

Deep, volcanic ash soils occupy about two-thirds of the project area. By plowing in the fall, farmers are able to conserve much of the moisture present in the soils at harvest time. Just prior to planting, the farmer plows deep furrows and plants the maize in holes opened with a spade in the bottom of the furrows.



In parts of the Project area (particularly in Zone II), much of the maize is grown in fruit orchards in the space between rows of trees. It seemed likely that the effect of the trees on the production of maize would vary depending on: (a) the fruit specie, (b) the amount of space between rows of trees, and (c) the size of the trees. Beginning in 1968, experiments were conducted to determine optimal levels of fertilization for maize growing in fruit orchards, taking into account the distinct characteristics of the orchards.

As shown in Table 3.2, plant densities, methods of land preparation, depth of the last cultivation, and rates of fertilization of maize in orchards were new lines of research in 1968. Studies on dates of planting were added when it became evident in 1967 that farmers planted maize from mid-March until late June. The research staff also decided to include studies of times of applying fertilizers and the residual effects of fertilizers to develop more reliable information about these factors.

The research program in 1969 (Table 3.2) was similar to that of 1968. The principal new line of research was the study of application rates for manure and fertilizers. In 1968, it had been observed that farmers' plantings that had received chicken manure that year, or chemical fertilizer that year and chicken manure during the preceding three-year period, were often more vigorous than the best experimental treatments. This suggested the possibility of a nutritional deficiency other than nitrogen and phosphorus. It was decided to include experiments in 1969 to determine economically optimal combinations of nitrogen, phosphorus, and chicken manure. In addition, the experiments were planned so that residual effects of the manure could be measured.

Two other lines of research were initiated in 1969: (a) optimal rates of nitrogen, phosphorus, and plant density for forage maize; and (b) effect of minimal tillage on maize yields. In addition, the use of a "potential yield" treatment in many of the experiments was begun that year. This treatment consisted of 10 ton/ha of chicken manure, plus

chemical fertilizers (140 or 160 kg/ha N plus 50 kg/ha P_2O_5). It was assumed that this treatment would provide all maize nutrition requirements.

A total of 47 field experiments were conducted in 1968 and 1969 (Table 3.2). Composite soil samples were collected at each experimental site from the plow layer (0-18 cm) and from the subsoil (20-35 cm), for property characterization.

TABLE 3.2. Lines of research in maize and numbers of field experiments conducted in the Puebla area in 1968 and 1969.

Lines of research	Number of experiments	
	1968	1969
Rates of nitrogen, phosphorus and plant density	8	12
Rates of nitrogen, phosphorus and plant density in maize for forage	0	1
Rates of nitrogen, phosphorus and manure.	0	3
Dates of planting	4	2
Times of applying fertilizers	2	5
Depth of the last cultivation	2	0
Rates of nitrogen and phosphorus for maize in orchards	2	2
Methods of land preparation	1	0
Minimal tillage	0	1
Residual effects of fertilizers	1	1
T o t a l	20	27