5- SUMMARY

This study was conducted to evaluate the effect of some environmental wastes on physical, chemical and nutritional properties of the soils in Beni-Suef governorate, also to study the effects on growth, yield and plant nutrients of the wheat crop.

The experiments:

Three experiments were conducted on the soil of Beni-Suef governorate; (a) pot exp., on sandy clay loam soil obtained from Shenera, (b) field exp.I, on sandy loam soil in Beni-Souliman, (c) field exp.II, on clay loam soil in El-Zaiton. The three experiments were cultivated with wheat plants (Seds variety) and subjected to the same treatments.

The treatments were three organic sources (enrich farm waste (EFW), enrich pudrette (EPD) and enrich town refuse (ETR)), four rates of these sources (0, 5, 10 and 20 ton/fed) and three rates of mineral fertilizers (0, 50% and 100% of the recommended) with three replicates in split split plot design. The recommended chemical fertilizers were 200 kg/fed calcium nitrate (15.5% N), 100 kg/fed super phosphate (15% P_2O_5). Potassium fertilizer was not applied depend upon the organic sources content. Three times of each rate of every organic sources were mixed with the three rates of the chemical fertilizers and saturated with water, then covered with clay for 45 days.

1-Pot exp. (soil sample from Shenera):

Hundred and eight solid plastic pots were used. Each pot was filled with 5 kg sandy clay loam soil (from Shenera) mixed with the aforementioned treatments. The application treatments in every pot was calculated on a base of one feddan area (4200 m^2) with the root zone layer (0.3 m soil surface layer, equal a million kilogram). Twenty seeds of wheat (seds variety) were sown on 11/11/1999 and irrigated frequency every three days to maintain the soil moisture content at about 70% of field capacity (using compensate way).The experiment was harvested after 150 days from sowing.

2-Field exp.I (Beni-Souliman) and exp.II (El-Ziton):

The two experimental areas were prepared to cultivate and every area was divided to hundred and eight plots (each plot 1/400 fed). The soils of the two experiments were mixed with the aforementioned treatments and sown with wheat grain (seds variety) after pot exp.sown by one day for exp.I and two days for exp.II . The plants were surface irrigated every 10-12 days depend upon the soil moisture. The experiments (I and II) were harvested after 150 days from sowing.

Soil and plant samples:

Surface soil samples (0-30 cm) from the three experiments were taken after 70 days and 150 days from sowing

(after harvest). Plant samples were taken at 70 days and the dry weight were recorded. Also, plant samples were taken at 150 days (after harvest) from straw and grain, and recorded the straw and grain yield.

The results show that:

some soil properties:

Enrich poudrette (EPD) relatively resulted lower pH values and higher OM content than others in the two field experiments. Enrich town refuse (ETR) resulted higher of EC in both field experiments, while EPD was in pot one. The highest rate of organic source or mineral fertilizer was the lowest pH value and the highest OM content. Organic sources with their rates as well as the rates of both of organic sources and mineral fertilizer significantly increased EC and OM content for the three experiments.

Soil nutrients:

Total N, and available P, K, Fe, Zn and Mn:

Organic sources had significantly effect on the total N, and available P, K, Fe, Zn and Mn at 70 and 150 days. The values of soil total nitrogen successively increased with increasing the rate of either organic source or mineral fertilizer, where the highest rate was the highest value of total nitrogen in the three experiments.

Organic sources with their rates significantly increased soil total N at 70 days in the field exp.I and at 150 days of the three experiments, also, significantly increased the available P, Fe and Mn in the three experiments.

Organic sources with their rates significantly affected on the available zinc at 70 and 150 days in pot exp., also at 150 in field exp.I and at 70 days in the field exp.II.

The combined effect of the rate of both organic source and mineral fertilizer significantly increased the soil total N and available P, K, Fe and Mn in the three experiments.

Dry weight and plant nutrients at 70 days:

Dry weight (g/plant):

Organic sources, their rates, mineral fertilizer rates and the combined effect increased the dry weight of wheat plants in the three experiments. Organic sources had affected on DW in the following order; town refuse < farm waste < poudrette. As for the rates, either of organic sources or mineral fertilizers successively and significantly increased the dry weight up to the highest rate in the three experiments.

EFW at 20 ton/fed, 100% MF with EFW, and 20 ton/fed of any organic source with 100% MF had contributed the highest values of dry weight (g/plant) in pot exp. EPD of 20 ton/fed alone or with 100% MF, as well as 20 ton/fed of any organic

source with 100% MF resulted the highest dry weight (g/plant) in both field experiments.

The plant concentration and uptake of macro- and micro-nutrients:

The effects of organic sources, their rates and mineral fertilizer rates significantly increased the concentration (%) and uptake (mg/plant) of N, P and K, as well as concentration (µg/g) and uptake (µg/plant) of Fe, Mn and Zn of wheat plant in the three experiments. The highest rate of the average values of three organic sources, such that the highest rate of mineral fertilizer had significantly the highest effect on increasing wheat plants concentration and uptake of macro- and micro-nutrients in the three experiments.

Generally, the effect of organic sources with their rates, organic sources with mineral fertilizer rates and rate of organic sources with rate of MF significantly increased N, K concentration and uptake and Fe uptake of wheat plants in the three experiments.

Phosphorus concentration in wheat plants was significantly affected by rate of organic sources with the rate of MF, while the uptake was significantly affected by organic sources with their rates in the three experiments.

Organic sources with their rates had achieved significant differences of zinc concentration and uptake in the three

experiments. As for organic sources with MF rates hasd achieved significant differences just in zinc uptake in pot exp. and field exp.II.

Organic sources with their rates had resulted significant differences on manganese uptake in field exp.I, as well as concentration and uptake in field exp.II. While combined effect of the both rates of organic sources and mineral fertilizers were significantly behaved on manganese uptake in the field exp.II..

Grain and straw yield at harvest:

Grain yield:

The organic sources, their rates or mineral fertilizer rates significantly increased the grain yield of wheat plants in the three experiments. The rates either of organic sources or mineral fertilizers successively increased the grain yield up to the highest rate in the three experiments.

Organic sources with their rates had significant effects on the grain yield of wheat plants in the three experiments. Organic sources with mineral fertilizer rates had significant effect on the grain yield. But the combined effect of the rates of both organic sources with mineral fertilizer showed significant trend on grain yield in pot exp. and field exp.II.

Straw yield:

The organic sources, their rates or mineral fertilizer rates significantly increased straw yield of wheat plants in the three experiments. The rates, either of organic sources or mineral fertilizers successively increased straw yield up to the highest rate in the field exp.I and field exp.II. Similar behaviour had been shown at the highest two rates of organic waste (10 and 20 ton/fed) as well as the highest two rates of mineral fertilizer (50 and 100%) on the straw yield in pot exp.

Organic sources with their rates had significant effects on straw yield of wheat plants, while organic sources with mineral fertilizer rates showed non-significant effect in the three experiments. While both rates of organic sources with mineral fertilizer had significant effect on straw yield on field exp.II.

Grain/straw ratio:

The ratio of grain/straw for pot exp., field exp.I and field exp.II were 0.15, 0.42 and 0.40 respectively. This means that pot yielded less grain for every straw unit than both field experiments. While the two field experiments are similar in their grain/straw ratio.

Overall:

Enrich poudrette is the superior organic waste affected the soil nutrients and nutrients concentration and uptake of wheat as well as yield.