Paradigms: A Research Journal of Commerce, Economics, and Social Sciences
Print ISSN 1996-2800, Online ISSN 2410-0854
2018, Vol. 12, No. 2 Page 132-138
DOI: 10.24312/paradigms120203

The Impact of Remittances on Agricultural Growth and Poverty Alleviation of Least Developed Countries

Afaf Mudassar[1], Abdul Waheed[2], Faisal Mustafa[3]

ABSTRACT

This study investigates the effect of remittances on agricultural growth and poverty alleviation in the least developed countries. For this purpose, panel data on least developed countries over the period 1970-2010, by using fixed effect model, has been analyzed. After using different sources, data of 41 least developed countries for the agricultural model and 16 least developed countries for poverty model have been extracted. It has been found that remittances are significantly related to the use of agricultural machinery, crop production index and agriculture value. The results indicate that an increase in remittances leads to a rise in agricultural growth in the least developed nations. Remittances are an effective source to enhance the size of the agriculture sector. The results also show that remittances have a significant negative effect on poverty in general but tend to decrease the poverty gap.

Keywords: Remittances; Agricultural Growth; Poverty; Panel Data; Least Developed Countries

INTRODUCTION

Lack of earning opportunities in the Least Developed Countries (LDCs) leads to giving rise to the emigration of both skilled and unskilled workers, to the areas where earning opportunities are perceived to be better. In LDCs, both internal and external migrations play an important role not only in earning but also in helping the process of development and poverty alleviation. Numerous LDCs have excessive human capital due to unchecked population growth. These labor-intensive countries are exporting labor to the developed industrial countries. Remittances earned by these migrants have a substantial share in uplifting the living standard and the economic growth of these LDCs. Remittances reduce poverty through increased incomes, allow for greater investment in physical assets and in education and health, and also enable access to a larger pool of knowledge Adams Jr (2011).

The remittances inflow around the world has sharply increased from $1.9 billion to $453.05 billion over the period of 1970-2010 (Canuto & Rafha, 2011). Remittances to emerging economies tend to rise from $416 billion in 2013 to $441 billion in 2015 (Ratha, Plaza, & Dervisevic, 2016), meaning that there is a 6.5% increase only in one year.

An increase in remittances through international migrants has created optimism about the potential growth benefits of these capital flows in migrant-sending countries, especially in rural farming societies where market failures are predominant.

Although the amount of remittances to developing regions varies from region to region, they all point to a substantial increase in quantity and importance of those monetary flows. For instance, the trend in Sub-Saharan Africa (SSA) grew from $34 billion in 2016 to $38 billion in 2017 and is expected to continue to grow in 2019. The largest remittance recipients in Sub-Saharan Africa in 2017 includes Nigeria ($22 billion), Senegal ($2.2 billion), Ghana ($2.2 billion), Kenya ($2.0 billion), Uganda ($1.4 billion), and Mali ($1.0 billion). These countries will likely remain the largest recipients in the region in 2018 and 2019. In South Asia, remittances inflated by 5.8% in 2017 after retardation of 6.1% in 2016. In India, after a sharp decline in 2016 (8.9%), the remittance rate increased rapidly to 9.9% in 2017 with total remittances of around $69 billion (as compared to $62.7 billion in 2016) (Ratha, De, Schuettler, Seshan, Yameogo, Plaza, Kim, 2018)

The rapid structural transformation from agricultural to industrial societies of the LCDs have not been able to reduce the primary importance of agriculture, which is still their mainstay, employing more than half of their workforce. This sector directly and/or indirectly provides income to a major portion of the population in LDCs, particularly in rural areas. Because of low-income returns and the high-interest rate on loans from institutional and non-institutional sources, farmers are not able to meet their agriculture expense. The scarcity of resources negatively influences the farmer to adopt new technology (Bogale & Hagedorn, 2003).

Agricultural growth can be enhanced by the accessibility of credit and financing facilities through foreign remittances which can make poor households in rural areas eligible to use new technologies. Remittances can help farmers by providing funds for payment of crops seeds, fertilizers, and other immediate seasonal needs.

