatively tested, yet qualitatively discussed through examples from the literature.

Nevertheless, it must be taken into account that these analyses are sensitive to choice of variables, time lags and estimation methods. The set of choices made for this study has revealed results in the favour of the VIs. However, it is not guaranteed that a different combination of variables and time dimension or an outlier analysis will not change the results.

9.2. Theory Implications

The results of the analyses presented in this study are in parallel with the general view on the existence of a positive relationship between education and productivity. However, when further details into this theory are considered, this study remains weak in terms of meeting the secondary conditions of the discussion fields. For example, the results of this study are hard to discuss in terms of Schultz's (1964) argument that human capital is more important for productivity growth in modern rather than traditional agriculture. The measurement of modernity in Turkish agriculture remains highly problematic for the period 1940-1970. The sudden increase in the number of agricultural tools and machinery by the help of the Marshall aid that was received in 1948 (Republic of Turkey Ministry of Agriculture and Rural Affairs, May 2004, p. 20) might have contributed to the modernization of agriculture, yet the magnitude of the effect was not

possible to measure. In order to define the level of modernity in Turkish agriculture, one needs to thoroughly analyze all the government plans and initiatives as well as the production and imports of agricultural materials, tools and machinery. Since this was beyond the scope of the project, not enough can be said about the modernization level of Turkish agriculture for the period investigated, thus no strong connections can be made to Schultz (1964).

9.3. Limitations / weaknesses of the Analysis

This study, like numerous other economic and social studies, was subject to certain limitations and weaknesses. Among these, reliability of data, accuracy of the estimates, limitations of the longitudinal dimension and the assumption of a linear relationship will be discussed in this section.

9.3.1. Reliability of Data

There is always a risk that the data collection method that had been used by primary data source was subject to certain faults. Unfortunately, this is usually very hard to detect. Turkey is infamous for its informal economy, which makes it harder to both the government and the academics to increase precision in their research. For example, the data on the wheat production or number of tractors only covers the numbers on which tax was paid, yet one must keep in mind that book keeping has been a major problem in the Republic of Turkey. The reliability of the rainfall data, on the other hand, can be discussed through the locations of the meteorology stations. Some provinces are so large that the weather conditions change across different parts of the province. For example, the meteorology station might be located in a relatively dry part of the province and thus present low rainfall figures. It might be that the fields lie in the wetter parts of the province.

Besides primary data collection errors, transferring the published data into analysis software has been problematic. Therefore the data set used in this study was subject to both the defects of the data collection and to those of presenting it. In a couple of cases, the province level values did not add up to the total value that was presented in the original source and certain assumptions had to be made. There were also times when the data source was hard to read, as it was quite old. Due to the choice of font, a "3" could look like an "8" or a "5" could look like "6". The reading errors have been minimized by row and column summation methods whenever it was possible, yet there might still be some which might have been overlooked.

9.3.2. Accuracy of the Estimations

The missing values for the literacy rates in 1940 have been estimated as the arithmetic average of the related values in the previous and next censuses. This assumes a linear change in a period of 10 years, which may not necessarily be the case.

Similarly, the missing values for province level number of tractors for 1940, -41 and -42 have been estimated by assuming equivalent rate of growth in all provinces as the growth in the national figures. Although the results presented in this study has employed the estimations that were based on the data from 1948, the results which uses 1964 based estimations changed the results by less than 1 percent, which is acceptable.

9.3.3. Limitations with the Time Dimension

The VIs existed between 1937 and 1954, with the first graduates starting their duties in 1942, and the emphasis on the work education being reduced in 1946. Therefore, the graduates of the years from 1942 to 1946 are expected to be the most effective ones in terms of agricultural development. Assuming a time lag of 5 years during which these graduates

work to earn the respect of the villagers and prove their methods in agriculture, the wheat output for the years between 1947 and 1952 would have been the best indicators. Moreover, the values for the VIGT variable for most of these years were available. Unfortunately, the data available on the wheat yield for these years were only at national level. At this point, one might argue that the provincial distribution of wheat productivity might be estimated assuming constant ratios from the next available year. However, as mentioned before in section 3.3, the wheat productivity was subject to convergence across the provinces, which makes it redundant to assume constant ratio between provinces.

