This study investigated the economic and social impacts of tractor mechanization in the Punjab province of Pakistan. It analyzed the influence of mechanization on production, soil fertility, crop yields, labor requirements, and the rates of return on investment in tractors and equipment. The social aspects included the influence of mechanization on employment of labor, social relations, and structures of farming. The method of study included questionnaire surveys and the selection of fields based on a field survey of a cross-section of tractor and bullock farmers and (3) policies based on a linear programming model developed for the wheat-ovens area in the Punjab.

The study encompassed two systems of irrigation, namely, the well-watered ("well") and the tubewell ("tubewell") irrigation. The survey plus tubewell irrigation included two cropping patterns, wheat and wheat-ovens. The results of the field survey and the programming model indicated that, on the whole, tractors appeared to be beneficially associated with mechanization. The yield of wheat was significantly higher than that of bullock cultivation, and this yield was significantly higher than that of bullock cultivation. The rate of return on tractor mechanization on a 5-acre farm in this area was only 0.7 per cent. More tubewell water assisted canal irrigation, tractor cultivation led to substantially higher crop yields as compared to bullock cultivation, whereas in the wheat-ovens area the rate of return on mechanization on a 5-acre farm was 5.2 per cent. More tubewell water assisted canal irrigation, and in the wheat-ovens area the rate of return on mechanization on a 5-acre farm reached 46 per cent. The rate fell to 3 per cent when major investments were made in tractor mechanization of the world market level. The results of the programming model indicated that the "without" tubewell area and the "with" tubewell area were the most profitable areas for mechanization.

The tractor farm had relatively less family labor but used more hired labor per hectare compared to the bullock farm. The structure of the hired labor on the tractor farm was more efficient and productive, with less permanent and more casual labor being used.

Tractor mechanization led to large scale tenant ejagment. The tractor farms resourced land for self-cultivation; they also purchased and rented land to increase the area under mechanization. The use of mechanized tubewell mechanization on tenants and the farm size of the owner operator were very similar to those of tractor mechanization. It is hypothesized that not only the tractor used in mechanized mechanization but also the tubewell increases the land haddly net gain of the landlord leads to the ejagment of tenants.

Implications for this research for agricultural development in Pakistan have been drawn. It is recommended that the following actions be taken to encourage mechanization instead of the traditional practices which have or have not been readapted into the labor force: (1) to study whether there is a shortage of permanent hired labor and if so, for what reasons; (2) to study the economic profitability of the tractor equipment and other improved inputs and practices; and (3) to study the decreasing shares in resistance, disease-resistant cotton varieties.