

# ABSTRACT

Agriculture sector is called the backbone of Pakistan's economy. Increase in agricultural productivity has implications not only for agriculture sector but also for whole of the economy. The present thesis tries to identify and estimate the input use pattern of different farm size categories at farm level in irrigated Punjab for four major crops and a model is estimated to analyse various input use contributions to productivity. Moreover, the figures for the returns to scale for major crops of different farm size categories are estimated.

It is a farm level study, which is confined to the irrigated Punjab. Four major crops, that is, wheat, cotton, rice and sugarcane are selected for the study. Data is cross sectional and is related to the cropping year 1998-99. The unit of analysis is individual farms which will respond to the survey. Farm sizes are divided into two categories. Small farms (upto 12.5 acres) and Large farms (above 12.5 acres). To estimate the contribution of various inputs in the productivity of major crops in irrigated Punjab for different farm size categories Cobb-Douglas production function is used and its log transformation is estimated by using OLS technique. Which is applied to small, large and then overall farm size category for the four crops one by one. Moreover, 'F'-test 't'-test and  $R^2$ ,  $\bar{R}^2$  is estimated to interpret the results.

The collected data indicates that there is not much variation in the use of seed and numbers of irrigation used between different farm size categories of the crops. Irrigation water is more required for sugarcane and rice than wheat and cotton crops.

Large farms use more quantity of fertilizer for all the four crops. The highest use of fertilizer is on cotton crop and then wheat, sugarcane and rice respectively. Highest use of labour hours is in case of cotton crop and sugarcane is on second number and then rice and wheat respectively. In case of cotton and sugarcane there is positive relationship between farm size and manual labour use but in case of rice and wheat it is negative. Highest use of power is in case of sugarcane and then rice, wheat and cotton respectively. There is also positive relationship between farm size and power hours used in case of cotton and wheat but negative in case of rice and sugarcane.

Estimation of the models give the results that small size farms are more productive than large farms in case of wheat, cotton and rice crops and there appears decreasing returns to scale for above three crops. In case of sugarcane crop large farms are about 21.3% more productive than small farms and there appears constant returns to scale in case of small farms and increasing returns to scale in case of large farms.

In case of estimated coefficients for inputs, the fertilizer appeared to be the most important factor to have positive effect on productivity in case of all the four major crops. Seed and fertilizer inputs have the most significant positive effect on productivity in case of sugarcane crop. The most significant positive contribution is emerged from manual hours in case of cotton and wheat for small farms. Moreover, irrigation contributes significantly and then emerged positive effect of the input on output specifically for wheat and rice crops.

The diagnostic analysis through production function reveals some disturbing features also i.e, negative returns on fertilizer, chemicals ( pesticides + weedicides) family labour and seed at certain farm sizes for different crops. Apparently, less than optimal combination of fertilizer nutrients, indiscriminate use of chemicals and under utilization of available family labour have contributed to such a situation