

soils of Zone V, and soils with a compacted horizon. These three groups of soils occupy 33 percent of the cultivated land in the Project area (Table 1.1.). In addition, some of the farmers with soils capable of retaining sufficient moisture for early plantings are unable to plant early because they do not employ moisture conservation practices at the proper time. Furthermore, it is usually not possible to conserve sufficient moisture to permit early maize plantings in soils where maize is interplanted in orchards. These three categories account for a sizeable area that is not planted until the rains begin. Farmers use short-season varieties for these late plantings. In the rare years when rains do not begin until early July, farmers prefer not to plant maize because of the frost hazard. According to 1967 survey data, maize plantings for that year were spread over a three month period, as shown below.

Date of Planting	Percentage of Land
Before March 1	3.8
March 1-31	34.6
April 1-30	37.4
May 1-31	17.8
After May 31	6.4

In their plantings of maize alone or in association, farmers use between 15,000 and 35,000 plants/ha, depending upon the fertility level of the soil and the amount of fertilizer to be used. If pole beans are grown with maize, the farmers sow sufficient seed on the same date to give a bean density of 5,000-20,000 plants/ha. A common rule-of-thumb is one bean plant for every two plants of maize. Maize plants that have no adjoining bean plant help support the weight of the beans and prevent lodging. The distance between rows of maize is about 90 cm.

Farmers use two methods for planting and cultivating bush beans: (a) planted in rows 70 cm apart and cultivated with animal-drawn implements, and (b) planted in rows 50 cm apart, using the method called *a barbecho*. In this

method, the soil is turned with a single-moldboard plow, the seed is deposited at the bottom of the furrow, and then it is covered by the following passage of the plow. Cultivations are made with a hoe. Population densities are about 60,000/ha for the first method; 90,000/ha for the *a barbecho* method. The *a barbecho* method is commonly used in soils with a high content of pumice in the plow layer, possibly because of the ease of hand weeding.

According to the 1967 survey data, 95.2 percent of the farmers in the Project area knew of chemical fertilizer; 80.1 percent had used it on at least one occasion; and 69.3 percent had used it in 1967. These farmers in 1967 used an average of 49.3 kg/ha N and 20.3 kg/ha P₂O₅. For the entire cultivated area in 1967, the average amounts were 34 kg/ha N and 14 kg/ha P₂O₅. Of the farmers applying fertilizers in 1967, 64 percent used the formula 10-8-4, 18 percent used ammonium nitrate or ammonium sulfate, and 15 percent used other formulas.

Chemical fertilizers have been used for several years in the Puebla area as indicated in the survey data shown next.

In What Year Did You First Use Chemical Fertilizers?	Percentage of Farmers
Have never used it	19.9
1967	7.5
1966	7.5
1965	10.4
1964	6.4
1963	6.4
1962	6.0
1961	2.0
1960	6.8
1959 or before	27.1



When the Project began in 1967, 95% of the farmers knew of chemical fertilizer and 80% of them had used it at least on one occasion. Most felt that some fertilizer was needed, but did not know which elements or how much to apply.