

## Research Article



# The Role of Agriculture in Poverty Alleviation: Empirical Evidence from Pakistan

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**Abstract** | One of the fundamental postulates of economic development in developing and emerging economies is the alleviation of poverty through agricultural led growth. Pakistan being an agrarian in nature is striving its best to fight against poverty, unemployment and unequal income distribution. Although, Agricultural growth is considered an important instrument for alleviation in poverty, but still its proper measurement is scarce in studies. To examine and analyze the nexus between agricultural growth and poverty in Pakistan, the present study has been organized. Data on key variables including agricultural growth and poverty head count ratio are taken from different authentic sources, such as: Pakistan Economic Survey (PES), International Financial Statistics (IFS) and World Development Indicators (WDI). Ordinary least square (OLS) method is used to estimate the model. Empirical results of the study reveal that agricultural growth and other important variables of the study such as cash crops, livestock, fisheries and forestry are significantly affecting poverty head count rate in Pakistan. Thus, long-run agriculture growth programme in line with overall economic development targets of the country needs to be planned on operational grounds with strict implementation mechanism. It will enhance the tempo of agricultural growth towards poverty alleviation which will ultimately increase the speed of economic development in Pakistan. Furthermore, sub sectors of agriculture may be properly analyzed to find the potential of these sectors for income generation activities which will provide a solution to the key economic issues in the country to meet the sustainable development targets of United Nations.

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## Introduction

In 1990's poverty alleviation emerged as a key instrument for development in underdeveloped economies. Donors from developed countries also prioritized agricultural development with poverty reduction. During 1990 to 2005 aid on agriculture sector fell by 45 percent and it was converted to do a research that how agriculture can directly reduce poverty (Islam, 2011). International Agricultural

Research Centers record shows that budget allocation was raised in 2000's which resulted that agriculture is promoting as a pathway for poverty alleviation (Derek, 2008). The market for agricultural research continued with imperatives that demonstrate effects on poverty and to compete for scarce research funding. Yet the bombast of poverty alleviation and diversified difference between agriculture environments and the varied structure of small-scale agriculture were emphasized. The role of agriculture to combat

poverty is hardly contextualized in terms of share of agriculture in household income, farm household and rural livelihood strategies. Conservatively, the benefits from innovative technology are measured in terms of income per hectare without the actual benefits to be received by individual household. Correspondingly, where agriculture share in total income is low, rise in agricultural productivity have a negligible impact on household total income. The best example in this case is the rice production in Uttar Pradesh, India where only one percent reduction in household income was observed as a result of yield loss from drought because rice accounted under ten percent in household total income (Cudjoe, 2010). So, benefits from new technology show a different picture from livelihood perspective.

The poverty paradox has a vital importance of the key role of agriculture in economic development. Moreover, it has led towards technological overconfidence and malnourished world. The food crisis anxiety had neglected agriculture sector. In this scenario agriculture sector face two special problems. The first in this case is strong dependence on natural environment which is biological in nature which result fluctuation in output from season to season and also on regional disparity among agricultural land and inputs used in production process. The later problem is the radical adjustments farmers are facing in the path of agricultural development which is economic in nature. During development phase of economy, the output continues to grow but the share of employment and GDP invariably decreases. Consequently, the absolute size of labor force in overall labor force decline in agriculture sector in later stages of development (Bezemer et al., 2008).

The nexus of poverty an agricultural investment presents a further challenge. Studies conducted on poverty alleviations and agricultural growth for economic development have done extensively (Adato et al., 2006). Nevertheless, various sources of agricultural led growth to poverty linkages and growth multipliers. In this case Cudjoe et al. (2010) found that national level poverty decreased through agricultural led growth by staple food crops. Differences exist in poverty rate between large scale plantation farmers and small-scale farmers (Barnett et al., 2008). While existing literature composed of agricultural led growth theories based on distributional approach. It also lacks the required specification of evidence-based

planning and does not reflect how to alleviate poverty through agriculturally based growth.

Poverty alleviation strategy can be achieved through pro-poor growth policies and transfers. Transfers are done through various social programmes planned for poor segment of the society and can be collected through public exchequer and foreign aid. This can be used most often to achieve quick poverty alleviation targets and dealing with emergencies; and to address marginal communities of the society who cannot generate income even they are struggling for employment opportunities. It has been found that autonomous income growth may not be a better substitute of relative ease of implementation for poor. It is politically very difficult to reduce poverty through redistribution of income, especially in case where it is a mass phenomenon. It is indeed very difficult to significantly reduce poverty for a longer period when poor are generating autonomous income. In this case the better option to alleviate poverty for working class is strategy of pro-poor growth (Dercon and Christiaensen, 2011).