Mass poverty is widely recognized as the most pressing problem in developing countries. Recent natural calamities and increase in food prices at the global level may add to the miseries of people living in poverty and minimize the potential and expected gains of poverty reduction efforts made during the last two decades. The average population in these countries operates in a vacuum of physical, social and economic infrastructure.

In most of the LDCs, the role of the state in social development is decreasing and there is more emphasis on privatization of services, resulting in further marginalization and vulnerability of the poor. In the given situation, remittances can be an effective tool to reduce poverty and improve the

[1] UCP Business School, University of Central Punjab, Lahore,
[2] UCP Business School, University of Central Punjab, Lahore
[3] UCP Business School, University of Central Punjab, Lahore

living standard of households in LDCs. The above-mentioned arguments emphasize the need to conduct studies investigating scientifically the role of remittances on agricultural growth and poverty reduction in LDCs. This paper is an attempt to fill this gap.

It is very hard to differentiate between developed and least developed countries and many definitions and parameters are available to make this distinction. As defined by United Nations (and this study also follows this definition for choosing countries for the analysis), a Least Develop Country is a country that has low performing indicators on the socioeconomic development front in comparison with developed countries in the world. As described by the Economic and Social Council of the United Nations, a Least Develop Country is marked by the following characteristics:
If the country has less than $1,035 average GNI in the last three years, she would be considered a least developed country. The country must jump to $1,242 to be excluded from this group.

If the country has low indicators on nutrition, food, basic health facilities, education, adult and vocational education. If the country is fiscally unstable: it has low agricultural production, less share of exports in GDP, gives less importance to economic activities than traditional, and proportion of the population that has been displaced by natural calamities.

The main purpose of this study is to examine empirically the link between remittances flows and agricultural growth of least developed countries (the complete list is given in the appendix), and the effect of remittances on poverty alleviation of these countries. To answer these potential problems, we design the following questions:

- What is the effect of remittances on the enhancement of agricultural growth in the least developed countries?
- What is the effect of remittances on poverty alleviation in the least developed countries?

This study has several contributions. It contributes to the academic literature concerning the determinants of growth of a country, especially the developing one. Most of the least developed economies are agriculture-focused and have a poor lifestyle. Their economies are not able to generate a handsome amount of jobs within the country. Therefore, people of these countries migrate to other developed nations and their remittances can be one of the main sources of these developing countries growth.

The results of this study can be helpful for policymakers to understand the importance of remittances for economic growth of these countries. The decision makers can be benefitted by this study to have more precise and focused decisions regarding their migration policies and their ways to channelize remittances more effectively. The results reveal that remittances have a positive influence on agriculture value and crop production index, implying that rural household invests remittances on livestock and land. However, remittances have a significant, negative impact on agricultural machinery. The analysis also shows that remittances benefit the household and decrease the level and depth of poverty.

LITERATURE REVIEW

A vast stream of literature exists explaining the influence of remittances on growth and poverty reduction in developing countries. Results of the studies vary from country to country. One stream of literature suggests that remittances inflow smooth out consumption patterns and minimizes poverty by uplifting the households at the micro level.

Remittances and Agricultural Growth

Remittances have micro and macro-economic effects; although the major amount of remittances is used for personal consumption, there are still certain sectors getting advantage from remittances. We can find large literature determining the effect of remittances on growth in different regions. For instance, Mochebelele and Nelson (2000) evaluated the impact of labor migration on the agriculture sector in Lesotho. They found that labor migration has a positive impact on the agriculture sector, agricultural productivity increased by the availability of income from migrant workers. Rozelle, Taylor, and DeBrauw (1999) explored the migration and remittances effect on agricultural productivity in northeast China and concluded that the net impact of migration and remittances is negative. Böhme (2015) used a panel data set from rural Mexico to explore the influence of remittances on agriculture and livestock investments. The empirical results showed that migration has a significant and positive effect on the accumulated rural assets, but not on livestock capital. Qin and Liao (2016) evaluated the link between migration, agricultural transformation and regional development in general by focusing on twenty case studies from rural China. They realized in the regions where economic development is lower agricultural production declines with high migration, whereas in financially sound regions migration and agricultural production appear to be completely connected. Thus, whether remittances are utilized for agricultural modernization and better production rests on the context and, most importantly, on household-peculiar characteristics.

