International Research Journal of Agricultural Science and Soil Science Vol. 12(3) pp. 1-3, May, 2023
Available online https://www.interesjournals.org/agricultural-science-soil-science.html

Mini Review

Agriculture Technology Administration's Involvement in Improving Grain Productivity Naturally

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Received: 02-May-2023, Manuscript No. IRJAS-23-98511; **Editor assigned:** 06-May-2023, PreQC No. IRJAS-23-98511 (PQ); **Reviewed:** 20-May-2023, QC No. IRJAS-23-98511; **Revised:** 24-May-2023, Manuscript No. IRJAS-23-98511 (R); **Published:** 31-May-2023, DOI: 10.14303/2251-0044.2023.20

Abstract

The recent shortage of wheat supplies from Russia and Ukraine has necessitated a significant increase in domestic production. As agricultural practices affect bread wheat yields, he assessed current production strategies in Egyptian wheat-based systems and studied their impact on wheat productivity in his four study areas of the Nile Delta. We selected 246 wheat farmers using a multilevel random sampling approach and applied a structured questionnaire to assess agricultural practices and crop performance characteristics. Data were analyzed using descriptive statistics, analysis of variance and multiple regression models. The average age of wheat farmers is 56, and they have about 30 years of farming experience. Land holdings were relatively small, averaging 1.05 hectares, with an average wheat yield of 6.4 tons (t) per hectare (ha). Farmers participate 5 times in a season. Most farmers had little knowledge of modern farming methods and no access to information. Increasing domestic production in Egypt requires tax incentives that allow or encourage wheat farmers to use most of their arable land for wheat cultivation. Furthermore, the guidelines should enable wheat farmers to increase productivity by implementing appropriate and sustainable agricultural practices such as crop rotation, mineral balance and the use of biological additives. . But the most important factors are interventions and technologies to improve irrigation water supplies and use them more efficiently.

Keywords: Agronomic practices; Fertilizers; Food security; Irrigation; Triticum aestivum

INTRODUCTION

As Egypt is an agricultural country, 53% of the population lives in rural areas and their livelihoods depend directly or indirectly on agricultural activities. About 27% of the population is engaged in agriculture and this sector contributes almost 15% of the national income **(Deaton A et al., 2008)**. However, 97% of Egypt's land area is desert. Of the total area of about 100 million hectares (ha), Egypt has only 3.6 million hectares (ha) of arable land, of which about. Agriculture takes place both on the "old land" and on the "new land". Located in the Nile delta, this 'ancient land' stretches from Giza in the south to El Mansara and Rashid in the north, with nearly one million hectares of farmland **(Headey D et al., 2012)**. The area is characterized by heavy alluvial clay soils with high organic carbon content and high water holding capacity. Plant water supply is primarily dependent on surface irrigation. Meanwhile, "new lands" have recently been taken from the desert. The new land is located to the west and east of the delta and covers an area of 880,000 hectares. It is characterized by sandy soil with low water holding capacity and low soil fertility. The crops are watered by a “sprinkler and pivot irrigation” pressure irrigation system. the most important crop in Egypt **(Datt G et al., 1998)**. Of this, it accounts for 1.5 million hectares (ha), almost half of the total winter area. In addition, Egyptians get one-third of their daily calorie intake and 45% of their protein intake from wheat-based foods, mainly baladi bread. Egypt consumes the equivalent of 20 million tonnes of wheat annually, less than half of which is produced domestically and the rest is imported. In 2021, Russia and Ukraine accounted for her 85% of total wheat imports to Egypt (60-66% from Russia and 20-25% from Ukraine). Wheat prices in Egypt rose 100% from June 2021 to April 2022, with the steepest rise occurring at the start of the Russo-Ukrainian war in February 2022, and domestic

inflation hitting a record high in March 2022. Reached 20% of this has contributed to international market expectations that the annual cost of wheat imports to Egypt will continue to rise in 2023, weighing heavily on the Egyptian economy **(Ravallion M et al., 2002)**. To mitigate the risk of bread shortages and potential social unrest due to high bread prices, Egypt should take steps to reduce its dependence on wheat imports from Russia and Ukraine. This can be achieved by seeking alternative sources of international wheat and, more importantly, increasing domestic wheat production. The Egyptian government has already set out a vision to increase domestic wheat production by 2014 in the "Egyptian Sustainable Development Strategy Towards 2030". The document highlights the government's goal of achieving 74% wheat self-sufficiency by 2017. However, the self-sufficiency rate in 2017 remained at 43%. The widening gap between domestic wheat production and consumption is largely due to factors other than agricultural production **(Christiaensen L et al., 2011)**.

