

The Identification of priorities and opportunities for sustainable agricultural development in Upper Egypt depend mainly on the efficiency of utilization of domestic resources, notably water and land, but also labor and capital, in producing different irrigation systems (old land vs. new land) and different irrigation systems (surface irrigation vs. modern irrigation) that need to be considered.

Towards More Efficient Use of Agricultural Resources in Upper Egypt

Optimum Cropping Pattern
Under Different Scenarios in
Qena

Egypt Network for Integrated Development

Policy Brief 001

The Need

In addition of being a way of living to a large number of families, agriculture in Egypt is a leading sector contributing to employment, exports, food security and economic growth and development. It generates about 15% of GDP, and absorbs about 27% of the labor force in Egypt. Agricultural exports represent about 20% of the total commodity exports.

Upper Egypt region which includes the Governorates of BeniSuef, Minya, Assiut, Sohag, Qena, Luxor and Aswan has a significant contribution to agricultural production in Egypt. The agricultural area of Upper Egypt amounting to about 2.7 million feddans represents about 31% of the total agricultural area, while the crop area, of about 4.7 million feddans, represent about 31% of the total cropped area in Egypt. In addition, the region is characterized by favorable climate for the cultivation of export crops competitive in European markets.

Qena Governorate is considered one of the most promising governorates for agricultural investments, especially in the field of non-traditional export crops such as medicinal and aromatic plants, in addition to producing high value varieties of vegetables and fruits.

Due to the existence of a competitive relationship on the limited agricultural land between different crops per growing season, there is a great need to provide decision makers with alternatives for cropping mix and advice on the optimal crop structures aiming at optimum exploitation of the

available agricultural resources and linking elements of agricultural production from-land, water and work - in the production process in order to achieve:

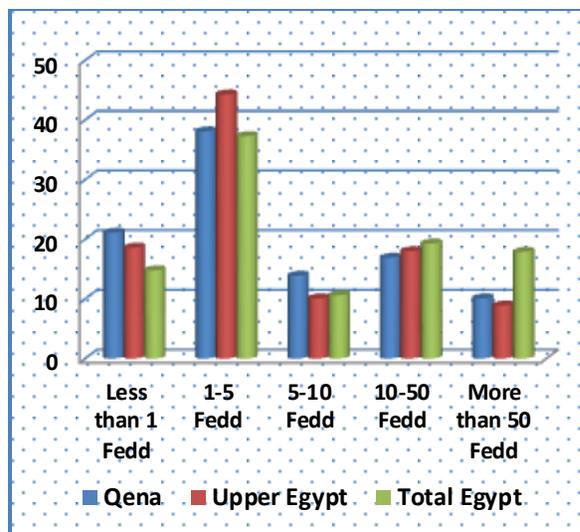
- The maximum possible return at the lowest possible cost.
- An economic efficiency of production elements.

Land Tenure and Cropping Pattern in Qena

Total Agricultural land holding in Upper Egypt is about 2.1 million Acres, represents 30.5% of total land holdings in Egypt. Number of land holders is approximately 1.8 million, representing about 42% of the total land holders in Egypt. Total agricultural land holding in Qena Governorate is about 241 thousand feddans represent about 3.4% of total land holding in Egypt, while number of holders are about 194 thousand holder, representing about 4.4% of total agricultural land holders in Egypt.

Figure (1) illustrates the comparison between the land tenure of the Qena Governorate and the total provinces of Upper Egypt and total Egypt. The holding area in the small category (less than feddan) are the largest in the province of Qena compared with Upper Egypt and the total Egypt, while number of holders in Qena is concentrated in less than Upper Egypt and total Egypt in the same category.

Figure 1: Land Tenure (% of Owned Area)



The cultivated area of Qena governorate is about 262 thousand Acres, representing about 3% of the total cultivated area in Egypt, while the cropped area is about 362 thousand feddans representing about 2.4% of the total cropped area of Egypt. Figure (2) shows the comparison between the crop cultivated area, both in the Qena governorate, Upper Egypt and total Egypt. Figure (3) represents the relative distribution of the cultivated area and cropping area for each district.

Figure 2: Cultivated & Cropped Area (1000 Acres), 2011

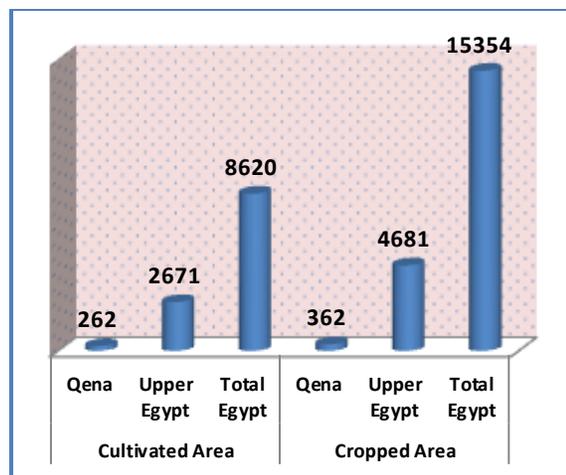
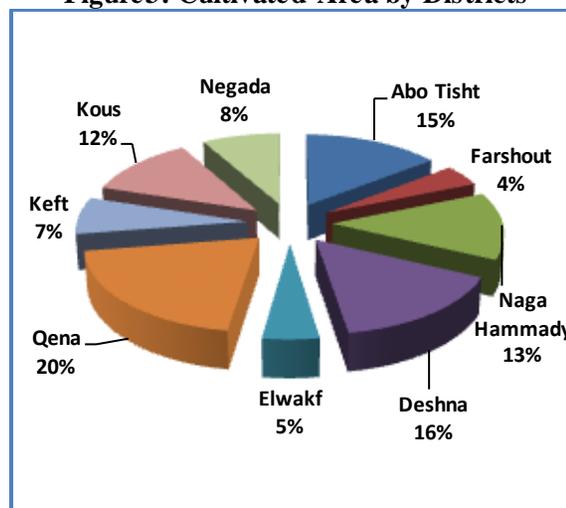


