



Fayoum University

An Economic Study of Irrigation Systems for the most Important Crops in New Lands in Beni Suef Governorate

By

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B.S.C. Agricultural Sciences (Agricultural Economics)
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**Department of Agricultural Economics
Faculty of Agriculture
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Summary

An Economic Study of Irrigation Systems for The most Important Crops in New Lands in Beni Suef Governorate

The agricultural sector is one of the most important economic sectors in Egypt as a source of raw materials for industry, as well as a source of food and clothing for the majority of the population. Water considered the most important limitation of horizontal and vertical agricultural development determinants, and despite the limited of this resource is and the stability of the water resources in Egypt, but the efficiency low due to high water losses.

The problem of the study is the lack of supply of regular water resources in return for the increased demand, where demand for water is increasing due to the growing number of the population as well as the growing demand for food. The mentioned statement demonstrates the growing water gap in Egypt and, accordingly, Egypt's entry into the circle of water poverty, where the average per capita reached about 130 m^3 / year. The low efficiency of the use of agricultural water resources, low yield from the water used in agriculture compared to other uses of water resources in general and particularly in Beni Suef is another side of the problem.

This study aims to determine the most appropriate irrigation systems that achieve higher economic efficiency in the production of the most important crops in Beni Suef. A set of objectives investigated to determine the study's aim. Objectives are as follow; investigate the the development of using irrigation machinery in Egypt and in Beni Suef, compare the efficiency of irrigation systems used in the irrigation of the most important agricultural crops in Beni Suef, estimates the production and cost functions, determines the potential for horizontal expansion in Beni Suef according to water resources available and under use of modern irrigation systems, and identify the most important problems facing farmers with regard to modern irrigation systems.

The study relies on using descriptive and quantitative economic analysis methods in order to estimate the efficiency of using water resources under various efficiency indicators for profitability of the most irrigation systems. The economic important agricultural crops under various irrigation systems are used.

The sources of data varies from secondary published and unpublished data collected from different related sources to primary data collected from the sample farmers using tailored questionnaire.

The study includes four main chapters in addition to the introduction, Arabic summary, English summary, and references.

The first chapter includes two sections; the first section is the theoretical background of the study and the second section is the review of literature. The second chapter highlights the current situation of irrigation machinery in Egypt and in Beni Suef. The third chapter provides estimates of economic efficiency of the most important agricultural crops under different irrigation systems in new lands in Beni Suef. The last chapter provides estimates for the production and cost functions and the economic impact of irrigation systems.

A random sample of 100 farmers from three villages in the new lands in Beni Suef has been selected. Tomatoes, onions, peppers and wheat are the four crops selected for investigation.

The main findings are summarized as following:

The number of fixed and Conveyor irrigation machines in Egypt was as low as ٤٦٩,٩ thousand machines in ١٩٩٧ and reached its peak in ٢٠١٣ with ٨٨٠,٦ thousand irrigation machine. As for Beni Suef, the number of machines was as low as ١٧,٠ thousands machines in ١٩٩٧ and reached its peak in ٢٠١٣ with ٧٦,٧ thousand machines with ٧٧% increase.

Changes in productivity, amount of irrigation water, cultivated area, and the production & economic efficiency of the unit of irrigation water are reported as follow. As for tomatoes, productivity has increased by ٩,٣ tons in case of drip irrigation which represent an increase of ٥١,٣٨% compared to productivity in flood irrigation. As for onion, productivity has increased by ٦,٩ tons in case of drip irrigation. irrigation which represent an increase of ٤٩,٣% compared to productivity in flood irrigation. As for pepper, productivity has increased by ٢,٩ tons in case of drip irrigation which represent an increase of ١٩,٥% compared to productivity in flood irrigation. As for wheat, productivity has increased by ٢,٥ and ٠,٩٥ bushels in case of drip irrigation and sprinkle irrigation respectively, which represent an increase of ١٦,٧% and ٦,٥% compared to productivity in flood irrigation.

