

# Estimation of Paddy Production: A Case Study of Saptari District.

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## INTRODUCTION

Agriculture plays a predominant role in the economy of Nepal. The contribution of this sector to the G.D.P. is 62 percent.<sup>1</sup> This sector provides the employment opportunities to 91.1 percent of the total population<sup>2</sup> and there is no other country in Asia where more than 90 percent of its people are engaged in agriculture.

As agriculture is the backbone of Nepalese economy, the development of Nepal is closely related with the development of this sector. Within agriculture, among crops it is worthy to note that food crops cover almost 90 percent of the total cropped area. Paddy is cultivated in 55 percent of the total cultivated land of Nepal and it contributes 59 percent of the total grain production. Despite long history and predominant position of paddy cultivation in Nepal, it is characterised by small farm size, use of primitive tools, high labour intensiveness and low productivity. Therefore an increase in production of paddy is related to the quality and quantity of inputs and also to some extent the related technology. To ascertain the quantities of different inputs to be used, it is necessary to estimate the relative contribution of inputs to output.

The focus of the study is the production analysis of paddy in Aurahi Village Panchayat of Saptari district. Saptari district is an important paddy producing area of the country. The share of Saptari district in the total production of paddy in Nepal was 4.06 percent in 1981/82.

## Objectives of the Study

Specifically the study had the following objectives:

1. To estimate the production function of paddy taking out the production as the dependent variable and inputs human labour, bullock labour and capital investment as explanatory variables.
2. To make policy recommendations relating to paddy production in the study area.

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## METHODOLOGY

### Sources of Data

The present study is based upon primary field survey data collected from Aurahi Village Panchayat of Saptari district in 1985/86. An appropriate questionnaire was prepared covering all the aspects of study and paddy producers were interviewed by using random sampling technique. The sample size was fixed at 30 households from different economic classes. This study has the obvious limitation of being based on a small sample but the aim is to demonstrate a relationship of inputs to output and the study can be extended to include many more households.

For the purpose of our study we define our variables as follows:

1. Output means the total production (Y) of paddy and is taken as the dependent variable.
2. Labour means human labour ( $X_1$ ) in man-days per bigha engaged in farming from the period of land preparation upto deposition of crops and contributes an important independent variable.
3. Bullock Labour means total bullock labour ( $X_2$ ) in bullock days per bigha used during the whole year of farming and is considered as another important independent variable.
4. Capital means investment ( $X_3$ ) in rupees per bigha towards chemical fertilizers, seeds, irrigation, pesticides, etc. required to produce a stated amount of paddy.

We consider the production of paddy to be the function of these three variables and take the relationship

$$Y = f(X_1, X_2, X_3).$$

### Production Function for Paddy

The model used for the study is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + U.$$

Where,

$\beta_0, \beta_1, \beta_2$  and  $\beta_3$  are regression coefficients to be determined from the sample data

and U = disturbance term.

We use standard tests like t and F for testing the significance of the variables in our study.

## ANALYSIS OF THE STUDY

Looking at the data on production of paddy for the sample households, a high of 2.8 m. ton per bigha and a low of 0.84 m. ton per bigha are observed. The range of 1.96 m. ton per bigha along with an average of 1.787 m. ton per bigha for the sample households is noted.

Looking at the data of human labour for the sample households a high of 55 human labour in labour days per bigha and a low of 40 human labour in labour days per bigha are observed. The range of 15 human labour in labour days per bigha along with an average of 48 human labour days per bigha for the sample households is noted.

Similarly, the data of bullock labour, a high of 22 bullock labour in bullock labour days per bigha and a low of 15 bullock labour in bullock labour days per bigha are observed. The range of 7 bullock labour per bigha along with an average of 18 bullock labour in bullock labour days per bigha for the sample households is obtained.

Looking at the data of capital investment, for the sample households a high of 500 rupees per bigha and a low of 300 rupees per bigha are observed. The range of 200 rupees per bigha along with an average of 389 rupees per bigha for the sample households is noted.

We shall now employ regression analysis to establish the empirical relationships between output and the inputs based in the sample data. We estimate the model as follows:

$$\hat{Y} = - 4.113 + 10.79 X_1 + 5.9 X_2 - 0.097 X_3$$

$$\text{S.E. } (\beta_i) \quad (2.467) \quad (3.143) \quad (0.138)$$

$$R^2 = 0.7$$

$$t^x \quad (4.4) \quad (1.9) \quad (0.7)$$

We have also carried out a F-test for the significance of the regression coefficients.

Analysis of Variance

Source of Variation	S.S.	D.f.	M.S.S.	F.
Due to regression	(0.7)X (5.95)	3	1.3883	20.24
Due to residuals	(1-0.7) <sup>X</sup> (5.95)	26	0.0686	
Total	5.95	29		

We see that the regression coefficients are significant at 5 percent probability level. We shall interpret each regression coefficient below:

With regard to estimated coefficients, the coefficient of human labour was significant at 5 percent probability level and positive. This implies that greater labour inputs in terms of human labour generally have increased the output of paddy for the sample households.

In regard to the estimated coefficient of bullock labour, the coefficient was found to be significant at 10 percent probability level and positive.

It is interesting to note that capital investment has a negative impact on the production of paddy, which cannot be generally accepted. But if we look at the magnitude of the coefficient attached to this factor we found that it is virtually insignificant so that the cause might be attributed to a small sample size of the study.

So, the model brings out the fact that extra inputs in terms of human and bullock labours give rise to production of paddy.

#### FINDINGS AND RECOMMENDATIONS

We list below some findings and recommendations of the study:

1. The study points out significant relationship between the dependent and independent variables. The volume of paddy produced is thus related to the inputs used for its production.
2. The finding of this study is suggestive of the fact that more labour means more production. The present state of affairs in agricultural sector points out to the fact that the production of paddy may be made more labour intensive.
3. The capital investment is not significant for the reason that per bigha investment will be smaller for larger farm size holdings than for smaller farm size holdings. In our study, we have included a very small proportion of both farm sizes, thus leading to a very inconclusive state of affairs regarding this factor. Moreover, farmers in this region resort to more traditional practices of farming so that inputs in forms of pesticides, chemical fertilizers, etc. are minimal; one can improve on the situation by increasing farm sizes and employing modern farm techniques. This calls for a total departure from the present style of farming.

#### FOOTNOTES

1. Central Bureau of Statistics (1988), Statistical Pocket Book, Nepal (1988), C.B.S. HMG, Nepal.
2. National Planning Commission (1985), Programme for Fulfillment of Basic Need (1985-2000), HMG, National Planning Commission.