How growth helps producers? This depends upon access to assets and the ability to generate income through these assets. In case of rural economy, it depends on rural non-form economy and the link to expand employment opportunities in better jobs. As witnessed from the study of green revolution in Asian economies showed that labor productivity was much lower than land productivity and it happened as a result of labors absorption capacity in agriculture sector and ultimately reduced poverty in these economies (Lipton et al., 1993). If agriculture sector is inadequate tradable, food production growth can raise real incomes and lower domestic prices of consumption goods for consumers. This will benefit landless rural workers, poor net-buyers among small holders and urban poor. Mostly small holders are benefiting from rise in food prices than a decline in prices. In case of India the impact of cereal yields growth to alleviate poverty was achieved through a decline in food prices in a context of non-tradability. However, conditions are changing. Food prices will become lower as a result of increasing agriculture tradability, productivity gains and through higher employment opportunities and wages. Growth is offering a multiple way for poverty alleviation. These ways mainly depend on agriculture, industry or service wise sector growth and in turn depend on the asset

distribution among producers and labor intensity in production process (Datt, 1997).

There is a substantial transformation in Agriculture sector in the last three decades. The rate of output has increased twice compared to earlier periods and it happened as a result of greater production capacity of food items in underdeveloped economies. Another reason for mass production of food items is unprecedented technical change throughout the globe. This underestimated achievement created the world food problem. Millions of people are still without enough food in underdeveloped countries. The massive increase in population growth has sharply decreased the associated rise in per capita income and benefits of food production (Solaymani and Kri, 2013).

Agriculture sector is not inimitable in most cases. Like other workers, farmers are also responding to incentives of various types. In buying foods, consumers are mostly influenced by price of a commodity, related price of goods, consumer purchasing power and tastes. The failure or success of agriculture also depends on those factors of demand which in turn affects economic activities in the economy. The pause in agriculture development occurs due to various factor; which include inadequate incentives, lack of investment, technology gap, climate, soil and inappropriate policies on government level. To utilize the public resources in its full capacity in agriculture sector, the agricultural policy must be designed ideally to address investment plans appropriately. This will lead to optimization of government investment plans in agriculture sector. In economies of agrarian nature, plans to develop agricultural oriented investment were not only helpful to show its extensive impact on food security and farming but also show contributions to job creation, poverty alleviation and economic growth. Moreover, it also replicates the objective and development process of industrialization and urbanization. A systems approach is adopted by agricultural policy makers in these countries that places farm level policies and investments with strategies and programmes with sectors. It also quantifies trade-offs and economy wide effects. This approach is in practice in Africa in particular, where African Union's Comprehensive African Agricultural Development Programme (CAADP) is commitment of many African governments to promote sector wide planning through national growth and poverty alleviation targets (Barrett, 2005).

Agriculture is the backbone of Pakistan's economy employing around 42 percent of labor force, contributing about 20 percent to GDP and provided raw materials to agro based industries. The rapid urbanization growth in the country resulted a massive demand for dairy products, meat, vegetables and fruits. The government is focusing to rise rural grower's yields through infrastructural development and other modern supply chains. In this case, (CPEC) China Pakistan Economic Corridor will enable the economy through value added product innovation and supply chain which will result agribusiness benefits (PES, 2017-18).

While measuring economy wide outcome using sector wide approaches is used in limited studies and technically challenging. Even though, there is a significant improvement in impact evaluation techniques but most of the small-scale pilot projects involved specific interventions. Evidences from multiple studies are consolidated by policy makers showing externalities from financing investment. The impact evaluation studies are mostly focus on agricultural food system as downstream trading and household level outcomes. Economy wide spillovers associated with agricultural investments are substantial (Taylor and Filipski, 2014).

Estrades and Terra (2012) studied the dynamics of agriculture for development and examined the impact of agriculture and non-agriculture growth on poverty reduction in 42 countries over the period 1978 to 2003. Ordinary least square estimates are used as estimation technique to show the impact of sector wise growth customer expenditures. Results show that agricultural oriented GDP growth have positively affected the spending pattern of poorest segment compared to other sectors of the economy. Poverty reduced at least three times higher as a result of agricultural led growth.

There is a serious debate on the dual economy traditional perspective that either agricultural or non-agricultural sector growth are vital for poverty alleviation in African economies (Collier and Goderis, 2012). This debate is based on extensive empirical literature that utilizes agricultural growth elasticities and poverty reduction with non-agriculture sector. These studies suggest that agricultural growth in developing countries have a strong multiplier effect on poverty alleviation compared to non-agricultural



led growth (Bezemer et al., 2008). The role of agriculture become more distinct over time focusing on agricultural policies prioritize large-scale or small-scale plantation farming (Naranpanawa and Bandara, 2012). Recent studies disaggregate agriculture to analyze the impacts of poverty reduction resulted by sub-sectoral growth. Decaluwe et al. (2009) found that food crops led to more poverty reduction compared to export-oriented crops in ten African economies. Collier and Goderis, 2012; Dercon and Christiaensen (2011) studied that investing in plantation farming and smallholder farmers reach to similar conclusion in agricultural growth.