The empirical findings of Molua (2009) showed that remittances contribute positively to farm profits; it was also found that remittances help to uplift the wellbeing in countryside Cameron. Mendola (2008) has described that due to the migration, the adoption of high yielding varieties of crop firstly increased in Bangladesh, but then temporary and internal migration has decreasing impacts on adoption, which was probably because of lost labor.

Tshikala, Kostandini, and Fonsah (2018) investigated the effect of migration, remittances, and government intervenes on the selection of better seeds in rural Kenya. Using 2SLS regression and 3SLS regression on the data from the World Bank, the analysis demonstrated that both migration and remittances influence the selection of enhanced seeds.

Remittances and Poverty

Olowa, Awoyemi, a Shittu, and Olowa (2013) surveyed the impact of domestic remittances and foreign remittances on poverty in rural. Results disclosed that both forms of remittances decrease the level and share of poverty in rural Nigeria. Serino and Kim (2011) studied the effect of

remittances on poverty in developing nations. They analyzed panel data of 66 developing economies over the time period 1981 to 2005 and found a significantly negative association between remittances and poverty. The results of Adams Jr and Page (2005) showed that both migration and remittances significantly lessen the level, complexity, and cruelty of poverty in the developing countries. Jongwanich (2007) examined the effect of remittances on growth and poverty reduction in developing Asia-Pacific countries. The result showed that remittances have a significant impact on poverty reduction through increasing income, smoothing consumption, but has only a minor impact on growth through internal investment and human capital expansion. Du, Park, and Wang (2005) studied two household datasets from China's poor areas to examine the impact of migration on rural poverty. The findings indicated that migration increased the per capita income of the household, but the overall effect on poverty remained modest because most of the people do not migrate.

Giannetti, Federici, and Raitano (2009) observed the role of remitted inflows on poverty reduction and income inequality Slovenia, Poland, the Czech Republic, and Hungary. The empirical analysis showed that remittances play a positive role in reducing poverty, but the effect of remittances on welfare varied across the countries. Viet (2008) investigated the impact of external remittances on the welfare of household, poverty and income inequality in Vietnam with Vietnam Household Living Standard Survey. He observed that remittances reduce poverty by increasing the income of residents, but remittances increase income inequality to a certain level.

Control Variables

People also examined the relationship between other macroeconomic determinants and growth and poverty. Makki and Somwaru (2004) analyzed the affiliation among FDI, trade and per capita GDP growth in developing nations in the "endogenous growth-theory framework". They examined the data from sixty-six emerging countries over the last three decades. Results suggested that FDI, trade and domestic investment are vital sources to enhance the GDP growth.

Christopher (2012) investigated the effect of foreign direct investment (FDI) on economic growth in Nigeria. They found that there is an optimistic relationship between FDI and GDP. It is also revealed by the results that foreign direct investment, government tax revenue, and savings have a positive but not substantial impact on GDP, excluding savings. Portes (2009) used a panel of 46 countries that covers the period between 1970 and 2000 and examined the effects of remittances on inequality. The results displayed that remittances are a helpful force to reduce income inequality by increasing the income of poor households.

Model Specification

To discover the effect of remitted funds on agricultural growth and poverty alleviation in LDCs, two separate models are specified.

Remittances and Agricultural Growth

This study uses a modified version of the models employed by Gonzalez-Velosa (2011) and Brownson, Vincent, Emmanuel, and Etim (2012), although they used different proxies to measure agricultural growth. The model in this study is enriched by including control variables and is defined as:

$$lnAG_{it} = \beta_0 + \beta_1 lnREM_{it} + \beta_2 lnINV_{it} + \beta_3 lnINF_{it} + \beta_4 lnFDI_{it} + \beta_5 lnAID_{it} + \varepsilon_{it} \quad (1)$$

AG_{it} is a dependent variable which is a proxy for agriculture growth of *ith* country at the time. Some new agriculture proxies (in logarithmic form) are used to measure agriculture growth. The measures used for the dependent variables are agriculture value, agricultural machinery, and crop production index.

