

TABLE 11.5. Benefit-cost ratios for the Puebla Project under alternative labor cost assumption.

Alternative	Direct benefits only	Direct and derived benefits
1	2.54	4.03
2	2.20	3.48
3	2.15	3.37
4	1.77	2.70

Alternative 1: Excess rural labor in the project area. Labor has a zero opportunity cost.

Alternative 2: Seasonal unemployment except at harvest. Project recommendations require 5.3 man-days per hectare above traditional technology at harvest. Daily wage of hired labor is \$1.28.

Alternative 3: No seasonal unemployment. Family labor can provide the 12.1 man-days per hectare required by recommended technology above traditional practices. The opportunity cost of family labor is half that of hired labor or 64 cents per day.

Alternative 4: No seasonal unemployment. The 12.1 man-days per hectare of additional labor need be covered by hired labor at \$1.28 per day.

seems to describe best the conditions of the area.

The present values of derived net benefits in Table 11.2 were summed over years and added to the present value of the stream of direct net benefits from Table 11.1, assuming excess labor. The benefit-cost ratio thus obtained for the Puebla Project was 4.03, taking into account both direct and derived benefits. The benefit-cost ratios under alternative assumptions were: Alternative 2, 3.48; Alternative 3, 3.37; and Alternative 4, 2.70. Again, Alternative 2, with a benefit-cost ratio of 3.48, seems to be the most plausible. Table 11.5 summarizes the values obtained.

According to the ratios obtained, investments in goods and services in the Puebla Project during 1967-1973 generated benefits with a value ranging from 2.70 to 4.03 times greater than that of the cost. The farmers now also know how to arrange for credit and how to use the new technology in future years. It can be expected, therefore, that benefits due to the Puebla Project will continue to accrue in years to come: thereby giving a benefit-cost ratio well above 4.0 for direct and derived benefits.

Intangible Benefits

The Project team contributed to important changes in the area in addition to increases in maize production and net income.

An important intangible benefit derived from the Puebla Project is the progress that has been made in assisting farmers to organize in groups and resolve problems in a collective manner. Many farmers in the area are now aware of the advantages in working together in arranging for credit, transporting fertilizers, and petitioning governmental officials for changes in the operational procedures of service agencies.

The technical assistance program of the Project has provided the farmers with a better understanding of the agricultural service institutions. In 1967, for example, most of the farmers in the Puebla area did not know how to arrange for credit from the official banks. Today, however, many farmers understand the procedures for requesting short-term credits for fertilizers, etc.; some also know how to apply for long-term credit to purchase equipment, animals, etc.

Over the long run, perhaps the most important intangible benefit attributable to the Puebla Project will be the favorable change that has occurred in the farmer's attitude toward modern technology and agriculture in general. Successful experience in the use of the new maize technology has given the farmers confidence that improved technology can be useful to them in other farming enterprises, and many have begun to seek new technical information about other activities, such as irrigation, improvement of fruit trees, and vegetable crop production.

Many subsistence farmers have received another intangible benefit in the form of greater certainty (because of the higher yields) that their family will have sufficient maize for the entire year. This represents an important contribution to the general welfare of the subsistence farm family, quite apart from the economic value of the increase in production.

Additionally, as a result of the action of the Puebla Project, problems in the operation of the credit banks and crop insurance company have been identified and studied. Operational procedures of these institutions are being changed so that greater use of these services can be made by the farmers in future years.