An economic Study of Water Resources in Agricultural Policy

Scarcity of water resources is regarded as a major challenge in agriculture in most of the Middle-East countries. Due to water shortage, the region will be liable to food insecurity in present and in future as well. Egypt relies mainly on Nile River water irrigation; Rain agriculture does not exceed 2%, concentrated mainly in the Northern coast (rain fall rate ranges from 140 - 230 m.m. a year). Nile water secures water for as much as 97 % of the cultivated area, while West Desert and Sinai ground water secures water for 1 % only. Problem of the study deals mainly with the shortage and mismanagement of water resources allocated for the agriculture in Egypt. The current cropping pattern includes several water intensive crops mainly rice and sugarcane. Though Egypt is ranked the first, at world level, in productivity of rice and sugarcane, the two crops utilize together about 35 % of water allocated for the agricultural purposes. The objective of this study focused mainly on the economic evaluation of two water saving techniques of production. They are introducing short season rice varieties and the implementation of improved surface irrigation project in sugarcane physical and economic indicators affecting irrigation water efficiency was figured out. This study was conducted based on the findings of field samples from rice and sugarcane growing Governorates. The study adopted qualitative and quantitative analysis of the research sample data statistical methods such as variance analysis were used for verifying economic analysis regarding evaluation of some physical and economic indicators and identifying the significance of such difference resulting from applying water saving techniques of production rice and sugarcane The study relied on primary data generated from a questionnaire covering Dakahlia and kafr El-Sheikh concerning the generalization of short season rice. Also, the study conducted a questionnaire covering Qena Governorate and Luxor city concerning irrigation development program in sugarcane through gated pipes. The study includes four chapters. The first chapter covers the introduction, which includes preface, problem of the study, objective, methodology, sources of data and literature review. The second chapter tackles water resources management in A.R.E. The first sub- chapter covers identification of current and future water resources in A.R.E. It shows that gross available water in 1997 reached about 67.27 B.c.m. .The total water in year 2017 is estimated to be 87.67 B.c.m.. The second sub-chapter indicates that total water needs at present is 66.34 B.c.m. and the expected in year 2017 is 86.74 B.c.m. . The third chapter deals with the economic impacts of introducing short season rice varieties. The first sub-chapter covers the current status of rice in Egypt. The second sub-chapter deals with sample selection techniques in addition to impacts of introducing short season rice varieties on some physical and economical indicators. The results indicated that the productivity of short- season rice varieties was higher than that of long season ones. The average productivity was 3.14 ton/fed for the long- season varieties compared to 3.63 ton/fed for the short season varieties. This difference of 0.49 ton/fed represents 15.61% of the overall average productivity of the long season varieties. The study revealed that the overall average of water utilized for irrigation of long- season varieties was 8090.90 m3/fed while it was 6024.66 m3/fed for short-season varieties. This means that, introducing the short-season varieties saves 2066.24 m3/fed annually, this saving represents 25.54% of the overall average water consumed for the long-season varieties, this difference was found to he statistically significant .Also, the short-season varieties productivity per feddan was higher 53.85% than that ofThe study also showed the overall

average of water quantity required for production one ton of long season rice varieties was 2605.81 m3 / ton, compared to 1677.73 m3 / ton of the short-season varieties. It indicates that introducing the short-season varieties could save 928.08 m3 / ton which represents 35.62% of the overall average of water required for production of the long-season rice varieties. The differences between these varieties in terms of water required were significant. The study revealed in the third chapter the effect of introducing the short-season varieties on some economical indicators as costs and returns. The overall average of total costs of the long-season varieties reached 1488.19 L.E./fed Compared 1309.79 L.E./fed for the short-season rice varieties. Total saving is 178.40 L.E./fed. Which represents 11.99% of the total costs of the long-season varieties the differences between those varieties in terms of total costs were found to be significant which refers to the highly economical efficiency of short-season varieties compared to the long-season varieties Regarding the total costs of irrigation, it was clear from the study that the irrigation cost of long-season varieties was 204.30 L.E./fed, which it was 175.08 L.E./fed for the short-season varieties this difference is 29.22 L.E./fed and respesents 14.3% of the average cost of irrigating one fed of the long-season rice varieties. The difference was also found to be significant. The study showed that the overall average net return of the long-season varieties was 528.09 L.E./fed compared to 695.39 LE./ fed for the short-season varieties. The net return of the short-season varieties was higher by 167.30 L.E/fed, which represents 31.68% of the average net return of the long-season varieties. Also these differences were significant. Concerning the net return for water unit, it was 65.64 L.E. /1000 m3 of water for the long-season varieties while, it was 115.57 L.E./1000 m3 of water for the short-season varieties. This difference was 76.06% of the total net return of the long-season varieties and was found to be significant. In chapter 4, the economical feasibility of using the developed irrigation system (gated pipes) in the sugarcane areas was addressed to achieve that, first the current situation of the sugarcane production in Egypt was studied; second, selection of the study sample of the sugarcane area was clarified. Third, the effect of using a developed irrigation system on the physical indicators of the sugarcane production was studied; gated pipes system was compared to the traditional (flooding system). The results showed that using the gated pipes resulted in a decrease in the production of the sugarcane areas under study compared to the flood- irrigation system, except for kolaib basin, Qena Governorate, where, using the gated pipes lead to an increase of 1.18% of the total yield of the sugarcane compared to the traditional irrigation (flooding system). The yield declination is attributed to the use of the developed irrigation system (which needs more time to be ready for work) caused delaying in the planting date, which in turn affected the yield.