

" ECONOMICS OF USING PESTICIDES "

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Summary and Conclusion

At the last thirteen years of the last century, pesticides became the main method of pest control. The mean percentages of yield loss yearly, by pests in case of wheat, rice, maize, vegetables, fruits and cotton were 39, 33, 37, 22, 24 and 33%, respectively.

The price of pesticides used per year is more than 100 million dollar. Egypt imports several hundreds metric tons of pesticides each year, being 2143 tons in 1952/1953 and increased to 35259 tons in 1972 and decreased to 18778 tons in 1982.

About 70% of these quantities is used to control cotton pests, (Egypt cultivates about 1.2 million feddan of cotton) according to its economic importance as a strategic crop.

The percentage of losses in the main crops in Egypt is about 60 million Egyptian pound per year. About one half of these losses is due to the infestation of cotton with cotton leaf worms and bollworms.

The main aim of this thesis is to study the side effects of pesticides, how to solve this problem and the economic use of these pesticides to determine the best method of their control to attain the highest benefit for the Egyptian Farmer.

Methods of pest control :

I - The natural control :

The natural factors that affect the natural balance between the environment and the pests, i.e. the atmospheric factors (temperature, relative humidity, wind, atmospheric pressure, light, rain... etc), the biological enemies (parasites, predaceous insects and infected microorganisms), topographic factors (deserts, mountains, seas, oceans, soil types).

2 - The applied control :

The man plays a director role for this method of control. He uses all the available methods of control as follows :-

- A) Manual and mechanical control .
- b) Legally methods : i.e. stopping berseem irrigation after 10 may in Egypt and treating the cotton seeds with high temperature to kill the pink bollworms .
- c) Biological control : By increasing the predaceous, the parasitic enemies of the pest in the environment by rearing or importing these enemies (i.e. bacteria, fungi, protozoa, virus, parasitic and predaceous insects, birds, fishes ...etc)
- d) Chemical control : - By using Insecticides, herbicides and fungicides. These pesticides are inorganic or organic compounds. The inorganic compounds are arsenic, sulphur and fluorine compounds ... etc) . The Organic compounds can be divided into several groups, : organochlorine pesticides, organophosphorous pesticides, nitrophenols, carbamate pesticides, pyrethroids, and organic pesticides from plant sources. These pesticides can be used as suspensions or emulsions or true solutions. These formulations can be used by several types of sprayers, i.e. Aeroplans or motors.

Pesticides assess in Egypt :

This part concerned with the development of pesticide uses for pest control in Egypt in the period from 1952/1953 to 1981/1982. It indicated that the quantity of pesticides used increased in the period from 1952/1953 to 1971/1972 and decreased in the period from 1972/1973 to 1981/1982 . Results also indicated that the mean decrease /year in the use of pesticides in the period from 1969 to 1980 is 6.05% . This decrease is highly significant to the level 0.01. While the percentage of increase in fungicides uses was 7.98% at the same period and this increase was significant at the level 0.05 . There was also a yearly increase in herbicides use. This increase was 17.83% being highly significant to the level 0.01 .

The statistical study of the time series of the real prices per ton of pesticides during the period (1970 - 1980) showed that the average increase of the price per ton reached L.E. 38.469, with an annual increase of about 5.4% within this period .

The demand function of pesticides use for pest control in Egypt was estimated during the period (1970 - 1980). Annual fluctuations of quantity demanded could be explained by the consequent variability of real prices per tone and time factor . Coefficient of determination (R^2) was 0.098. Price elasticity annual demand for pesticides was about (0.056). Dropping time factor, and re-estimate this demand function also revealed that the coefficient of determination (R^2) was (0.018) and price elasticity was (0.098). This means that not only prices were the determinant factor of quantity demanded but also area cultivated of different crops and the degree of infestation.

It is expected that the quantity consumed of pesticides in Egypt will reach 17773, 13957, 10142, 6326 tons in 1985, 1990, 1995 and 2000, respectively.

The Sample of study was taken from one village (Batta) in Banha district and the number of individuals (43), were taken from all five class area of holders, which were cultivated by cotton for two seasons (1977 and 1980) .

With regard to the economic study of the different methods of spraying pesticides to cotton cultivation aeroplanes and low or high volume sprayers, the study indicated that the revenue per feddan of using aeroplane in the second degree of soil fertility was the highest one followed by first degree by using motor sprayers, third degree with motor sprayers, third degree with aeroplane first degree with aeroplane and second degree by using motor sprayers, respectively, in the sample of study in kalubia Governorate .

- c) Fruits, vegetables and other field crops.
 - d) Meat, milk, eggs and fat.
 - e) Air .
 - f) Water .
 - g) Human health .
- 2 - Indirect side effects :
- A) Appearance of Secondary pests .
 - b) Effect of natural enemies and pollinators and honey bees .
 - c) Appearance of resistant strains of the pests.

The suggested solutions for the economic use of pesticides :

- 1 - The use of ovicides to decrease the price of collecting egg masses .
- 2 - The use of parasitic and predaceous insects to control pests .
- 3 - The use of remote sensing technique to determine the infested areas .
- 4 - Decreasing the use of pesticides by using the sex attractants, repellents, antifeedants, sterilizing materials, hormones, and biological control .