

The Puebla Project has been oriented primarily toward increasing maize production, and secondarily toward increasing the production of beans, fruits, forages, and vegetable crops. Information was available, however, only on annual changes in maize yields; thus, only benefits derived from maize production are considered here.

Two alternatives were available to estimate the direct benefits accrued from maize production: (a) to consider only increases in production obtained by farmers on credit lists, as direct benefits due to the Project, or (b) to similarly consider the increases in production obtained by all farmers in the area. It was decided to consider only increases in maize production obtained by farmers on credit lists as direct benefits, and to treat increases in production obtained by the rest of the farmers in the area as derived benefits.

Direct Gross Benefits

For the farmers on credit lists, the annual increase in maize yields attributable to the new technology was calculated by taking the difference between the observed average annual yield and the average annual yield assuming no change due to the new technology. These yields have been estimated in Chapter 9 using two alternative procedures. The average yields assuming no change in technology estimated in Table 9.9 were used instead of those estimated in Table 9.10 because they lead to a more conservative estimate of the direct benefits of the Project. These annual increases in maize yields were multiplied by the number of hectares cultivated by farmers on credit lists to obtain the increases in production attributable directly to the Project.

The values of the increases in maize production were calculated using the price guaranteed by the official Mexican purchasing agency, CONASUPO. Over the years, the market price of maize has deviated somewhat from the guaranteed price, depending on amounts harvested; however, \$75.20 per ton seems a reasonable approximation to the average price that farmers received for their maize between 1967 and 1972. The price paid by CONASUPO was increased to \$96.00 in 1973, and this value was used in estimating benefits for that year. The direct gross benefits are shown in Table 11.1.

Derived Gross Benefits

The derived gross benefits were considered to be the value of the increases in maize production obtained by all farmers in the area not on credit lists. Since there probably would have been a small increase in maize production in the area in the absence of the Puebla Project (as has occurred in parts of Mexico), it is possible that this method of calculating derived benefits overestimates the true values. For the purposes of this analysis, however, it was assumed that the increases in maize production during the 1967-1973 period due to effects exogenous to the Project were insignificant and could be ignored.

As a compensating factor, the derived benefits have been underestimated by considering only the value of the increases in maize production obtained by the farmers not on credit lists. As mentioned earlier, the Project has provided some assistance to farmers in improving their production of beans, fruits, forages, and vegetable crops. Benefits derived from these secondary activities have not been included in the analysis, because no quantitative information was collected on changes in the production of these crops.

TABLE 11.1. The calculation of the direct gross benefits attributable to the Puebla Project, associated costs, direct net benefits, project costs, present value of net benefits and present value of project costs for seven years of operation of the project.

Year	Average maize yield* of farmers on credit lists kg/ha	Estimated average maize yield in the area without the Puebla Project** kg/ha	Average increase in maize yield attributable to the Puebla Project kg/ha	Area benefited directly by the Puebla Project ha	Increase in production attributable directly to the Puebla Project kg	Direct gross benefits ⁺ \$	Associated costs ⁺⁺ \$	Direct net benefits \$	Project costs ^o \$	Present value of net benefits ^{oo} 1967 \$	Present value of project costs ^{oo} 1967 \$
1967									52,939		52,939
1968	3894	2091	1803	76	137,028	10,304	3,023	7,281	130,141	6,268	112,031
1969	2765	1715	1050	5838	6,129,900	460,969	213,694	246,275	169,271	182,084	124,645
1970	2670	1777	893	12601	11,252,693	846,202	307,190	539,012	199,380	328,666	121,573
1971	2618	1652	966	14438	13,947,108	1,048,823	286,344	762,479	228,190	393,261	117,693
1972	2920	2011	909	17533	15,937,497	1,198,500	364,056	834,444	219,231	366,986	96,417
1973†	2920	2011	909	20604	18,729,036	1,797,987	430,344	1,367,643	195,253	488,321	69,716
									Total	1,765,586	695,014

* All yields in the table are with 12% moisture for 1967-1971 and 14% moisture for 1972-1973. CONASUPO, the official Mexican marketing agency, used 12% as the maximum moisture content without a discount in price during 1967-1971 and 14% during 1972-1973.

** Information from Column c, Table 9.9. The values for 1967-1971 were adjusted to 12% moisture.

+ A price of \$75.20 per ton was used for the years 1968-1972 and \$96.00 per ton for 1973.

++ Assuming zero labor costs.

o Includes an 18% overhead charge.

oo Adjusted for the expected change in value due to income from interest and the change in the price index using 1967 as the reference (See formula, page 95).

† Yields for 1973 were estimated in September, just prior to harvest.

$$\frac{B}{C} = \frac{1,765,586}{695,014} = 2.54$$