9.3.4. Limitations of Linear Regression

Linear regression models, self-explanatory by the name, assume linear relationships between the dependent variable and each of the explanatory variables (Feinstein & Thomas, 2002, p. 302). However, this may not always be the case. In multivariate regression models, non-linearity can be tested by applying single regressions for the dependent variable with each of the independent variables separately and see if the coefficients found in the simple regressions are close to those obtained by the multivariate model (Feinstein & Thomas, 2002, p. 303).

Table 10. Coefficients of variables in the multivariate and
simple models.

Variables	Multivariate model		Simple model	
	Coefficient	Sig.	Coefficient	Sig.
VIGT	.609	.000	1.151	.000
SR	.429	.038	.555	.016
LR	6.806	.000	12.244	.000
T	.035	.090	.132	.000

Dependent variable: WY

The second column in Table 10 above, displays the coefficients of the variables in the multivariate model which was first introduced in section 8.2 on page 63. The fourth column displays the coefficient of each variable when it is employed as the only explanatory variable against WY. Comparing the values of the coefficients for each variable, SR is distinguished as the only variable whose coefficient does not change to any large extent when used for simple regression. All the other coefficients almost double when switched to a simple regression model. This might mean that the relationships are not in fact linear, signalling the necessity to test for a non-linear regression model. Of course, it is a question of intended precision again: Is a change of 100% for the coefficients from multivariate to simple models enough to decide that a non-linear regression model must be used, or can one still hope the best out of a linear model up until differences like 300 or more percent? However, the theory of statistical methods falls beyond the scope of this thesis.

9.4. Ideas for further research

The first suggestion to improve the analysis presented in this study is to use the same dataset to carry out a non-linear regression analysis. Besides this, there are a number of adjustments that can be made in the research question. This can be done by scanning through Section 2.2 of this study.

Jamison & Moock (1984) suggest that a large number of studies assume that education increases one's likeliness of adopting innovations, which is expected to increase productivity (p. 68). For instance, one can design a study to investigate the extent to which the VIs affected the population's approach towards innovation. The frequency of usage of a new type of fertilizer or a new irrigation technique may be a good indicator of innovation adoption. Next, the effect of the new innovation on agricultural productivity can be measured.

The second idea for further research may be inspired by Lockheed, Jamison & Lau (1980), whose findings show strong correlation between elementary school education and farm efficiency, with more likeliness of a positive relationship in modernizing agricultural environments than in traditional ones (p.61). If information can be retrieved on the modernization levels of different provinces in Turkey, the sample can be grouped according to this criterion and they could be tested for the strength and sign of the mentioned relationship. Next, another analysis can be designed to measure the extent to which this difference in farm efficiencies between modernizing and traditional agricultural environments can be attributed to the number of VI-graduate teachers in the respective regions.

Third, similar to what Mineo (2010) and Appleton & Balihuta (1996) have done, the relationship between VIGT on off-farm mobility can be analyzed. For this purpose, the off-farm mobility can be indicated by change in the ratio of farm families to total population in the province, as the number of individuals employed in agriculture in Turkey is harder to find than the number of farm families. Nevertheless, even the latter has not been recorded in all of the censuses, but only a few.

10. APPENDICES

APPENDIX A – Statistics on Turkey and the Village Institutes

Table 11. Overall literacy and distribution of
literacy by sex, Turkey, 1935-2000

Year	Overall literacy rate	Literacy rate among males	Literacy rate among females
1935	19%	29%	10%
1940	25%	36%	13%
1945	30%	44%	17%
1950	32%	45%	19%
1955	41%	56%	26%
1960	39%	54%	25%
1965	49%	64%	33%
1970	56%	70%	42%
1975	64%	76%	50%
1980	67%	80%	55%
1985	77%	86%	68%
1990	80%	89%	72%
2000	87%	94%	81%

Source: TurkStat (December, 2008, p18)

Table 12. Evolution of the Village Institutes from 1937 to 1954: Number of teachers, students and institutes at national level.

Academic year	Number of teachers			Number of students			Number of institutes
	Female	Male	Total	Female	Male	Total	
1937 - 1938	5	21	26	60	526	586	2
1938 -1939	7	34	41	85	711	796	3
1939 - 1940	10	50	60	166	1,401	1,567	4
1940 - 1941	46	189	235	500	5,163	5,665	14
1941 - 1942	80	214	294	775	7,277	8,052	17
1942 - 1943	101	259	360	1,008	9,153	10,161	18
1943 - 1944	128	298	426	1,595	12,571	14,166	18
1944 - 1945	145	360	505	1,765	13,796	15,561	20
1945 - 1946	119	403	522	1,727	13,806	15,529	20
1946 - 1947			547	1,336	12,822	14,158	20
1947 – 1948			642	1,078	11,814	12,892	20
1948 – 1949			709	773	11,244	12,071	21
1949 – 1950			672	721	13,251	13,972	21
1950 – 1951			597	773	13,322	14,090	20
1951 – 1952			570	706	12,467	13,173	20
1952 - 1953			544	881	11,312	12,193	20
1953 - 1954			449	951	11,981	12,932	20

Source: Transferred from Altunya, 2000, p.47 which was cited from Gedikoğlu, 1971.

