Benha University
Faculty of Agriculture at Moshtohor
Agronomy Department
Land cultivation (Advanced)
Post graduate studies **Code: AG 635** **Time: 2 hours**

Final Exam
First Semester 2018-2019

Answer the following questions:
Question No. (1) : **40 marks**
Writ about on:
a) Wind erosion? 10 marks
b) Food security? 10 marks
c) Water erosion? 10 marks
d) water use efficiency? 10 marks
Question No. (2) : **20 marks**
Chose only two points:
1- How can you cultivation of sandy soils? 10 marks
2- Write notes about, sources of water in Egypt? 10 marks
3- How can you cultivation of salinity soils? 10 marks

GOOD LUCK

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Model answer for land cultivation (Advanced) curse
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Answer question No. (1) : **40 marks**
Writ about on:
a) Wind erosion? **10 marks**
Wind erosion is a serious environmental problem attracting the attention of many across the globe. It is a common phenomenon occurring mostly in flat, bare areas; dry, sandy soils; or anywhere the soil is loose, dry, and finely granulated. Wind erosion damages land and natural vegetation by removing soil from one place and depositing it in another. It causes soil loss, dryness and deterioration of soil structure, **nutrient and productivity losses** and **air pollution**. Suspended dust and dirt is inevitably deposited over everything. It blows on and inside homes, covers roads and highways, and smothers crops. Sediment transport and deposition are significant factors in the geological changes which occur on the land around us and over long periods of time are important in the soil formation process. wind erosion is a real problem. This buries fertile soil, irrigation canals, roads, railway lines, buildings, seasonal water courses and even river channels. These difficulties are very pronounced in
b) Food security? **10 marks**
USAID's support to Egyptian agriculture over the past 40 years has improved productivity, exports, and earnings for low-income Egyptians.

Agriculture is a major component of the Egyptian economy, contributing up to 14.5 percent of GDP and 28 percent of all jobs. Agriculture employs almost 45 percent of all women in the workforce. USAID's program is focused on Upper Egypt, where over 55 percent of employment is agriculture-related.
The agriculture sector in Egypt is dominated by small farms which use traditional practices that do not comply with internationally recognized standards. For example, farmers tend to overuse and misuse agricultural chemicals and use outdated technologies and tools for land preparation, irrigation, and harvesting. As a result, farmers experience increased production costs, reduced yields, decreased soil fertility, and limited marketing opportunities. They are further constrained by lack of cold storage infrastructure, transportation systems, and market information. Applying the 'Feed the Future' approach, USAID/Egypt is addressing these challenges by strengthening the agriculture supply system based on market demand for high value crops, such as tomatoes and green beans. The program is multifaceted with each component strategically complementing the others by enhancing the productivity of the entire agriculture value chain, beginning on the farm and ending when products reach consumers. USAID introduces innovative technologies that enable farmers with fewer than ten acres of land to be more responsive to the needs of local and foreign buyers, leading to reliable, sustainable results. For example, USAID is providing training to farmers to achieve international quality standards certification, thus helping them gain the confidence of exporters. With direct access to the international markets, farmers make nearly twice what they would on the local market.

c) Water erosion? 10 marks

Water erosion is a two-part process involving the detachment and transport of soil particles. The water erosion process consists of discrete stages from rain drop impact to the formation of gully erosion. Each stage has its own processes and characteristics. Controlling or preventing water erosion requires an understanding of each step in the erosion process.

water erosion and the subsoil has assumed the "basket-of-eggs" appearance that encourages maximum run-off. The hydrological behaviour of this formation facilitates further erosion of neighbouring soils and, therefore, the devastation is now self-propagating. There is severe gully erosion on the clay plains and main river banks. The two words kerreb and haddam are used locally to describe this type of soil degradation.

d) water use efficiency? 10 marks

WUE is often equated in a simplistic manner with drought resistance without considering the fact that it is a ratio between 2 physiological (transpiration and photosynthesis) or agronomic (yield and crop water use) entities. As a ratio it is often susceptible to misinterpretation, especially when the dynamics of the nominator and the denominator are obscure. The intrinsic paradox in assuming that a high WUE means better yield under stress is demonstrated in results of a greenhouse experiment (A. Blum and C. Y. Sullivan 1983, unpublished data) briefly presented here (Fig. 2). The experiment compared a high-yielding semi-dwarf cultivar (HYV) with a landrace (LR) of durum wheat (*Triticum durum*) grown under stress and control conditions. Plants were grown in 1.5-m-long, white PVC tubes in aerated hydroponics culture. Control plants were grown with full volume of half-strength Hoagland's nutrient solution. Stressed plants

were allowed to draw down the solution in the tube (while the solution was exchanged daily to maintain standard nutrient concentration). When the solution reached
function of WUE:
Y ¼ WU _ WUE _ HI (1)
where Y is grain yield, WU is water-use, and HI is harvest index.
While Passioura shifted in opinion towards ‘‘water productivity’’ as a prime consideration in dryland crop production (Passioura, 2006), Eq. (1) remains quite popular among breeders (e.g. Reynolds and Tuberosa, 2008) and in training courses since it is simple and has some educational merit. Here it is used only as a gateway for explaining the main message of this review.
The equation implies that WUE is an independent variable in affecting grain yield. In this expression WUE equals B/WU, where B is biomass, therefore:

Y ¼ WU _
B
WU
_ _
_ HI (2)

Answer Question No. (2) : 20 marks

Chose only two points:

1- How can you cultivation of sandy soils? 10 marks

Sandy lands constitute almost 95% of the Egyptian deserts. The characteristics of these lands vary according to their parent materials. The western desert lands are dominated by the presence of quartz that originated from the erosion of sandstones following the geological changes that led to the formation of the El-Kattara depression—with the exception of the northern coast of that desert where the sandy soil has a marine parent material with a high content of calcium carbonates (98%). In the eastern desert and northern Sinai region, quartz constitutes a major formation originating from deposits carried by the Nile water. This is evidenced by its high content in heavy metals similar to that of the Nile valley and Delta soils. On the contrary, the internal sands of the Sinai peninsula originated from geological formations which were the parent material of El-Tih (wilderness) Plateau. However, it is to be noted that the various origins of the Egyptian sandy soils do not affect the multifarious problems encountered during the implementation of development programmes. These problems are:

- ❏ lack of nutrient elements;
- ❏ easy loss of fertilizers, especially nitrogenous fertilizers;
- ❏ inability to keep water due to its poor content in minute particles;
- ❏ as a result, plants grown in sandy soil have little access to water;
- ❏ exposure to water and wind erosion.

2- Write notes about, sources of water in Egypt? 10 marks

River Nile Basin, General Description

Water is one of the most valuable resources on earth, Egypt is fed by the River Nile, not only does Egypt share the Nile water with many countries but it also lies at the end of the Nile's route toward the sea (the ten countries of the basin are: - Egypt, Sudan, Ethiopia, Eritrea, Tanzania, the Democratic Congo, Uganda, Burundi, Rwanda, and Kenya). This means that it receives the Nile after it has emptied much of its water

along the way. In 1959 Egypt signed an agreement with Sudan. The agreement specifies that Egypt's share of the Nile water is 55.5 billion M3 /year (table 1) [3]. Egypt can only release more than 55.5 billion M3 /year of water if the flood is so great that will endanger the High Dam. This has happened, in 1998 (fig.1). Because droughts occur periodically, it is important to store water in Lake Nasser during the years of high Nile inflow.

Ground Water of Egypt

Ground water is the portion of the water beneath the surface of the earth that can be collected with the wells, tunnels, or drainage galleries, or that flows naturally to the earth's surface via seeps or spring. Not all underground water pressure is greater than atmospheric pressure. Groundwater is a vital resource of water that is used for countless purposes. It is used for public and domestic water supply systems, irrigation, industrial, commercial, mining and thermo-electric power production purposes. The amount of ground water in Egypt is 4.80 km3 / year (table 1). In many cases and locations groundwater serves as the only reliable source of drinking and irrigation water. Unfortunately, this vital resource is vulnerable to contamination. Nowadays, groundwater is being threatened by a vast array of pollutants from such diverse sources as sanitary landfills, soil treatment systems, septic tanks and subsurface disposal wells.

Origin of Groundwater: The age of groundwater may range from a few years or less to ten of thousands of years or even more. Old meteoric water often occurs in arid areas where most of the groundwater was formed during previous climatic periods with higher rainfall. In Egypt as example the groundwater age of Suze Rift Valley is more than 31,000 years

Reuse of agriculture drainage water mixing with canal water

The total reused of agriculture drainage in Egypt 4.5 billion M3 /year).

Rain Water

Egypt is a very arid country, where the average annual rainfall seldom exceeds 200 mm along the northern coast (table 1). The rainfall decline very rapidly from coastal to inland areas, and becomes almost nil south of Cairo. This meager rainfall occurs in the winter in the form of scattered showers, and can not be depended upon for extensive agricultural production. This amount (1 billion M3 /year**)** cannot be considered a reliable source of water due to its spatial and temporal variability

Reuse of Treated Waste Water

A new wastewater treatment plants come on steam in Cairo and other urban cities amounts of treated wastewater that could be available for agricultural activities:

1 – Reuse of treated agriculture water.

2 - Reuse of treated domestic water. "Treated domestic wastewater in 2001/02 was estimated at 2.97 km3/ year.

3 - Reuse of treated industrial water.

Desalination of Sea Water

The use of non-conventional water sources has been practiced for a long time in Egypt. An additional option is desalinization which is being applied in several areas (some costal towns, islands, remote industries sites) the desalination capacity in Egypt has grown to some 150,000 m3 /day.

3- How can you cultivation of salinity soils? 10 marks

Salient Features and Classification of the New Lands

God has bestowed on Egypt felicity of the Nile water running through its territory, and carryring, over the years, alluvial materials that formed the Nile Valley and Delta. These lands have a deep profile and a homogenous texture. They are also rich in macro and micro-nutrients. Therefore, the Egyptian farmer encountered no difficulties in cultivating these lands and, after the introduction of crop intensification systems, he had to use nitrogenous and phosphorous fertilizers in addition to manure. This pattern continued to characterize Egyptian agriculture until the construction of the High Dam. There exists a totally different pattern in the new lands. Many problems have to be solved before adding these lands to the Egyptian agricultural area. Problem areas are the saline soils near the Red Sea shore and the partially flooded areas. These are totally neglected in some parts and under-used in others.

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