The present study is an attempt to show some new dimensions of the capacity of agricultural growth with special focus on poverty alleviation. Primarily poverty alleviation ratio, labour and land productivity growth, GDP growth in agriculture sector vis-à-vis other sectors of the economy are examined. The market oriented small holder farming in particular has showed a mark growth in poverty reduction. The key connection between sectoral growth and public investment requires response to finalize the use of agricultural growth as a poverty alleviation strategy. This is one of the key areas of agricultural development and it depends on the policy circumstances where it applies. Studies shows that investing in agriculture sector is a valid strategy for poverty alleviation in underdeveloped countries. Various studies have used poverty rates, income of the poor as indicators outcome and sectoral value added and agricultural labour productivity as growth concepts. It resulted that agricultural growth lead to reduce poverty alleviation. Kakwani (1980) used time series data to estimate the connection between GDP growth, income of the poor and sectoral labour productivity. The resulted that a rise in agricultural labour productivity of labour increased overall GDP growth on average three time more than raising in income in underdeveloped economy. Dercon and Christiaensen (2011) used another approach to find the connection between poverty and agricultural growth. They used the impact of growth on poverty headcount rate instead of poorest income. They establish that GDP growth led by agriculture sector is almost three times more effective in decreasing headcount poverty rate in least developed African economies and about 2 times more in developed African economies compared to non-agricultural led growth. Lipton (1993) examined the impact of sector wise growth on head count

poverty by using time series data from 1985-2006 in china. Head count poverty is the percentage of total population living on less than USD 2 per day taking 2011 as base year for price calculation. They found that secondary and tertiary sectors have negligible impact on poverty alleviation, while primary sector shows greater impact of 3.5 times in poverty alleviation. Dorward (2012) used cross section data for 55 sample countries to estimate the link between unskilled labor in various sectors of the economy and poverty alleviation capacity growth. In this scenario, agricultural growth led to 3 times faster reduction in poverty rate compared to manufacturing and around 2 times than originating in construction sector.

## Materials and Methods

Various studies have been conducted to examine and analyze the effect of agricultural growth on poverty reduction. Wodon and Zaman (2010) found that high prices of agricultural products increases poverty in underdeveloped countries. Different studies have applied co-integration and causality approach to gauge the relation between poverty, food prices at household level and GDP growth Cudjoe et al. (2010). Oluoko-Odingo (2011) applied regression method to examine the relationship between sectoral growth and poverty alleviation. These studies employed GDP growth, Gini coefficient, Headcount poverty, household consumption and agricultural growth as variables. In countries with poor governance agricultural growth affects GDP growth with low intensity and vice versa in countries with good governance system.

This study will investigate the nexus of agricultural growth, crops, Livestock, Fisheries, Forestry growth and poverty in Pakistan between 1980-2017. The following regression model will be used to gauge the effects of agricultural growth, crops, Livestock, Fisheries, Forestry growth on poverty reduction in Pakistan, followed by the studies conducted by Estrades and Terra (2012) and Wodon (2010).

$$Y_t = b_0 + b_1 X_{1t} + b_2 X_{2t} + b_3 X_{3t} + b_4 X_{4t} + b_5 X_{5t} + e_t$$

Where;

$Y_t$  = Poverty headcount rate t (%);  $X_{1t}$  = Agricultural growth t (%);  $X_{2t}$  = Crops (%);  $X_{3t}$  = Livestock (%);  $X_{4t}$

= Fisheries (%);  $X_{5t}$  = Forestry (%); et = error term.

## Results and Discussion

This section explains the descriptive statistics and estimation of the model using ordinary least square method. Table 1 shows the standard deviation, minimum and maximum values of Agricultural growth, poverty, cash crops, livestock and fisheries.

**Table 1: Descriptive statistics.**

Variable	S.D	Minimum	Maximum
Agriculture Growth	0.345	0.3123	0.6574
Poverty	0.732	0.546	0.879
Cash Crops	0.212	0.167	0.348
livestock	0.543	0.411	0.490
Fisheries	0.782	0.405	0.924

Improved incentives in agriculture sector through replacing existing system of market liberalization by regional food self-sufficiency and household responsibility by collective farming have a significant impact on growth. The sectoral share of GDP during 1980-2017 were about 40 percent for agriculture and 60 percent for non-agriculture. Results show that at one percent change in agriculture sector contributes 0.39 percent change in overall growth, while 1 percent change in non-agriculture sector contributes 0.43 percent change in overall growth. Agriculture sector contributes 41 percent directly to growth and contributes about 59 percent indirectly to growth. The link between agriculture and poverty is showed in the last column. At one percent change in agriculture sector contributes 0.021 percent reduction in poverty, similarly non agriculture sector contributes 0.035 percent reduction in poverty. The direct contribution of agriculture sector to poverty is about 64 percent, while indirect contribution is 36 percent. Correspondingly, the contribution of non-agriculture sector to poverty is 69 percent direct and 31 percent is indirect.

