SUMMARY

Agricultural sector in Egypt is one of the key sectors to achieving socio-economic development. It is one of the major sectors in terms of providing employment opportunities. Based on that, optimum use of labor is considered the cornerstone for achieving economic development in Egypt. It is worth noting that agricultural labor force represents one-third the labor force in Egypt. Therefore, providing more employment opportunities and better conditions for the agricultural labor force helps improve the performance and economic efficiency of the agricultural sector. Labor force is considered an important resource for boosting agricultural production. As such, achieving efficiency of agricultural production mainly depends on the efficiency of utilizing this important factor of production that it is considered the cornerstone for developing agricultural production. The study's research problem focuses on finding answers to some questions that help identify the periods of high and low demand for agricultural labor, the main economic factors affecting agricultural labor, and the efficiency of labor use. Therefore, the study aimed at measuring some economic indicators related to the current situation of agricultural labor in Egypt, estimating some production functions to attain some economic indicators on agricultural labor, assessing the main factors affecting the used and available agricultural labor, and finally studying the market of agricultural labor using some equation in a trial to simulate reality. To achieve these objectives, the study methodology depended on applying some econometric methods to identify the factors affecting the used and available agricultural labor. As regards data, the study depended on secondary data published by both the Central Agency for Public Mobilization and Statistics (CAPMAS) and the Ministry of Agriculture and Land Reclamation (MOALR), in addition to field data collected from samples drawn from Kafr El-Dowaar and Koom Hamada Districts in Behaira Governorate, and from Assiout and Qosia Districts in Assiout Governorate during the agricultural season 2003/2004.

The study comprised an introduction, five chapters, two summaries in Arabic and English languages and a list of Arabic and English references.

Chapter one comprises a review of literature of research studies conducted on agricultural labor in the past four decades. Chapter two investigates the main features of agricultural labor in Egypt in addition to selection of the study regions. The main findings of this chapter indicate an increase in total agricultural labor force in 1996 census compared to the total agricultural labor force in 1986 census. Despite this increase, the relative importance of agricultural labor to the total labor force declined in 1996, which can be attributed to lack of interest in agricultural work due to the low individual income earned by workers in the agricultural sector compared to that earned in other economic sectors. Studying the relationship between yield per feddan of land planted with major crops (summer rice, nili and summer maize, sugar cane, cotton, wheat, broad beans, onions, long clover, winter and summer tomato, and summer potato) and agricultural labor cost revealed a significant impact of the studied crops, except for long clover and winter tomato, on the cost of agricultural labor. Findings regarding investment profit revealed that profit per pound invested in human agricultural labor reached L.E 4, 4.13, 3.4, 1.35, 2.2, 4.5, and 2.25 for summer rice, summer maize, wheat, broad beans, winter onions, summer tomato, and summer potato respectively. These findings indicate that wheat is the most profitable winter crop in terms of agricultural labor investment profit, whereas summer tomato, followed by summer maize, are the most profitable summer crop in terms of agricultural labor investment profit.

Studying the rates of growth in yield achieved per agricultural labor investment revealed low rates for all the studied crops except for winter tomato where the yield per pound invested in agricultural labor increased by 85 kg. It was also found that the relative importance of agricultural labor cost with respect to either total cost per feddan or gross total cost of the studied crops is low. The study found significant differences

between average growth rate of yield per investment and average relative importance of wages to agricultural labor during the pre-reform period (1985-1990), (1991-2001) for all the studied crops except winter tomato.

In addition, to the study indicates that demand for agricultural labor for long clover, wheat, onions, garlic, and sugar beet increased during May, which complies to the logic of economics since harvesting of these crops is done in this month, whereas demand for labor for broad beans, fenugreek, and lupine increased during November due to the fact that land preparation and cultivation of these crops, which are performed in this month, require intensive agricultural labor. As regards summer crops, the study found that demand for agricultural labor for summer maize reaches its maximum during June, which complies with economic logic since cultivation and other farm operations are done in this month. On the other hand, it was found that demand for agricultural labor for sugarcane reaches its maximum during October and November, during which the crop breaking is performed, whereas dropped during March, April, and May, during which the performed farm operations does not require intensive labor.