The rem_{it} is the total amount of remittances as a share of the gross domestic product. INV_{it} represents an investment which is measured as gross capital formation. The annual percent change in the GDP deflator is used to measure the inflation INF_{it}. FDI_{it} represents a foreign direct investment. AID_{it} represents foreign aid which is the sum of official development assistance and ε_{it} is the error term.

Remittances and Poverty

To analyze the relationship between remittances and poverty, this study applies the model of Adams Jr and Page (2005), Anyanwu and Erhijakpor (2010) and Louise and Clovis (2012) with some modifications. To enrich the analysis, the model is augmented by adding controls and is defined as:

$$P_{it} = \beta_0 + \beta_1 lnREM_{it} + \beta_2 (Gini)_{it} + \beta_3 INF_{it} + \beta_4 AID_{it} + \beta_5 ANI_{it} + \varepsilon_{it} \quad (2)$$

P_{it} is a measure of poverty in country *i* at time *t*. Poverty indices are used to observe the influence of remittances on poverty reduction in the least developed countries. The proxies used as the explained variable are "headcount ratio at poverty line" and "poverty gap at the poverty line". We use these measures to represent the level and depth of poverty. Gini index is a measure of income inequality fluctuating from 0 to 1. The higher the ratio, the greater the degree of inequality.

Therefore, the Gini coefficient limits 0 for perfect equality and 1 perfect inequality. ANI_{it} represents the adjusted net national income (annual % growth). Other variables are as defined earlier.

Explanation of Variables

Agricultural growth

Agricultural growth is the dependent variable which is measured by agriculture value, agricultural machinery, and crop production index. World Bank defines these measures (and this study also follows these definitions) as:

Agriculture value is measured in terms of % of GDP includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding all outputs and subtracting intermediate inputs. *Agricultural machinery* refers to the number of wheel and crawler tractors (excluding garden tractors) used in agriculture". *Crop production index* shows agricultural production for each year relative to the base period 2004-2006. It includes all crops except fodder crops.

Poverty

In the second model, poverty is the dependent variable and is measured by the headcount ratio and poverty gap. World Bank

describes these proxies (and this study also follows these definitions) as:

Poverty headcount ratio at $1.25 a day (PPP) (% of the population**)** is the percentage of the population living on less than $1.25 a day at 2005 international prices. Poverty gap at $1.25 a day (PPP) (% of the population) is the mean shortfall from the poverty line as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.

Independent Variable

Remittances are the main independent variable. The remittances basically involve the transfers made by those migrants who reside and work in a country other than their homeland, the compensation earned by those non-resident workers who perform work for residents of other countries and those financial transfers which sometimes take place due to the change of migrant's residence from one country to another.

Remittances are measured as the personal remittances received by the respective country as *% of her GDP*.

Control Variables

To enrich the models, some control variables are also used. These variables are inflation, investment, foreign direct investment, adjusted net income, Gini coefficient, and foreign aid. The domestic investment level varies from country to country, so we control the investment variable in this study as this could distort the relationship of remittances with agricultural growth and poverty. Inflation can also have a substantial effect on poverty and agricultural growth of a country. Easterly & Fischer (2001) explored the impact of inflation on poverty. They concluded that inflation has an adverse effect on poverty; high inflation tends to decrease the worth of household wages and increase the poverty level.

A rise in inflation tends to have an undesirable impact on agricultural growth and poverty reduction. Therefore, this effect needs to be controlled. We account for this by using the inflation ratio that represents the annual percentage of GDP. Adjusted net national income (annual % growth) is also controlled in this study. In addition, some variables that capture the effect of the external source of capital are included. Foreign direct investment, which is related to inflows of foreign funds, is controlled, as this might distort our relationship between remittances, agricultural growth, and poverty. The effect of foreign aid inflows is also accounted for, which consist of official aid plus official development assistance as a percentage of GDP.

