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Research Article

Impact of Agriculture on Economic Development of Nepal using Statistical Model

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I N F O

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A B S T R A C T

Nepal has many factors that influence economic development one of the factors in agriculture. The main objectives of this paper are to examine the status of the economic growth of Nepal and dependency on economic growth in Agriculture illustrating statistically.

The quantitative cum survey method is employed here to analyse the relationship between the economic growth of Nepal and Agriculture. The macro data used here are based on a secondary source. The data are taken from an economic survey published by the Ministry of Finance, Government of Nepal.

Statistical tools like regression analysis, correlations, the coefficient of multiple determinations and the adjusted coefficient of determination have been employed.

In Nepal, over the last fifteen years, poverty has remarkably come down despite lower economic growth meaning that reducing poverty would be much easier if the economic growth rate could be increased. Regarding economic growth contribution of the agriculture sector to GDP is gradually decreasing every year, while that of the non-agriculture sector increasing. The contribution of the agriculture sector to GDP is estimated to stand 27.7% and 72.3% respectively in the FY 2019/2020 while their contribution during FY 2018/2019 was 27.0% and 73.0% respectively.

Keywords: Statistical Model, Agriculture, Economic Growth, Economic Development, GDP

Introduction

In the study of agriculture, we do have agricultural science. The agricultural sector has been a major sector of the economy in terms of income employment and food security. Although the contribution of the agricultural sector to the GDP has been steadily declining over the years. It can be considered significant from the point of view of structural change of the economy. Economic policies need to focus on increasing the production and productivity of the overall agricultural sector by increasing the productivity of resources. (Torado & Smith, 2003) Increment of Gross Domestic Product (GDP) of the country perpetually sounds like economic growth. Low economic growth is a core obstacle to economic development. So these two variables are concomitant with one another. The term

economic development is used interchangeably with such terms as economic growth, economic welfare, economic progress and secular change. Economic growth is the steady process by which the productive capacity of the economy is increased over time to bring about rising levels of national output and income whereas development is the process of improving the quality of all human lives. Economic growth is measurable and objective. It prescribes expansion in the labour force, In the capital, in the volume of trade and consumption and economic development can be used to describe the underlying determinants of economic growth such as changes in techniques of production, social attitudes and institutions. Such changes may produce economic growth. It has been emphasized that capital accumulation, growth in population and hence labour force and technical progress are the three components of growth.

Objective of Study

The basic objective of this paper is to examine the status of the economic growth of Nepal and dependency on economic growth in agriculture illustrating statistically.

Methodology

Statistical principle component analysis is used here to analyse the data. The Pearson's correlation coefficient between the elements i & j is calculated as the linear correlation of the variables. Correlation measures the strength of the linear relationship between two variables. A correlation coefficient of 0 means that there is no linear association between two variables. A correlation 1(-1) means there is an exact positive (negative) linear association between the two variables. If we have series of n measurements of X and Y written as xi and yi where i = 1,2,...n then correlation coefficient can be used to estimate the correlation of X and Y. The Pearson coefficient is also known as the "simple correlation coefficient". It is especially important if X and Y both are normally distributed. The Pearson correlation coefficient is then the best estimate of the correlation X and Y the Pearson coefficient is written as

$$r_{xy} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{(n-1)s_x s_y}$$

Where $\bar{x}$ and $\bar{y}$ are the sample means of x_i and y_i . s_x and s_y are the sample standard deviation of x_i and y_i and sum is from i=1 to n As with the population correlation. We may rewrite this as;

$$r_{xy} = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n\sum x_i^2 - (\sum x_i)^2}\sqrt{n\sum y_i^2 - (\sum y_i)^2}}$$

The cause and effect relationship is indicated through regression analysis than by correlation. The term 'regression' literally means 'stepping back towards the average'. The report of heredity of Sir Francis Galton (1822-1911) describes a tendency of adult offspring having either short or taller parents to revert toward the average height of the general population.