Part two of this chapter focuses on selecting the study regions. Behaira Governorate was selected from the Delta region because it is one of the largest agricultural Governorates in Egypt and the Delta, whilst Assiout was selected from the Nile Valley Governorates. Districts that were then selected based on the relative importance they represent in terms of the number of holders include Kafr El-Dowaar and Koom Hamada in Behaira Governorate, and Assiout and Qosia districts in Assiout Governorate. Villages selected from these districts include Kafr Sleem village from Kafr El-Dowaar district, El-Zaafarani village from Koom Hamada District, Bani Hosein village from Assiout District, and Meer village from El-Qosia District. The number of sample individuals selected from each village amount to 50. Some statistical tests were then applied to ensure that the sample is representative to the population, namely Egypt. The

questionnaire indicates that women play important roles in farm operations such as seed preparation for planting purposes, poultry production, taking care of the farm animals and bringing them to the field, backing bread to the family, processing milk to dairy products, marketing of agricultural crops, etc.

Chapter three focuses on the statistical estimation of production function for agricultural labor in the studied sample. The study revealed that the amount of male labor, female and child labor, and the total amount of labor in Kafr Sleem village in Behaira Governorate reached about 25.00, 6.50, and 25.80 working days respectively. They reached about 39.50, 12.20, and 84 working days respectively for rice crop; about 56.70, 37.30, and 90.50 working days respectively for tomato crop; and about 41.60, 23.80, and 62.80 working days respectively for potato crop. The amount of male labor, female and child labor, and the total amount of labor in El-Zaafarani village in Behaira Governorate reached about 21.60, 10.50, and 37.80 working days respectively for wheat crop; about 29.80, 51.00, and 76.60 working days respectively for tomato crop; about 42.70, 21.70, and 64.00 working days respectively for potato crop; and finally the amount of male labor and total labor reached about 41.50 and 47.90 working days respectively for rice crop.

The study also found that the amount of male labor, female and child labor, and the total amount of labor in Bani Hosein village in Assiout Governorate reached about 38.50, 3.40, and 47.90 working days respectively for wheat crop; about 31.40, 14.80, and 45.30 working days respectively for long clover; and about 34.20, 31.40, and 65.90 working days respectively for sorghum crop. In Meer village, the amount of male labor, female and child labor, and the total amount of labor reached about 38.60, 4.10, and 33.90 working days respectively for wheat crop; about 46.00, 1.80, and 43.20 working days respectively for long clover; about 42.70, 23.90, and 67.40 working days respectively for cotton crop; and about 35.50 and 9.20, and 42.10 working days respectively for sorghum crop.

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Chapter 4 of the study focuses on identifying the factors affecting the amount of used labor and the amount of available labor in the studied regions. Findings indicate that the cost of machine work, labor wage, and yield per feddan have significant impacts on the amount of male labor, whereas the amount of machine work and yield per feddan have significant impacts on the amount of female and child labor. It was also found that cost of mechanical work, labor wages, and yield per feddan have significant impacts on the total amount of labor. As regards the impacts on crops, it was found that cost of machinery labor, labor wages, and yield per feddan have significant impacts on the total amount of human labor used for wheat crop grown in Kafr Sleem village in Kafr El-Dowaar District. It was also found that the amount of mechanical work, cost of mechanical work, and yield per feddan are amongst the factors affecting the amounts of male labor and total labor used for rice crop respectively. on the other hand, the study found that the amount of machine work, labor wage, and yield per feddan represent the factors affecting the amount of female and child labor used for rice crop. As for tomato crop, it was found that the amount of mechanical work and yield per feddan are the factors affecting the amount of male labor, whilst the amount of mechanical work, cost of mechanical work, labor wage, and yield per feddan are amongst the factors affecting the amount of female and child labor. Moreover, it was found that the cost of machine work, labor wage, and yield per feddan affect the amount of human labor with respect to total labor.

As regards potato crop, the study found that the amount of mechanical work, labor wage, and yield per feddan affect the amount of male labor, and female and child labor respectively, whereas labor wage and yield per feddan affect the total amount of labor. Findings regarding El-Zafarani village indicate that the amount of mechanical work, labor wage, and yield per feddan affect the amount of human labor with respect to total labor used for wheat crop; whereas labor wage is the most important factor affecting the amount of human labor with respect to the total

amount of labor used for rice crop. As for tomato crop, the study found that the cost of mechanical work, labor wage, and yield per feddan are the factors affecting the amount of human labor with respect to total labor used for this crop. The study also found that yield per feddan is the main factor affecting the amount of human labor with respect to total labor used for potato crop.

Findings regarding Bani Hosein village in Assiout District revealed that the cost of machinery labor and labor wage both affect the amount of human labor with respect to total labor used for wheat crop, whereas labor wage is the main factor affecting the amount of human labor with respect to total labor used for clover, and both the cost machine work and yield per feddan affect the amount of human labor with respect to total labor used for sorghum crop. Findings regarding Meer village in Qosia District revealed that labor wage is the main factor affecting the amount of human labor with respect to total labor used for wheat crop, whereas both labor wage and yield per feddan affect the amount of labor with respect to total labor for clover and cotton crops, and labor wage is the main factor affecting the amount of human labor with respect to total labor used for sorghum crop.