Table 13. Total number of village school teachers and number of those who have VI diplomas. (1939, 1946 and 1950)

Year	Total number of village school teachers	Number of village teachers graduated from a VI
1939	6 847	0
1946	11 533	5 225
1950	18 426	13 182

Source: Şimşek (2006, p.11)

Table 14. The Village Institute Education Program, 1943.

Courses	Year 1 (hr/week)	Year 2 (hr/week)	Year 3 (hr/week)	Year 4 (hr/week)	Year 5 (hr/week)	Total number of hours for 5 years
A-GENERAL STUDIES						
Turkish	4	3	3	3	3	736
History	2	2	1	1	1	322
Geography	2	2	1	1	-	276
Civics	-	1	1	-	-	92
Mathematics	4	2	2	3	2	598
Physics	-	2	2	1	1	276
Chemistry	-	-	2	2	-	184
Nature and school health	2	2	2	1	1	368
Foreign language	2	2	2	2	1	414
Handwriting	2	-	-			92
Arts and crafts	1	1	1	1	1	230
Physical education and national games	1	1	1	1	-	184
Music	2	2	2	2	2	460
Military training	-	2	2	2	2	368
Housekeeping and childcare	-	-	-		1	46
Pedagogy *	-	-	-	2	6	368
Agricultural business economics and cooperatives	-	-	-	-	1	46
Totals	22	22	22	22	22	5060
B-AGRICULTURAL STUDIES						
Agriculture	-	3	4	2	1	580
Horticulture	8	4	3	3	2	1160
Agriculture of industrial crops and rural crafts	-	-	1	1	2	232
Zootechnics	1	2	2	1	2	464
Poultry farming	2	2	-	-	-	232
Apiculture and sericulture	-	-	1	2	2	290
Fishing and fishery products	-	-	-	2	2	232
Totals	11	11	11	11	11	3190
C- MALE ARTISAN STUDIES (One of the following)						
Ironworking	11	11	11	11	11	3190
Woodworking	11	11	11	11	11	3190
Construction	11	11	11	11	11	3190
C-FEMALE ARTISAN STUDIES (One of the following)						
Needlework	11	11	11	11	11	3190
Weaving and Textile	11	11	11	11	11	3190
Agricultural Studies	11	11	11	11	11	3190

Source: Altunya, 2000 p.43-44; Şimşek, 2006, p.7

APPENDIX B – Regression Results

Table 15. Regression results for the model constructed for White's test on Equation (2),

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	86662.194	84102.227		1.030	.304
	VIGT52	-452.550	413.821	-.387	-1.094	.275
	SR	671.183	569.893	.306	1.178	.240
	T	46.050	78.717	.260	.585	.559
	LR	-1435.708	4963.209	-.098	-.289	.773
	sq_vigt	.241	.651	.087	.371	.711
	sq_sr	-1.333	1.046	-.292	-1.275	.203
	sq_t	-.003	.007	-.087	-.489	.625
	sq_lr	57.616	68.329	.221	.843	.400
	Vigt_SR	1.364	1.534	.238	.889	.375
	Vigt_T	.082	.121	.173	.676	.500
	Vigt_LR	-2.070	10.723	-.062	-.193	.847
	SR_T	-.029	.180	-.028	-.159	.874
	SR_LR	-12.798	17.489	-.209	-.732	.465
	T_LR	-1.259	1.815	-.267	-.693	.489

Dependent Variable: sq_res

APPENDIX C – Data modification

Table 16. Number of tractors at province level and as national totals,
Turkey, 1940-42, 1948 and 1964-66.