Rapid population growth, measures to subsidize bread prices while abolishing agricultural subsidies, delays in government price announcements, and changing climatic conditions acted as external pressures, increasing demand for wheat while reducing domestic production. Adversely affect I worked. Responses of smallholder wheat producers in agricultural systems include using most of the wheat crop for domestic consumption and animal feed, rather than selling wheat to governments to fill storage silos. In addition, due to the low productivity of conventional wheat, farmers are reducing their wheat acreage and replacing wheat in their growing portfolios with other economically competitive crops such as clover and kidney beans. Egypt used to compensate for low domestic production by increasing wheat imports. However, this compensation was accompanied by a decrease in food self-sufficiency **(Bamji MS et al., 2011)**. The recent disruption of wheat supplies from Russia and Ukraine and the high price of wheat and pesticides on the international market make it imperative to increase domestic production through expanded cultivation and improved production practices. The latter means balancing the use of external inputs and increasing the efficiency of scarce water resources. Considering there is a large gap of about 6 t/ha between the potential wheat yield above and the farmers' actual yield. It is clear that increased production is achievable. The main target area for such increased production is the Nile Delta region, which has fertile soils and sufficient irrigation water **(Headey D, 2013)**.This is especially true in the province of El Beheira. El Beheira Governorate now produces 65% of his wheat in Egypt. Little is known about the current state of production strategies and the performance characteristics of wheat-based systems related to farm resources (land, labor and capital availability) of wheat producers. We believe that a farmer's ability to adapt to changing demands in a timely manner is related to access to the latest technology and advisory services, as well as the availability and utilization of human capital **(Abdul-Rahaman A et al., 2018)**

RESULTS

Farmer attributes and resource endowment

The characteristics of wheat farmers and their holdings of production resources (land, labor and capital) varied greatly from farm to farm. Our study used real capital investment proxies, such as labor input, land area, and amount of fertilizer. Our results show that land area has a significant and positive impact on wheat productivity, suggesting that farmers with more land can produce more wheat per hectare. Furthermore, we found that labor availability had a positive impact on productivity, meaning that farmers with better access to labor were better able to manage their crops. Furthermore, the results indicate that farmers with more financial resources were able to invest in inputs such as fertilizers, resulting in higher yields **(Gidago G et al., 2011)**. In contrast, our statistical analysis shows that there was no significant difference between farmer age or experience and wheat yield variability. The farmer was middle-aged, with an average age of his 56 years (variation: 32-79 years) and an average experience in wheat cultivation of about 30 years. In addition, the average landholding area was 2.5 fedang (1.05 ha) and varied widely between 0.2 and 2.3 ha, with the rest of the area occupied by other winter crops, mainly clover and fava beans. Wheat farmers rely heavily on labor provided by family members and neighbors for plowing and field work during the growing season. Improved varieties of modern high-yielding wheat are almost always sourced from the local departments of the Department of Agriculture, sometimes using homegrown seed from previous harvests by farmers **(Gizachew L, 2002)**.

Yield and agronomic practices

Relatively small differences among the study areas. Yields varied according to the farming methods used, but investment results in Abu El Matamir, a dry and purely rural desert fringe region, showed the most variability and therefore the greatest losses. Variations were minimal where there was definitely good access to irrigation water. (Al-Mahmodiyah in the "Old Land" and El-Nubariyah in the "New Land"). The rate of adoption of agricultural practices reflects the ability of farmers to adapt to changing conditions and meet their needs and expectations. They relate to the type of crop rotation, the source of seed, the mechanization of cultivation and harvesting, and the use of pesticides.

DISCUSSION

Due to disruptions in the wheat value chain related to the Russo-Ukrainian war and higher wheat prices in international markets, increasing domestic wheat production is of critical importance for Egypt. Expansion of irrigated arable land is limited by water availability. His two options for achieving national wheat self-sufficiency are (1) increasing the proportion of wheat planted area mainly by substituting

winter clover and wheat, and (2) increasing the proportion of wheat planted area on existing irrigated land.

Increasing wheat production

Only less than 20% of the winter irrigated areas in the study area are currently cultivated with wheat, compared with almost 30% in China, 42% in Europe and up to 60% in South Asia. Replacing wheat with Alexandria clover (Bersem) as the main winter crop could increase wheat acreage in the Nile Delta by up to 600,000 hectares, effectively offsetting the current shortage of wheat imports. Because it severely impacts feed production, jeopardizes meat and milk supplies, and turns bread shortages into protein shortage problems. preferential treatment will be required. For example, in 2019 the net income from wheat cultivation for one fedang (0.4 ha) was estimated at 2,991 EGP (equivalent to US$178). This means that a small farmer can get a net monthly income of just $29 from growing 1 fedang of wheat. This low economic attractiveness of wheat production is illustrated by the fact that local purchase prices are strongly correlated with the area of wheat planted in Egypt.

CONCLUSIONS

In summary, this study found that inappropriate agricultural practices, mainly related to irrigation and fertilization planning and intake, were the main contributors to low yields due to lack of knowledge and advice services. However, implementing sustainable irrigation and fertilization could significantly increase yields and increase wheat production across Egypt. Increasing domestic wheat production in Egypt is essential to alleviate the growing economic burden of wheat imports, secure the livelihoods of farmers, and make Egypt more resilient to disruptions in the international wheat supply chain. Two promising strategies are (1) to increase wheat acreage by partially replacing Belsee clover with wheat as the main winter crop, and (2) to increase farmers' incomes while reducing yield gaps. This includes implementing effective and sustainable agricultural practices.

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