The drip irrigation system in tomatoes is proved to reduce water consumption per feddan of tomato of about ٤٥٤ cubic meters compared to flood irrigation. Change flood irrigation system into dripping system may save about ٥,٢٢ million cubic meters for Beni Suef and about ١٤١,٦ million cubic meters for Egypt. The preserved amount of water can be used to expand the area cultivated with tomatoes by about ٢,٢, ٥٩,٥ thousand feddans for Beni Suef and Egypt respectively considering that the water requirements per feddan of tomatoes is ٢٣٨٠ cubic meters.

The drip irrigation system in onion is proved to reduce water consumption per feddan of tomato of about ٤٥٠ cubic meters compared to flood irrigation. Change flood irrigation system into dripping system may save about ٣,٣ million cubic meters for Beni Suef and about ٢٢ million cubic meters for Egypt. The preserved amount of water can be used to expand the area cultivated with onion by about ٢ and ١٣,٤ thousand feddans for Beni Suef and Egypt respectively considering that the water requirements per feddan of onion is ١٦٥٠ cubic meters.

The drip irrigation system in pepper is proved to reduce water consumption per feddan of tomato of about ٥٤٢ cubic meters compared to flood irrigation. Change flood irrigation system into dripping system may save about ١,٩٥ million cubic meters for Beni Suef and about ٤٠,٥ million cubic meters for Egypt. The preserved amount of water can be used to expand the area cultivated with onion by about ٠,٧٢ and ١٥ thousand feddans for Beni Suef and Egypt respectively considering that the water requirements per feddan of pepper is ٢٧٠٠ cubic meters.

As for wheat, the drip irrigation system in wheat is proved to reduce water consumption per feddan of tomato of about ٤٧٠ cubic meters compared to flood irrigation. Change flood irrigation system into dripping system may save about ٤,٤ million cubic meters for Beni Suef and about ٢٩٢,٣ million cubic meters for Egypt. The preserved amount of water can be used to expand the area cultivated with onion by about ٢,٥ and ١٦٦ thousand feddans for Beni Suef and Egypt respectively considering that the water requirements per feddan of tomatoes is ١٧٦٠ cubic meters. The sprinkle irrigation system in wheat is proved to reduce water consumption per feddan of tomato of about ٢٥٠ cubic meters compared to flood irrigation. Change

flood irrigation system into dripping system may save about ٤,٣ million cubic meters for Beni Suef and about ١٥٥,٥ million cubic meters for Egypt. The preserved amount of water can be used to expand the area cultivated with onion by about ١,٢ and ٧٨,٥ thousand feddans for Beni Suef and Egypt respectively considering that the water requirements per feddan of tomatoes is ١٧٦٠ cubic meters.

As for the impact of replacing regular flood irrigation system with drip irrigation system, economic indicators show an expected increase in the net return of all investigated crops. Net return of tomatoes is expected to increase by ١٠٦,٢ and ٢٨٨١,٩ million pounds at Beni Suef and Egypt levels. Net return of onion is expected to increase by ٢٦,٥ and ١٧٧,٢ million pounds at Beni Suef and Egypt levels. Net return of pepper is expected to increase by ٢٠,٣ and ٤٢٠,٥ million pounds at Beni Suef and Egypt levels. Net return of wheat is expected to increase by ٦ and ٤٠٦,٦ million pounds at Beni Suef and Egypt levels. As for the impact of replacing regular flood irrigation system with sprinkle irrigation system in wheat, net return of wheat is expected to increase by ٥,٤ and ٣٦١,٢ million pounds at Beni Suef and Egypt levels.

The study Recommendations:

١. Expand the use of modern irrigation systems in the new lands for various agricultural crops as it may increase the area cultivated of investigated crops.
٢. Provide irrigation kits with reasonable prices to farmers through agricultural associations to encourage farmers to switch from flood irrigation to modern irrigation, especially in the new land dedicated to graduates.
٣. Provide loans to invest in modern irrigation systems.