This section reports the model estimation results. Table 3 depicts the Unit root test results proposed by Pesaran (2007) and Levin et al. (2002). For unit root test, the null hypothesis of unit root could be rejected at levels for all variables. Thus, the variables are stationary at levels. It is vital to give attention to the stationarity issue of variables to avoid the possibility of getting spurious results. Moreover, we followed Pedroni (1999) who examined cointegration relations among variables. This test is used under

the assumption of no co integration and normally accounts for independence and heterogeneity within samples Result shows in Table 3 that agricultural growth, poverty, cash crops, livestock, fisheries and forestry are stationary at levels and significant at 5 percent level of significance. Hence, we can apply OLS model.

**Table 2: Contribution of sectoral growth to aggregate growth and poverty reduction in Pakistan 1980-2017.**

Sectoral growth	Aggre-gate growth	Contribution to growth (%) direct indirect	Poverty reduction	Contribution to poverty (%) direct indirect
Agriculture (1 percent)	0.39	41 59	0.021	64 36
Non-Agriculture (1 percent)	0.43	80 20	0.035	69 31

**Table 3: Unit root test results.**

Variables	At levels	p value
Agriculture Growth	8.23	0.01
Poverty	4.54	0.01
Cash Crops	3.92	0.00
livestock	5.78	0.02
Fisheries	1.21	0.00
Forestry	2.03	0.00

**Table 4: OLS results of the effects of agricultural growth on poverty alleviation Dep: variable: Poverty headcount ratio.**

Variable	Coefficient	t-stat	p value
Intercept	0.2459	2.491	0.0021
Agri. growth	-0.3877	-3.3192	0.0018
Cash crops	-0.0012	-4.8620	0.0062
Livestock	-0.01563	-5.3912	0.0030
Fisheries	-0.02348	-3.2762	0.0021
Forestry	-0.1893	-4.3442	0.0044
R <sup>2</sup> = 0.83 Adjusted R <sup>2</sup> = 0.82 F-statistics = 6.29 Durbin Watson=2.13			

*R<sup>2</sup>: 0.83; Adjusted R<sup>2</sup>: 0.82; F-statistics: 6.29; Durbin Watson: 2.13.*

Results in Table 4 show the effects of agricultural growth and other important variables on poverty head count ratio in Pakistan. Since agricultural growth is one of the major means to alleviate poverty in under developed country and the same case with Pakistan in this study. Furthermore, agricultural growth is one

of the prominent sectors and play a significant role in poverty alleviation as indicated by  $t$  value = -3.3192. Similarly, cash crops is also significant and evident from both  $t$  value = -4.8620 and  $p$  value = 0.0062.

Livestock are among important sectors in reducing poverty in the country and it is significant showed by  $t$ -value = -5.3912. Besides, fisheries and forestry are also significant as indicated by  $p$  values of 0.0021 and 0.0044 respectively.  $R^2$  is the indicator of the overall significance of the model and it is clear indication that the overall model is a good fit suggested by  $R^2$  = 0.83.

## Conclusions and Recommendations

Since Agricultural growth is playing an extensive role in poverty alleviation in Pakistan as proved by our results. Other important sub sectors like cash crops, livestock, fisheries and forestry are significantly contributing in poverty reduction through employment generation, raise in output and reducing the income inequality gap in the country. The millennium development goals of UN in 2000 have risen targets for poverty alleviation around the globe. The contribution of agricultural growth in poverty reduction depend on direct and indirect growth effects and the overall size of the economy. Agriculture being one of the prominent sectors of the economy can reduce poverty if this sector is properly managed. Advancement in Agriculture sector over the period have contributed enough in reducing poverty, employment generation and minimizing the inequality gap in Pakistan. Empirical evidence from the study proved that development in Agriculture sector is providing more income to the marginalized section of the society and farmers with more income can spend prosperous life than before. The government of Pakistan needs to bridge the gap between the agriculture sector of Pakistan vis-à-vis developed countries. The input-output ratio in developed countries is far high than developing countries including Pakistan. The government needs to provide support to all sub sectors of agriculture in order to alleviate poverty in its true sense in line with the Sustainable Development Goals of international community.

## Novelty Statement

The present work is a comprehensive assessment of the

agriculture-poverty nexus in case of lagging economy and provide a well-presented addition to the literature in poverty alleviation through agriculture led growth.

## Author's Contributions

Umar Hayat supervised the overall research and wrote the manuscript. Shahid Ali estimated the model. Abdul Mateen and Hazrat Bilal prepared the literature review and gathered data.

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