Panel Data Analysis as a Statistical Method

We employ yearly unbalanced panel data for the period 1970-2010. The rich data on yearly bases gives the luxury to observe all seasonal effects on the economy of LDCs during the business cycle. A panel data set contains repeated observations made on the selected units (individuals, households, firms) over a number of periods. Panel data record behaviors of entities observed across time. These entities might be states, companies, individuals, countries. Panel data technique is useful because it helps to identify certain parameters or questions, without making limited assumptions. Panel data sets are generally greater than time series and cross-section data sets, and explanatory variables differ over two aspects (individuals and time) rather than one. Calculations based on panel data are often more reliable than time series and cross-section. A large quantity of data points increases the degrees of freedom and improves the competency of outcomes

Data and Summary Statistics

To observe the relationship of remittances with agricultural growth and poverty, we extract secondary data of 41 least developed countries for the agricultural model and 16 least developed countries for poverty model over the period 1970-2010, by using different sources. Since data for the complete time period are not available for all countries, only those countries for which at least four years of data are available are included, for both models.

For the data on agriculture growth and poverty measures, World Bank annual development indicators are used. The data on remittances is also collected from the World Bank. Gini index and data on some macro-economic variables (inflation, investment, foreign direct investment, adjusted net national income, and foreign aid) is also collected from the World Bank annual development indicators.

Table 1 shows the variable description and summary statistics for the agricultural growth model based upon 41 countries, and Table 2 demonstrates the summary statistics for poverty model which includes 16 countries.

As shown in Table 1, on average 2028.65 tractors are used in the land area, while the standard deviation is 3715.78, indicating that tractor usage is more in some countries and less in others. The mean of agriculture value is 36.55 percent and the standard deviation is 14.75 percent. The average crop production index is 73.82 with a standard deviation of 27.12. We find that 6.39 percent (of GDP) remittances were received on average, and its standard deviation is 13.56 percent. The central ratio of inflation is 14.97 percent, but the variation is 104.18 percent. Variation in inflation is quite large; this can be due to the high instability in the economies of least developed countries. Overall economies of the world are highly affected by the international financial crisis, hence inflation rises rapidly and deviation from mean also shows this impact. The mean value of "foreign direct investment" is 2.98 percent and standard variation is 8.99 percent. The rural areas of least developed countries are receiving 299.88 million of foreign aid and the standard deviation is expressed as 427.3 million. The mean of gross capital formation is 20.13 percent which indicates the average ratio of investment, and its respective variation is
18.7 percent.

Table 1: *Summary Statistics of Poverty Variables*

Variables	N	Mean	S.D.
Headcount ratio	77	55.68	16.86
Poverty gap ratio	77	23.12	12.19
Remittances	428	8.04	18.00
Gini index	74	41.26	7.87
GDP Deflator	574	10.32	18.40
Foreign Aid (current US$ mil)	656	403.77	470.53
Adjusted net income (annual % growth)	371	3.67	7.38

Note: We have converted Foreign aid (official assistance) current US$ in million.

Table 2 shows the summary statistics for poverty measures. Recall that, the results of this table are based upon the 16 countries. The results show that the average of headcount ratio, an indicator of the normal level of poverty, is 55.68 percent, suggesting that most of the households are living below the poverty line. The standard deviation is 16.86 percent. Average value of poverty gap is 23.12 percent, while its deviation from mean is 12.19 percent. It is shown by results that mean value of remittances received by the least developed countries is 8.04, and its standard variation is 18.00. The mean value of income inequality prevailing among least developed countries is 41.26 percent which means that income is not equally distributed in the least developed countries, and its dispersion from mean is 7.87 percent.

Table 2: *Summary Statistics of Agriculture Variables*

Variables	N	Mean	S.D.
Agricultural Machinery	868	2028.65	3715.78
Crop production Index	1669	73.82	27.12
Agriculture value (% of GDP)	1259	36.55	14.75
Remittances	897	6.39	13.56
GDP Deflator	1368	14.97	104.18
Foreign direct investment (% of GDP)	1281	2.98	8.99
Foreign Aid (current US$ mil)	1681	299.88	427.3
Gross capital formation (% of GDP)	1250	20.13	11.85

Note: We have converted Foreign aid (official assistance current US$ in million).