	1948[a]	1940[b]	1941[b]	1942[b]	1964[c]	1965[d]	1966[e]
National Total (given)	2161	1066	1039	1012	51781	54099	65103
Ratio of the total figure to that in 1948		0.493	0.481	0.468			
Adana	661	326	318	310	5848	4152	6936
Adıyaman	0	0	0	0	57	132	166
Afyon Karahisar	8	4	4	4	748	801	878
Ağrı	0	0	0	0	53	82	185
Amasya	10	5	5	5	785	841	913
Ankara	85	42	41	40	3750	4530	5297
Antalya	208	103	100	97	1354	1434	1696
Artvin	0	0	0	0	3	3	2
Aydın	118	58	57	55	4174	3997	4007
Balıkesir	15	7	7	7	1282	1459	1652
Bilecik	2	1	1	1	54	74	113
Bingöl	1	0	0	0	9	7	10
Bitlis	0	0	0	0	60	76	77
Bolu	6	3	3	3	359	410	451
Burdur	5	2	2	2	250	297	382
Bursa	8	4	4	4	1463	1548	1751
Çanakkale	8	4	4	4	495	507	736
Çankırı	2	1	1	1	175	164	234
Çorum	9	4	4	4	611	3	749
Denizli	17	8	8	8	689	624	930
Diyarbakır	9	4	4	4	137	789	580
Edirne	17	8	8	8	1291	263	1900
Elazığ	4	2	2	2	268	1278	321
Erzincan	2	1	1	1	166	303	271
Erzurum	2	1	1	1	137	176	166
Eskişehir	158	78	76	74	1381	160	1722
Gaziantep	9	4	4	4	475	1565	534
Giresun	0	0	0	0	18	457	47
Gümüşhane	0	0	0	0	47	30	107
Hakkari	0	0	0	0	0	93	3
Hatay	37	18	18	17	814	0	1200
Isparta	1	0	0	0	174	774	218
İçel	147	73	71	69	1446	174	1685
İstanbul	46	23	22	22	692	1664	851
İzmir	87	43	42	41	3120	761	3718
Kars	12	6	6	6	200	3704	437
Kastamonu	9	4	4	4	236	314	379
Kayseri	9	4	4	4	308	321	679

Kırklareli	20	10	10	9	743	628	780
Kırşehir	8	4	4	4	422	830	522
Kocaeli	18	9	9	8	1121	1206	1387
Konya	124	61	60	58	3793	4346	4508
Kütahya	5	2	2	2	234	243	255
Malatya	2	1	1	1	309	370	367
Manisa	47	23	23	22	2852	2638	3311
Maraş	9	4	4	4	596	633	695
Mardin	6	3	3	3	247	251	313
Muğla	12	6	6	6	629	765	1002
Muş	1	0	0	0	180	200	192
Nevşehir	.				811	838	689
Niğde	6	3	3	3	569	421	546
Ordu	0	0	0	0	6	8	11
Rize	0	0	0	0	0	0	0
Samsun	36	18	17	17	1141	1249	1281
Siirt	2	1	1	1	47	53	134
Sinop	0	0	0	0	54	60	109
Sivas	3	1	1	1	609	649	847
Tekirdağ	51	25	25	24	1888	2277	2465
Tokat	11	5	5	5	795	884	1137
Trabzon	0	0	0	0	12	5	6
Tunceli	0	0	0	0	57	81	103
Urfa	67	33	32	31	722	622	1285
Uşak					73	97	132
Van	1	0	0	0	43	47	93
Yozgat	20	10	10	9	656	675	835
Zonguldak	0	0	0	0	43	56	115

The blue cells present the estimated values whereas the yellow ones are the given in the statistical records of TurkStat.

Sources:

[a] General Statistical Office (1952, pp. 8-43)

[b] The total figures are published in General Statistical Office (1957, p. 1)

[c] State Institute of Statistics (1965, p. 16)

[d] State Institute of Statistics (1966, p. 16)

[e] State Institute of Statistics (1967, p. 16)

Number of Tractors

The national totals for the number of tractors were given for all of the years presented above in

Table 16. To estimate the province level figures, each number in the column for 1948 have been

multiplied by the ratio given in the third row that related to the year of interest and rounded to

the nearest integer. For example, the ratio of the totals in 1940 to 1948 is 0.493. For one random city, be it Adana, the estimated number of tractors is 661 x 0.493 = 326

Province modifications:

1. Adana was called Seyhan in the 1940s, therefore the data for Seyhan has been transferred directly to Adana. The same applies to Artvin, which was called Çoruh before.

2. Sakarya was a district of Kocaeli in the 1940s, therefore the values for Sakarya has been added to those of Kocaeli for all variables.

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