Part two of chapter 4 investigates the main factors affecting the availability of human labor using hierarchical regression modeling. Findings about the sample drawn from Sleem village revealed that the equilibrium wage for human labor with respect to total labor represents 64.3% of the prevailing average wage for wheat crop. Therefore, the rate of unemployment was estimated at 35.7% for wheat, 43.1% for rice, 76% for tomato, and 82.2% for potato. Findings about the sample drawn from El-Zaafarani village revealed that the estimated rates of unemployment with respect to total human labor for wheat, rice, tomato, and potato amounted to 37.2%, 43.1%, 24.1%, and 72.5% respectively. As regards findings on the sample drawn from Bani Hosein village, they revealed that the estimated rates of unemployment with respect to total human labor for wheat, clover, and cotton amounted to 59.8%, 69.5%,

and 50.4% respectively. Finally, findings on the sample drawn from Meer village revealed that the estimated rates of unemployment with respect to total human labor for wheat and cotton amounted to 0.6% and 47.2% respectively.

Chapter five of econometric analysis for agricultural labor market in the sample regions. Findings obtained from the estimated labor availability function in Behaira Governorate indicates a direct relationship between the availability of agricultural labor per feddan and average labor wage per feddan. The estimated elasticity amounted to 0.63 and 1.23 for the two relationships respectively, indicating that 1% increase in average labor wage per feddan results in 0.63% increase in available agricultural labor, whilst 1% increase in the value of plant production per feddan results in 1.23% increase in available agricultural labor. On the other hand, labor availability function indicates an inverse relationship between the amount of agricultural labor used per feddan and average labor wage per feddan, whilst indicates a direct relationship between average cost of mechanical labor per feddan and the average value of plant production per feddan. The estimated elasticity for these relationships amounted to − 0.31, 0.65, and 0.72 respectively, indicating that 1% increase in these variables results in -0.31%, 0.65, and 0.72 change in the used amount of agricultural labor respectively. Moreover, comparing the equation of used labor to the equation of available labor revealed that the equilibrium wage is estimated at L.E 7.49/day/man, which accounts for 71% of the average labor wage per feddan that is estimated at L.E 10.5 in the studied sample. Therefore, unemployment rate in the studied sample was estimated at 29%.

The estimated value-of-crop-production function indicates a direct relationship between the value of plant production per feddan and average quantity of used human labor per feddan. The estimated elasticity that reached 2.14 indicates that 1% increase in used labor results in 2.14% increase in the value of agricultural production per feddan. On the other hand, the

estimated function of the quantity of mechanical labor indicates a direct relationship between the volume of mechanical work per feddan and the average value of plant production per feddan. The estimated elasticity that reached 0.48 indicates that 1% increase results in 0.48% increase in average mechanical labor per feddan.

As regards Assiout Governorate, the estimated supply function indicates a direct relationship between agricultural labor supply per feddan and average labor wage per feddan. The estimated elasticity that reached 1.25 indicates that 1% increase in average wage of labor per feddan results in 1.25% increase in labor supply. On the other hand, the estimated demand function indicates an inverse relationship between demand for agricultural labor per feddan and both average labor wage per feddan and the average quantity of mechanical work per feddan, whilst indicates a direct relationship between demand for agricultural labor per feddan and both average cost of mechanical work per feddan and the average value of plant production per feddan. Elasticities that were estimated at -0.11, -0.48, 0.12 and 0.40 respectively indicate that 1% increase results in -0.11%, - 0.48%, 0.12% and 0.40% change in the quantity demand from agricultural labor.

Comparing the demand equation to the supply equation indicates that the equilibrium wage is estimated at L.E 2.69/day/man, which represents 84% of the average labor wage per feddan, estimated at L.E 3.21, indicating that the rate of unemployment in the study sample is around 16%.

The estimated function for the value of plant production indicates a direct relationship between the value of plant production per feddan and each of the average value of capital investment per feddan, average cropped area, and average quantity of human labor required per feddan. The estimated elasticities amounted to 0.07, 0.34 and 0.41, indicating that 1% increase results in 0.07%, 0.34% and 0.41% increase in average value of plant production per feddan. On the other hand, the estimated function for the volume of mechanical work indicates a direct relationship between the quantity of mechanical work

per feddan and the average value of plant production per feddan, where elasticity was estimated at 1.04 indicating that 1% increase results in 1.04% increase in average quantity of mechanical work per feddan.

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