The best estimate for the values of Y for any specified values of X:

Regression equation of Y on X is Y = a+bX

Where Y = Regressed or explained variable

X = Regression or predictor or explanatory variable

a = Intercept of line

b = Slope of the line

The values of the constants a and b can be determined by solving the normal equation

$$\sum Y = na + b\sum X$$

$$\sum XY = a\sum X + b\sum X^2$$

Table 1.Contribution of agriculture to total economic growth of Nepal

Fiscal Year	Agriculture	Total Economic Growth
2010/11	4.5	3.8
2011/12	4.6	4.6
2012/13	1.1	3.8
2013/14	4.5	5.7
2014/15	1.1	3.0
2015/16	0.2	0.2
2016/17	5.2	7.7
2017/18	2.8	6.3
2018/19	5.1	6.7
2019/20	2.6	2.3

Source: Author's Computation from Economic Survey (2010/11-2019/20) Data released by Ministry of Finance.

Agricultural Economic Growth

The involvement of the population in the agricultural sector is gradually declining due to the increasing use of technology and professionalism in agriculture and the expansion of the service sector. According to the Nepal labour force survey 2008, 73.9% of the population was engaged in the agriculture sector but in 2018 the proportion has decreased to 60.4%. The contribution of the agricultural sector in total Gross Domestic product is estimated to be 27.7% in the current fiscal year 2019/20 which was 37.1% in the FY 2010/11. The average annual growth rate of agriculture in the last decade was 3.2%. Product of agriculture sector was increased by 5.1% in the fiscal year 2018/19, whereas it is estimated to grow by 2.6% in the fiscal year 2019/20. The production of paddy has declined and the production of vegetables, meat and milk has been affected due to

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the measures taken for the prevention and control of the coronavirus and the disruption made in the supply system. Although the contribution of the agriculture sector to the GDP has been gradually declining the contribution of the agriculture sector to the economic growth has been fluctuating. The contribution of this sector to the economic growth was 21.2% in the fiscal year 2018/19 which is

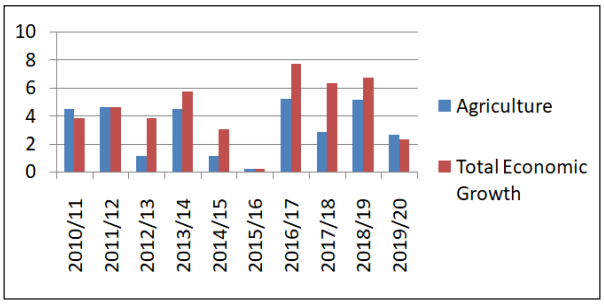

Figure 1.Comparative status of agricultural sector to the overall economic growth of Nepal

estimated to be 32.7% in the current fiscal year.

The comparative status of growth of agriculture sector to the overall economic growth of Nepal is presented in Figure.

Table 1, shows the contribution of agriculture to the total economic growth of Nepal for different years. Here the contribution of the agriculture sector's growth (X) is regarded as the independent variable and total economic growth (Y) as the dependent variable.

Under the computation one can find the;

Correlation coefficient (r)=0.7.

Thus, it is evident that the significant contribution of the agriculture sector in the total economic growth of Nepal. The computation of the regression coefficient and other statics were found as follows:

a = 1.6, b = 0.9

The regression lines on substitution of a and b one can get

Y = 1.6+0.9X

Result and Disscussion

The Y-intercept a = 1.6 tells us that when the agricultural growth is zero the expected change in the total growth is 1.6 i.e. the index predicted to increase by 1.6%. The slope b=0.9 represents that each increase in agricultural growth 1%, we predict that the expected change in the total growth is 0.9 i.e. the index is predicted to increase by 0.9% for each 1% increase in agricultural growth.

Conclusion

The simple ordinary least square test results and find that agriculture has a significant positive impact on both economic growth and development in Nepal. The study concludes that agriculture is the backbone for an economy without which the economy neither can be functioned nor can be survived, so it's necessary for a developing country to give importance to agriculture particularly in the initial stages of economic development. To attend a higher level of growth with the desired level of development, agriculture should be the main agenda of the policy to attend balanced economic growth with sustainable development in the economy.

Strategies

- There are major four ways to increase agriculture production, productivity and income of farmers. those are:
- Increase productivity of agriculture crops through the use of suitable technologies, inputs resource management options and market facilities
- Reduce the cost of production through the use of low-cost resource conservation technologies and practices
- Bring agriculturally suitable fallow land into agriculture production through increase irrigation facilities and soil improvement
- Improve agricultural production by increasing the cropping intensity in Terai and mid-hill valley

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