Empirical Analysis

In this section, we will discuss empirical evidence on the effect of remittances on agricultural growth and poverty alleviation. As panel data is used, it is very hard to decide whether one should use a fixed effect or random effect model. The Hausman test is applied to decide the model. In the case of agricultural value, the test suggests applying random effect at 13% significance level, and the results for all other agricultural growth-related variables cannot be found. For the poverty model, the Hausman test suggests applying a fixed effect. For the above-mentioned reasons, and because the sample of countries is not drawn from a large pool of countries, we prefer to apply a fixed effect model.

RESULTS

Agricultural Growth

The results of the analysis, based on the fixed effect model, of the effect of remittances on agricultural growth are reported in Table 3. Note that, throughout the table, remittances have a significant relationship with agricultural growth.

More specifically, the effect of remittances on agricultural machinery and its value is statistically significant. It is expected that investment might be collinear with remittances. We empirically analyzed this and did not find any collinearity between these two variables.

Table 3: *Fixed Effect Model Estimates of the Effect of Remittances on Agricultural Growth*

Variables	Agricultural Machinery	Agriculture Value	Crop production index
	Fixed Effect	*Fixed Effect*	*Fixed Effect*
Remittances	-0.099*	0.020*	0.017***
	(0.023)	(0.007)	(0.010)
Inflation	-0.047**	0.010	-0.057 *
	(0.021)	(0.007)	(0.010)
Foreign direct investment	0.022	-0.026*	0.047*
	(0.013)	(0.005)	(0.007)
Foreign aid	0.236*	-0.072*	0.212*
	(0.041)	(0.015)	(0.019)
Investment	-0.029	-0.020	0.014
	(0.072)	(0.025)	(0.034)
Constant	5.109**	3.835*	3.204*
	(0.313)	(0.102)	(0.135)
R^2	0.14	0.12	0.35
F	10.39	15.61	63.31

Note: All variables expressed in log. * Significant at 1%, ** significant at 5% *** significant at 10%

When agricultural growth is measured by agricultural machinery, the analysis finds that remittances have a significant, negative effect on machinery, implying that farmers' invest remittances more in their immediate consumption than in advancement of technology such as tractors, threshers etc. In rural areas, farmers deem to give less consideration to the advancement of machinery because of the high cost involved, especially in case of its import from the developed world. Another reason might be renting the agricultural machinery at the start of sowing and harvesting season that entails less or bearable expenses. They can benefit from the use of machinery without actually buying it, which remains idle or useless between the sowing and harvesting season. Farmers tend to invest more in insecticides and crop fertilizers to get the maximum crop or land output. Maintenance and repairing costs of this machinery is also a problem and hindrance to buying such machinery

As expected, foreign aid has a positive impact on agricultural machinery, implying that most of the portion of foreign aid is spent on agricultural machinery. Inflation has a negative but significant impact on agricultural machinery; due to inflation the prices of machinery rise, it affects the farmers' purchasing power. This explains the negative impact of inflation. Foreign direct investment and investment have an insignificant impact on agricultural machinery.

When the dependent variable is agriculture value, the effect of remittances is positive and statistically significant. This indicates that most rural households invest more remittances in the land, farm area, and livestock in order to enhance their agricultural production. They invest in forest and farm tree which supply important support materials to crop production such as raw material, harvest, and ready cash in case of selling them into the local market. The household spends more money to raise their livestock that provides meat, dairy products, fiber, which is helpful to increase agricultural productivity.

Considering control variables, the results indicate that foreign direct investment and foreign aid are negatively related to agriculture value. The reason for the negative impact might be the flow of foreign reserve into industry sector in the least developed countries, and the agriculture sector is somewhat ignored. The effect of inflation on agriculture value appears to be insignificant. The likely justification of this insignificant relationship is that inflation does not affect the prices of some agricultural related commodities and products due to their

fewer price elasticities. Investment has also an insignificant impact on agriculture value.

Estimates of crop production index suggest that remittances have a significant and positive effect on crop production index. The finding indicates that remittances help farmers to expand their land area, and increase the frequency of production of different crops. They adopt proper irrigation methods to ensure minimum wastage of crops and water. It is also suggested that households spend their remittances on quality seed and fertilizers. By increasing yield growth such as wheat yields they can increase their agriculture growth.

