

ABSTRACT

Crop protection is of vital importance in modern agriculture. This is especially true where large areas of land are cultivated with genetically similar germ plasm as in the case of the Aranguez Garden (a vegetable producing area in Trinidad). There are, however, problems embracing environmental social and economic effects of chemical protective practices. These problems are compounded in instances where the chemicals are misused. As such, this study was concerned with estimating the relative contribution of pesticides expenditure (by the tomato and cabbage producing farmers of the Aranguez Garden) to agricultural output as well as the efficiency of their use.

Data were obtained from a recent survey of the area under a joint project between the Department of Agricultural Economics and Farm Management, U.W.I. and the International Business Machines (IBM).

With the aid of multiple regression techniques, a production function of the Cobb-Douglas type was estimated. This function subsequently provided the basis for the efficiency analysis.

The result of the analysis showed that the farmers were not overutilizing the resource from a private profit maximization point of view since the value of the contributions to output of an additional dollar expenditure on pesticides far exceeded this amount. However a comparison of the quantities of pesticides used by the farmers and that required, based on the manufacturers' recommendations showed that the

farmers were in fact significantly overutilizing the resource. This paradox was explained in terms of market imperfections. It was suggested that the wide divergence between the marginal value productivity and the unit price of the input existed because the farmers were able to influence the price of the output. As such they were not maximizing profit under conditions of perfect competition (i.e. price takers in both product and input markets) as assumed, but rather under an imperfect one (i.e. where price of output was a function of the quantity of input used). Under this latter condition they were able to overutilize the resource (technically) and still appear to be efficient when judged by the criterion of $MVP = P_x$.

The overuse of pesticides was further highlighted by the observation of the farmers' behaviour. It was found that they were not using pesticides as a treatment per se but rather as a form of insurance.

A strategy was subsequently suggested with the main objective of achieving a reduction in both the quantity of pesticides currently being used and the detrimental externalities associated with their use. Such an action appeared justified since the elasticity of production for the input, pesticides, showed that a one dollar (\$1) reduction, (say in the interest of environmental protection) would only result in a loss of approximately \$0.38¹ in terms of the value of output forgone.

¹Assuming other inputs remained constant and no other crop protection measures were used to supplement the reduction.