Figure 3: Cultivated Area by Districts



ENID Approach

ENID has provided training to the local staff of the Department of Agriculture in Qena on the concept and analytical models including Linear Programming - LP. The staff members were trained to identify the elements of the LP through field visits to a representative sample village of each district.

applied Linear Programming Model at the district (9 Districts) and Qena Governorate levels within the valley and outside the valley (desert farming), including all the current crop compositions.

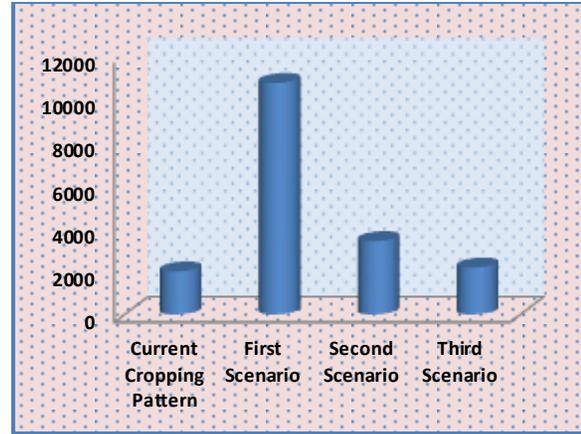
Results

The results of LP model application at Qena governorate level showed that:

- *The first scenario:* An increase in the net return of the three seasons of 7777 million pounds and a surplus in the amount of used water is estimated at 29 million m³, and surplus labor is estimated at 458 thousand working days.
- *The second scenario:* An increase in the net return of the three seasons of 435 million pounds and a surplus in the amount of used water is estimated at 164 million m³, and surplus labor is estimated at 622 thousand working days.
- *The third scenario:* An increase in the net return of the three seasons of 208 million pounds and a surplus in the amount of used water is estimated at 58 million m³, and surplus labor is estimated at 175 thousand working days.

Fig (4) shows cropping net return for the current cropping pattern and results of the three scenarios for total governorate.

Figure 4: Cropping Net Return by Scenarios (Million LE)



Box 1: Determining the Optimal Cropping Pattern

The following elements of the LP were identified by the staff of the Department of Agriculture in Qena:

- The agricultural activities (current Summer, Winter and Nili cropping pattern) in old and new land (inside and outside the valley).
- Net Return per Acre for each crop including: cost items- production items and prices.
- Technical Coefficients for each crop including: water requirements and labor requirements per Acre.

Linear Programming model was performed for three scenarios:

- 1st scenario: Does not include any regulatory restrictions.
- 2nd scenario: Depending on the results of the first scenario and retained areas for strategic crops (sugar cane, wheat and alfalfa).
- 3rd scenario: Depending on the results of the first and second scenario, crops with low return in the current crop structure were included with a reduced its area by 25%.

Policy Implications:

- Increased cropping intensity through the use of a new agricultural cycle that includes three crops a year instead of two crops, will lead to maximize the return of land and water and increase the rate of self-sufficiency.
- Provide price incentives and premiums to encourage the adoption of the modern irrigation systems that lead to the rationalization of water utilization in agriculture.
- There is no justification for increasing sugar cane cultivated area. There is a need, however, to increase the productivity per feddan to secure the operation of sugar mills and various other industries that depend on sugar as a raw material.
- Direct the agricultural research and extension services towards the expansion of the cultivation of aromatic and medicinal plants and high value crops in Upper Egypt.
- Provide improved extension advice and support to increase the efficiency of irrigation systems in the areas cultivated with sugar cane.
- The development of early maturing high-yield breeds that are resistant to pests and diseases, drought and salinity should be one of the priorities for research centers with special attention to aromatic, medicinal and other high value crops.
- Support the role of the Principal Bank for Development and Agricultural Credit to finance agricultural development projects related to small farmers.
- Development of agricultural associations, including cooperatives and rural

organizations to increase the possibilities of integration and consolidation in land use.

- Enhancing the technical and institutional capacities of agricultural extension system to improve its effectiveness for technology transfer with special attention to services provided to small farmers.
- Implementation of training programs to improve the knowledge, skills and capacities of the agricultural labor force and agricultural management at the Governorate level with special attention to the area of agricultural policy analysis and indicative planning.