Inflation has a significant but negative impact on crop production index. On the other hand, foreign direct investment and foreign aid show a positive and significant relation with crop production index. The results indicate that a large portion of these foreign reserves is invested in the land, seeds and irrigation process in order to increase the production of crops. Investment does not have an effect on crop production index.

Poverty

This section, of the paper, discusses the results of the analysis of the relationship between remittances and poverty. The results of this analysis, based on the fixed effect model, are reported in Table 4. Note that, contrary to the analysis of the agricultural model, in this model, we do not use variables in logarithmic form except remittances. The results discover that remittances have a substantial impact on each measure of poverty.

For the poverty gap, the coefficient of remittances is negative and statistically significant. The results indicate that remittances decrease the depth of poverty. Since the poverty depth measures the distance of the poor persons from the poverty line, it can be interpreted that an increase in the ratio of remittances leads to decrease in the gap of the poor from the poverty line.

Table 4: *Fixed Effect Model Estimates of the Effects of Remittances on Poverty*

Variables	**Headcount ratio**	**Poverty gap**
	Fixed Effect	*Fixed Effect*
Remittances	-2.448***	-2.381***
	(1.395)	(1.387)
Gini Index	0.994*	1.015 *
	(0.345)	(0.335)
Inflation	0.494**	0.576**
	(0.244)	(0.235)
Foreign aid	-0.015*	-0.009**
	(0.004)	(0.003)
Adjusted net income	-0.099	0.145
	(0.349)	(0.334)
Constant	19.479	-18.123
	(15.320)	(15.068)
R^2	0.65	0.61
F	9.45	7.65

Note: *significant at 1%, **significant at 5%, ***significant at 10%

When the dependent variable is headcount ratio, the results for remittances are again significant and negative. The results indicate that remittances benefit the poor household and decrease the level and share of poverty in the least developed countries.

Gini index has a positive and significant impact on both poverty measures which indicates that higher inequality is related to higher poverty. Quite intuitively, if income is not distributed on an equal basis among people, it will raise the level and depth of poverty. Inflation is positively and significantly related to poverty. As inflation rises, it reduces the purchasing power of households, implying that high inflation tends to decrease wages of households and increase the poverty level. Adjusted net income is insignificantly related to the poverty measure. Foreign aid has a significant and negative impact on poverty.

CONCLUSION

Remittances play a vital role in promoting living standard in LDCs. The empirical studies investigated the relationship between remittances and important components of the standard of living are desperately needed for evidence-based policymaking. This study investigates the effect of remittances on agricultural growth and poverty in the least developed nations by using different proxies for agricultural performance and poverty.

The analysis reveals that remittances exert a positive and significant influence on agriculture value. The findings of this study indicate that remittances increase the agriculture value and in result rural community invests more in livestock and acquiring more agriculture land for more social, monetary and value addition. Remittances also influence the crop production index positively and significantly. That indicates that rural people use better quality seeds and modern irrigation methods to enhance the production of their land. Remittances have a significant but adverse impact on agricultural machinery.

The likely explanation is that, in the case of LDCs, people prefer to invest in their household needs rather than modern machinery which is used seasonally. This might be a major reason for this negative impact in addition to availability, affordability, and price of this machinery.

Remittances have a negative and significant effect on the headcount ratio and poverty gap. The results indicate that remittances help in decreasing the volume of poverty in the least developed countries by the uplifting of social and human development indicators.

This paper presents that remittances lead to an increase in the size of the agricultural sector. Remittances seem to transform productive practices of the agriculture sector in the least developed countries. This might contribute to overall development in the society. Remittances contribute to reducing poverty as revealed by the positive relationship of remittances on poverty alleviation. According to the analysis, remittances can serve as an important force in stabilizing and eliminating the level of poverty and help to increase the standard of living of households in the least developed countries.

REFERENCES

Adams Jr, R. H. (2011). Evaluating the economic impact of international remittances on developing countries using household surveys: A literature review. Journal of Development Studies, 47(6), 809-828.

Adams Jr, R. H., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? World Development, 33(10), 1645-1669.

Anyanwu, J. C., & Erhijakpor, A. E. (2010). Do international remittances affect poverty in Africa? African Development Review, 22(1), 51-91.

Bogale, A., & Hagedorn, K. (2003). Poverty profile and livelihood diversification in Rural Ethiopia: Implications to poverty reduction. Paper presented at the 1st international conference on the Ethiopian economy.

Böhme, M. H. (2015). Does migration raise agricultural investment? An empirical analysis for rural Mexico. Agricultural Economics, 46(2), 211-225.

Brownson, S., Vincent, I.-m., Emmanuel, G., & Etim, D. (2012). Agricultural productivity and macro-economic variable fluctuation in Nigeria. International Journal of Economics and Finance, 4(8), 114-125.

Canuto, O., & Rafha, D. (2011). Migration and remittances. Factbook 2011. In: Washington, DC: World Bank.

Christopher, A. J. (2012). Impact of foreign direct investment on economic growth in Nigeria. Interdisciplinary Journal of Contemporary Research in Business, 4(5), 64-79.

Du, Y., Park, A., & Wang, S. (2005). Migration and rural poverty in China. Journal of Comparative Economics, 33(4), 688-709.

Easterly, W., & Fischer, S. (2001). Inflation and the Poor. Journal of Money, Credit and Banking, 33(2),160-178.

Giannetti, M., Federici, D., & Raitano, M. (2009). Migrant remittances and inequality in Central-Eastern Europe. International Review of Applied Economics, 23(3), 289-307.

Gonzalez-Velosa, C. (2011). The effects of emigration and remittances on agriculture: Evidence from the Philippines. Job market paper, 129.

Jongwanich, J. (2007). Workers' remittances, economic growth, and poverty in developing Asia and the Pacific countries: United Nations Publications.

Louise, T. D., & Clovis, M. W. (2012). Workers' remittances and economic development in Sub-Saharan African countries. International Research Journal of Finance and Economics, 88, 25-38.

Makki, S. S., & Somwaru, A. (2004). Impact of foreign direct investment and trade on economic growth: Evidence from developing countries. American Journal of Agricultural Economics, 86(3), 795-801.

Mendola, M. (2008). Migration and technological change in rural households: Complements or substitutes? Journal of Development Economics, 85(1-2), 150-175.

Mochebelele, M. T., & Winter-Nelson, A. (2000). Migrant labor and farm technical efficiency in Lesotho. World Development, 28(1), 143-153.

Molua, E. L. (2009). Migrant remittance and farm production decisions in Cameroon. Journal of Applied Sciences Research, 5(10), 1668-1675.

Olowa, O. W., Awoyemi, T. T., a Shittu, M. A., & Olowa, O. A. (2013). Effects of remittances on poverty among rural households in Nigeria. European Journal of Sustainable Development, 2(4), 263-284.

Portes, L. S. V. (2009). Remittances, poverty, and inequality. Journal of Economic Development, 34(1), 127-140.

Qin, H., & Liao, T. F. (2016). Labor out-migration and agricultural change in rural China: A systematic review and meta-analysis. Journal of Rural Studies, 47, 533-541.

Ratha, D., De, S., Plaza, S., Schuettler, K., Shaw, W., Wyss, H., & Yi, S. (2016). Migration and remittances: Recent developments and outlook. Migration and Development Brief, 26, 4-6.

Ratha, D., Plaza, S. & Dervisevic, E. (2016). Migration and Remittances Factbook 2016. World Bank Publications.

Rozelle, S., Taylor, J. E., & DeBrauw, A. (1999). Migration, remittances, and agricultural productivity in China. American Economic Review, 89(2), 287-291.

Serino, M. N. V., & Kim, D. (2011). How do international remittances affect poverty in developing countries? A quantile regression analysis. Journal of Economic Development, 36(4), 17-40.

Tshikala, S. K., Kostandini, G., & Fonsah, E. G. (2018). The Impact of Migration, Remittances and Public Transfers on Technology Adoption: The Case of Cereal Producers in Rural Kenya. Journal of Agricultural Economics.

Viet, N. (2008). "Do Foreign Remittances Matter to Poverty and Inequality? Evidence from Vietnam. Economics Bulletin, 15(1), 1-11.